

Program Planning and Evaluation for the Treatment of Women with Gestational Diabetes
(GDM) in Rural Northwest Washington

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Abstract

Gestational diabetes (GDM) is the most common metabolic disorder in pregnancy. The CDC estimates that up to ten percent of women in the United States experiences GDM. This health concern can be managed by both lifestyle changes and medications when needed. GDM can have serious health implications for both mother and baby. If not treated adequately, babies can be born nine pounds or more, which can result in injury to baby during delivery or increase the mother's chances of cesarean birth with longer recovery time. Additionally, GDM increases chances of type two diabetes, a growing chronic disease, in both baby and the mother.

Due to the rural nature of Fidalgo Island, there is limited access to diabetes specialty care, such as an endocrinologist in this area, leaving most of the diabetes management to the diabetes educator and family care provider or obstetrician (OB). The current Island Health (IH) GDM program has room for improvement. Currently, there are no official protocols for when or how to initiate medication management in these patients. Additionally, there are no classes before, during or after pregnancy specific to gestational diabetes management or prevention. Also, there is limited participant qualitative information gathered in the GDM program. Moreover, prior to this project there have not been any questionnaires, satisfaction surveys, focus groups, or process evaluations implemented to assess the program.

After implementing a GDM program focus group, findings dictated clear recommendations for the program. The focus group indicated the need for more support and education prior to and after the current GDM program. Moreover, the focus group indicated the need for additional breastfeeding resources and support in completing postpartum oral glucose tolerance tests (OGTT). Though the focus group was small, findings were critical in implementing program changes to benefit the IH GDM program.

Introduction to Gestational Diabetes

The first documented case of Gestational diabetes (GDM) is in the early 1800s by Dr. Heinrich Bennewitz in Berlin, Germany. Dr. Bennewitz was treating 22-year-old Fredrica Pape in her fifth pregnancy. It is noted that her first three pregnancies were unremarkable, but her fourth pregnancy was notable for increased thirst and frequent urination, which had resolved postpartum. These symptoms returned at an undocumented time in her fifth pregnancy. It was noted that her urine greatly exceeded the volume of fluids consumed, and her urine looked cloudy and stale-smelling (Lane, 2020). From 32 to 36 weeks gestation, Pape had a sore throat and a significantly distended abdominal area, so much so that the possibility of twins was considered; however, she was not pregnant with twins (Hadden, 1998). Instead, she was suffering from GDM, and her baby was large for gestational age. Unfortunately, the 12-pound infant perished during childbirth.

GDM is a type of diabetes that only occurs during pregnancy. Symptoms include excessive thirst, frequent urination, and fatigue. GDM is the most common metabolic disorder in pregnancy. In fact, the Centers for Disease Control and Prevention (CDC) estimates that between two and ten percent of women in the United States experience GDM each year. GDM occurs when the beta cells of the pancreas are not able to make enough insulin particularly in the second and third trimesters of pregnancy to maintain healthy blood sugar levels. Additionally, the body is unable to effectively use the insulin that is produced, causing insulin resistance or a reduced sensitivity to the produced insulin. Insulin resistance primarily occurs as a result of pregnancy hormones and the weight changes that occur during pregnancy. Insulin helps sugar in the blood move into the body's cells to create energy. Without adequate insulin production and utilization during pregnancy, blood sugars increase resulting in gestational diabetes. Essentially, GDM is

described as carbohydrate intolerance during pregnancy, in which there is no previously diagnosed diabetes. The glucose intolerance usually normalizes postpartum, but some women may go on to acquire type two diabetes. Early screening for diabetes in pregnancy is recommended to rule out pre-existing diabetes. This can be done prior to pregnancy or in the first trimester. The American Diabetes Association (ADA) recommends women with one or more risk factor to be screened early. Risk factors include first-degree relative with diabetes, high-risk race/ethnicity, history of cardiovascular disease, hypertension, low HDL or high triglycerides, polycystic ovarian syndrome (PCOS), physical inactivity, or other clinical conditions associated with insulin resistance (Johns et al., 2018).

In the United States, there is a universal screening for GDM between 24 and 28 weeks, utilizing either a ‘one-step’ two-hour 75g Oral Glucose Tolerance Test (OGTT) or ‘two-step’ screen with 3-hour 100g OGTT. The two-hour OGTT requires plasma blood glucose tests of fasting and then one hour and two hours after consumption of a 75g glucose beverage. The parameters for diagnosis are a fasting over 92mg/dl, one hour over 180mg/dl, or two hour over 153mg/dl. Any one number that exceeds these values qualifies a GDM diagnosis. Alternatively, the ‘two-step’ approach requires a woman first complete a 50g glucose screen. The woman consumes the 50g glucose beverage and her plasma glucose level is checked at one hour. If that number is above 140mg/dl, she moves onto the 100g OGTT. For the 100g OGTT, her fasting, one hour, two hour, and three hour glucose is checked. If two of these numbers exceed 95mg/dl, 180mg/dl, 155mg/dl, or 140mg/dl respectively, the diagnosis of GDM is warranted (Johns et al., 2018).

In healthy, lean pregnant women without GDM, insulin sensitivity is estimated to be reduced by 56% and endogenous glucose production increases by 30% in the third trimester

(Johns et al., 2018). This indicates that even in healthy women, pregnancy requires increased insulin needs, particularly in the second and third trimester; however, those with normal glucose tolerance have pancreatic beta cells that adjust to these circumstances by increasing insulin production in order to maintain normal glucose levels. It appears pregnancy may unveil unknown beta cell dysfunction in the setting of pre-existing insulin resistance.

There are several unmodifiable risk factors for GDM, which includes advanced maternal age, family history of diabetes, and certain minority ethnicities with increased risk for diabetes. One modifiable risk factor is obesity. According to the CDC, obesity prevalence has increased from 30.5% to 41.9% from 1999 to 2020. This increase in obesity also correlates with associated chronic diseases including type two diabetes (CDC, *Adult obesity facts* 2022). GDM rates have also been increasing in relation to the rising obesity rates. In fact, the risk of GDM may be two, four, and eight times higher in women considered overweight, obese, and severely obese respectively (Chu et al., 2007).

GDM can increase health risks for both mom and baby. Babies with mothers that experience GDM have increased risk for being large for gestational age (LGA) and for neonatal hypoglycemia. LGA occurs when fetuses in utero are exposed to high levels of sugar. The excess sugar is stored as fat tissue on the fetus resulting in a LGA baby. LGA can also result in a large neonate, or macrosomia. Women with GDM have an increase chance of giving birth to babies nine pounds or larger when blood sugars are not well managed. Macrosomia can impact the child's safety during delivery. This includes higher risk for joint dislocations, nerve injuries, or even getting stuck in the birth canal. Additionally, neonates born to mothers with GDM are at higher risk for hypoglycemia after birth. With prolonged exposure to elevated blood sugar levels in utero, an infant may experience hypoglycemia, low blood sugar, at birth. At Island Health

(IH), the threshold for hypoglycemia treatment of neonates is 40 mg/dL or less. Prolonged hypoglycemia in infants can lead to trouble breathing, lethargy, irritability, seizures, and in extreme cases brain damage (Abramowski et al., 2021). Furthermore, children born to mothers with GDM are at an increased risk for both obesity and type two diabetes later in life. Managing blood sugars during pregnancy can reduce such risk factors.

For the mother, GDM increases risk for type two diabetes postpartum, risk of preeclampsia during pregnancy, and chances of cesarean section (C-section) birth, which may result in longer recovery postpartum.

Gestational Diabetes Care at Island Health

Island Health (IH) is a rural hospital located in Anacortes, Washington on Fidalgo Island. This program primarily serves Fidalgo Island, Whidbey Island, and Orcas Island. The current programming for women with gestational diabetes at Island Health entails diabetes education one-on-one visits exclusively, both in-person and virtually. There is limited access to diabetes specialty care, such as an endocrinologist in this area, leaving most of the diabetes management to the diabetes educator and family care provider or obstetrician (OB).

The Island Health GDM program has room for improvement. Unfortunately, there are no official protocols for when or how to initiate medication management. Additionally, there are no classes before, during or after pregnancy specific to gestational diabetes. There is one childbirth class series and one pregnancy nutrition class available for pregnant women at IH. Neither of which cover postpartum diabetes prevention related topics. Also, there is limited participant qualitative information gathered in the GDM program. The only qualitative information gathered

is during the one-on-one visits with the diabetes educator. During these visits, the educator asks a series of assessment questions, including how participants are currently eating, their family history of diabetes, and what information they know about GDM. No questionnaires, satisfaction surveys, or focus groups have been implemented. Last, there is no process evaluation in place to determine if the program is implemented successfully.

Medication Recommendations for Gestational Diabetes

Women with GDM are asked to check blood sugars four times per day, fasting and one or two hours postprandially. Postprandial numbers are often managed with lifestyle changes, however elevated fasting numbers can be a challenge to manage with diet and exercise alone. Additionally, elevated fasting numbers have a higher association with LGA fetuses and higher incidences of hypertensive conditions during pregnancy for the mother (Ryan et al., 2019). When lifestyle management is not effective in treating high blood sugars, medication is recommended.

According to the American Diabetes Association (ADA), about 15-30% of women will require a medication intervention to manage blood sugars. At IH, there is currently no policy regarding when to begin medication management or which medications to implement. Though it is recommended to tailor medication management, providing some basic guidelines as to when or how to initiate medications, may offer more cohesive care and more intensive management of hyperglycemia (high blood sugars) in pregnancy.

Overall, there seems to be limited consensus as to when to begin medication management. The Canadian Diabetes Association (CDA) suggests beginning medication management if blood sugars are not in the targeted range after 1-2 weeks of lifestyle changes

(Kelley et al., 2015). Sweet Success California Diabetes and Pregnancy Program and the University of Washington suggest initiating medications once blood sugars are more than 20% above the target range (Fay & Delaney, 2019). Still other studies suggest medication management initiation when 20-39% of blood sugars are elevated to reduce poor maternal and neonatal outcomes (Harrison et al., 2020). At IH, medication initiation may vary by provider with some treating hyperglycemia earlier than others.

There are varying recommendations about which medications to utilize to treat GDM hyperglycemia. The International Diabetes Federation (IDF) and the ADA suggest prioritizing use of insulin over oral medication, such as Metformin. This is primarily due to the ability for Metformin to cross the placenta and the lack of long-term studies regarding use in pregnancy.

The ADA Standards of Care indicates that Metformin has been found in umbilical cord blood levels as high or higher than the levels of the mother's blood level. Furthermore, the Offspring Follow-UP study referenced in the standards of care indicates that at 9 years of age, children exposed to Metformin in utero may have a higher waist-to-height ratio, waist circumference and body weight (Rowan et al., 2018). This suggests that oral medication treatment of GDM hyperglycemia may increase risk of obesity in childhood, which may increase risk for type two diabetes. The ADA states that Metformin should not be the first-line defense in treating hyperglycemia in pregnancy. In fact, Metformin may not be effective for 25-28% of women experiencing GDM hyperglycemia. In such cases, women that were perhaps trying to avoid injections would have to initiate insulin injections after Metformin failed to reduce blood sugars.

The American College of Obstetricians and Gynecologists (ACOG) and Sweet Success both recommend the use of insulin and oral medication equally. Sweet Success recommends the

use of Metformin up to 2500 mg per day. Per Sweet Success guidelines, a 2004 study indicates that use of Metformin during pregnancy does not cause any teratogenic effects, and infants had a normal height and weight within the first 1.5 years since birth (Glueck, 2004).

The National Institute for Health and Care Excellence (NICE) suggests use of Metformin over insulin unless the fasting blood sugar at diagnosis is more than 126 mg/dl or 108-125 mg/dL with a complication, such as macrosomia. NICE guidelines suggest use of insulin as an adjunct treatment with oral medications.

Currently, IH does not have a policy regarding medication management of GDM. Each OB has a preferred medication route, with most opting for Metformin use over insulin. For IH to provide the best care to their GDM population, the diabetes educator and OB group should work together in establishing clear and cohesive medication guidelines.

Postpartum Care to Prevent Type Two Diabetes

According to the American Diabetes Association, women that have had GDM have a 50-60% chance of developing type two diabetes postpartum. Risk can be reduced with healthy weight management postpartum, hemoglobin A1c (HgA1c) checks every 1-3 years, breastfeeding support, and an oral glucose tolerance test (OGTT) at 6-12 weeks postpartum for diabetes screening. IH currently does not have a postpartum class or support group to address diabetes prevention or screening in this population.

Breastfeeding can reduce diabetes risk for both mom and baby. In fact, the amount of time the mother breastfeeds may directly correlate with her risk of diabetes. The ADA indicates that women may be able to cut their risk up to half with just two months of breastfeeding.

According to the CDC breastfeeding report card, only 58% of infants in 2018 were breastfed exclusively until three months of age in Washington state. Interventions to support breastfeeding may improve breastfeeding time and reduce risk of type two diabetes in women with GDM history.

Two ways to diagnose or screen for type two diabetes includes the OGTT and HgA1c lab test. As stated earlier, the OGTT is used to diagnose and screen for diabetes at 6-12 weeks postpartum. The HgA1c test is used to diagnose or screen for diabetes every 1-3 years. Despite the importance of diabetes screening postpartum, the rate of women that complete their OGTT worldwide ranges between 30-60%, leaving a large portion of at-risk women that do not complete their diabetes screening. Furthermore, women with a normal HgA1c are more likely to complete their OGTT than women with an abnormal HgA1c, indicating that the more at-risk populations for diabetes may not be getting screened or receiving prompt treatment (Abu Bakar & Ismail, 2021). Women are more likely to complete postpartum diabetes screening with proper support and frequent reminders.

Given the rural nature of this hospital, there are limited outside resources for postpartum women with history of GDM. With implementation of a postpartum class or support group at IH, women could gain access to education regarding prevention of type two diabetes by a trained dietitian/diabetes educator. Furthermore, in collaboration with the IH lactation consultant team, they would receive breastfeeding information and support, further reducing their risk of type two diabetes.

Process Evaluation

The purpose of a process evaluation is to gather information about the delivery of the program so that the intervention implementation can be assessed and adjusted as needed. To know that the program has the desired effect on recipients, it is essential to first know if the program is implemented as intended (Issel et al., 2022). The CDC suggests conducting a process evaluation throughout the lifespan of a program to identify and address any potential issues. To date, there is not a process evaluation in place for the GDM program at IH. Utilizing appropriate data collection methods for a process evaluation is recommended. This includes implementation of activity logs, checklists, a focus group, pre-test/post-test surveys and questionnaires to improve program processes.

Capstone Proposal

The objective of this capstone project involves developing detailed program planning and evaluation guidelines for the Island Health GDM program. This entails establishing medication protocols, creating program curriculum and materials with rural populations in mind, conducting a focus group with women with present and history of GDM, and creating both process and summative evaluations.

To establish medication protocols, evidence-based recommendations and coordination with the OB team would be essential. This would entail first compiling a variety of recommendations regarding medication initiation and types of medications proposed for GDM management. After drafting a policy, a meeting with OB would be recommended for collaborative care treatment of GDM at IH.

Development of a postpartum class for women that have experienced recent GDM would be valuable in reducing type two diabetes risk, increasing breastfeeding resource access, and supporting OGTT completion at 6-12 weeks postpartum. Collaboration with the lactation team at IH would be essential in program planning. The lactation team would partner with the diabetes educator in presenting a comprehensive postpartum class for this population. Implementing both an in-person and virtual class should be considered. An in-person class lends itself to more participation among the women and allows for them to complete their OGTT while on campus. Providing a virtual class is also vital in serving the most rural populations in this area. In terms of feasibility, the resource for online classes is already in place. Current virtual classes are provided using Webex at IH. In terms of financial feasibility, two options are available for class charges, utilizing insurance or offering this benefit as a community health class. To charge insurance for group classes, determination of postpartum education coverage would be necessary. Contacting the IH billing department, insurance companies (specifically Medicaid and Tricare as the main insurances for GDM diagnoses in this area), and other diabetes programs offering postpartum care could help determine if insurance charges for this class are possible. Alternatively, this class could be offered as a community class in collaboration with the Community Health Education department at IH. This would provide the class for free or for a fee of \$10.

To aid in determination of program changes, a focus group was implemented. This included both women with a history of GDM and women currently experiencing GDM. The goal was for eight to fifteen participants to be chosen at random. An Institutional Review Board (IRB) was utilized to help protect the focus group participants, which deemed the focus group exempt from needing review. The focus group took place at Island Health in the Cypress meeting room and was recorded using both audio and visual medium. Informed consent was provided via a

signed consent form. Open-ended questions regarding class content ideas, understanding of diabetes and diabetes risk, access to breastfeeding support and resources, class details (day, time, length of class), and interest in postpartum care was included (see Appendix VI). After completion of the focus group, data was coded and used to create curriculum and materials.

Through program evaluation, development of process evaluation methods and refinement of the current summative evaluations was recommended. Process evaluations require the use of activity logs, checklists, pre-test/post-test surveys, and organizational records (electronic medical records or EMR). Activity logs would be used to improve program processes by documenting the length of time a woman with GDM is contacted after the EMR or paper referral is received from the healthcare provider (see Appendix XI). Logging this information will bring to light time delays for treatment. The ADA recommends participants receive nutrition care within one week of a GDM diagnosis. To determine current scheduling timelines, activity logs and the EMR would be essential tools.

Checklists can be utilized to improve processes, such as content provided to each participant. Supplying a checklist in each participant chart would aid in this. The checklist would include topics such as GDM pathophysiology, risks to mom and baby, self-monitoring blood glucose meter education, blood sugar trend review, nutrition education, postpartum recommendations, and any additional information gleaned from the focus group (see Appendix X). This would ensure that each participant is provided with proper education during the program process.

Currently, the GDM program is evaluated based on health outcomes alone. This includes maternal weight gain, neonatal hypoglycemia, and neonatal birth weight. Creating further summative satisfaction surveys to add qualitative information would be necessary. Utilizing the

focus group to determine appropriate postpartum survey questions would be recommended. Questions regarding participant satisfaction and diabetes knowledge are key qualitative measures that can help refine program planning. Additionally, including further postpartum measurements (i.e., percent of women that complete their oral glucose tolerance test postpartum) would provide more summative evaluation information. This may be completed using postpartum surveys either in class or via mail/email and by reviewing the EMR lab work.

Methodology

To properly plan and evaluate the gestational diabetes program at IH, a focus group was conducted. The purpose of this focus group was to gather information from participants with the intent to improve the current GDM program at Island Health in Anacortes, Washington.

The study population was women with gestational diabetes or those with a history of gestational diabetes that have attended at least one diabetes education visit at Island Health. The anticipated sample size (N) was 15 participants, with a goal of 8 minimum participants. This focus group will benefit future women with GDM by providing essential feedback on current programming and GDM knowledge. Focus group information helped shape one-on-one visit information content, developed pre-visit education opportunities, influenced a new postpartum GDM support group, and impacted evaluation processes.

All GDM program participants of current and past attendance were entered into a Microsoft Excel spreadsheet. A random number generator was used to choose the participants at random for an initial call using a call script (Appendix II). The intent was to call these participants in random order until 15 participants committed to attending the focus group. After

calling every participant of the program, there were seven that committed to attendance, six that reported they might attend, and only four that actually attended the focus group. After women agreed or stated they may attend, an email was sent including information regarding the focus group location, time, and date (Appendix III). One week later, participants were sent a subsequent reminder email, the week of the focus group (Appendix IV), and the day prior to the focus group a reminder call was implemented using a call script (Appendix V).

Once participants presented to the IH main lobby, they were greeted by the principal investigator and provided an informed consent form indicating the purpose of the focus group and the participant's rights. The principal investigator subsequently escorted participants to the Cypress conference room. Informed consent was obtained through both a signed waiver prior to recording and the acknowledgment of consent with participation in a verbal statement during recording. A waiver of consent was necessary due to the nature of medical and/or sensitive information that may be shared by the participants, and it was also necessary since the information was recorded with both audio and video medium.

After obtaining consent, participants were asked to discuss a series of focus group questions presented in a semi-structured approach (Appendix VI). Participants shared their experiences and recommendations for the program. After 75 minutes of questions and discussions, participants were asked if there was any further information they would like to share. After no further information was shared the focus group was concluded. Recordings were completed and each participant received a gift card as gratitude for participating. The principal investigator escorted participants to the lobby exit. Subsequently, participants were sent a handwritten thank you card for their attendance.

The focus group was completed on site in the Cypress conference room at Island Health. Data collection, transcription, and coding occurred on a password protected laptop at Island Health. Original transcription was performed by Zoom during video recording. Information coding was performed using Microsoft Excel to determine themes and trends of the focus group content. Subsequently, the codes were used to inform program planning for a postpartum GDM class or support group, as well as to implement changes to improve current programming as applicable. Video and audio recordings were used for the educational purposes of this project and subsequently will be destroyed one year after collection.

Results

The focus group provided helpful feedback about the GDM program at IH and identified some key themes that could help improve programming. The most predominant themes were the need for more patient instruction prior to diabetes education initial visit, more information and resources for breastfeeding, a more convenient system for postpartum OGTT, and implementation of a postpartum support group.

Participants unanimously expressed the need for additional instruction prior to their first diabetes education visit. Participants shared that they often felt scared and emotional when learning about their new diagnosis. Some shared that they were not called by the OB office, but rather received a call from their pharmacy indicating that they needed to start checking their blood sugars. Those that were called by OB about the diagnosis stated that the conversation entailed instructing them to check their blood sugars four times per day and that they would be referred to diabetes education. They were not told how to check their blood sugars or what their

blood sugar goals were. Participants indicated that more information prior to their first visit with the diabetes educator would have made them feel more prepared.

Another predominant theme included the need for additional support and information regarding breastfeeding. When discussing breastfeeding participants' most common concerns were that breastfeeding was more difficult than originally anticipated, and they struggled with latch concerns. Participants also shared their most helpful breastfeeding resources, which were either friends and family and/or breastfeeding websites, such as Le Leche League.

Participants were also asked about what could improve OGTT completion postpartum. Participants stated that the test must be scheduled at certain times. This lab draw cannot be completed by walk-in, like other tests. One participant commented that she still has not completed her OGTT months after giving birth. Each participant agreed that if the test was more convenient, they would be more likely to complete the OGTT. Most participants agreed that pairing the OGTT with their 6–12-week postpartum OB visit would be most effective.

The need for a postpartum support group was perhaps the most prevalent theme discovered during the focus group. When asked what topics would be beneficial for a class setting, unanimously participants wanted a support group structured in much of the same way the focus group was. They stated they wanted to have the opportunity to meet with other women that also experienced GDM and who could discuss parenting challenges and tips. The main themes discovered in this discussion revealed that participants wanted more support and connection. They also voiced the need for more nutrition information postpartum, including easy prep meals, how to maintain nutrition goals, family nutrition recommendations, and type two diabetes risk reduction tips. Participants agreed that once per month in the Cypress conference room for 60-90 minutes would be an adequate frequency, place, and length of time for the group. As for the time

of the gathering, there were conflicting ideas. Some suggested evenings, others suggested weekends, and some even suggested offering two different times in the day or a rotating time.

Other general trends discovered during the focus group were determined. In general, each participant felt supported during the GDM program. Most recommendations for improvement were regarding pre- and post-program support. Each participant agreed that diagnosis of GDM was challenging, some commenting that it was an emotional time and others commenting on the stigma they felt with the diagnosis. When asked about the most helpful resource during the program all participants agreed that the one-on-one visits with diabetes education was the best resource. Other helpful resources included making realistic goals and carbohydrate counting.

Based on this focus group, the participants successfully communicated some key aspects of GDM and type two diabetes. Participants were able to accurately discuss the link between GDM and type two, as well as strategies to reduce risk such as breastfeeding. Additionally, many participants voiced their success in continuing nutrition lifestyle changes postpartum thanks to the information received from diabetes education.

Discussion

GDM is the most prevalent metabolic disorder in pregnancy. Based on focus group findings women may feel stigmatized, scared, guilty, and emotional about their diagnosis. Providing diabetes education is one intervention that can help women become more knowledgeable about their diagnosis and feel supported in implementing interventions to manage GDM. Despite this support, more can be done for women at IH to feel cared for during their GDM journey.

The original proposed program has been altered based on focus group findings. Originally, the proposed project entailed providing a structured postpartum GDM class for women to attend to learn how to reduce type two diabetes risk and to complete their 6–12-week postpartum OGTT. Focus group findings have altered program planning by transforming the curriculum-based class into more of a support group structure. Furthermore, program planning recommendations now include making the 6-12-week postpartum OGTT more accessible at their follow-up OB visit postpartum instead of at the postpartum class. Additionally, the original project did not incorporate any interventions from OB prior to the initial diabetes education visit. The focus group brought to light the need for collaboration between OB and diabetes education in providing this support in the interim time between diagnosis and diabetes education.

Based on focus group findings, participants are asking for more support and connection postpartum. Participants were clear on how the new diagnosis made them feel and how difficult postpartum can be. The intent is to implement a GDM support group and include educational speakers, such as a dietitian, diabetes educator, lactation consultant, and pediatrician. Participants can attend either while pregnant or postpartum. Some participants had shared that if they had a support group to attend during their pregnancy, they would have felt more supported with their new diagnosis and lifestyle changes. A suggested support group schedule and agenda have been constructed as a template for future meetings (Appendix VII).

The focus group demographic were all military families living in Oak Harbor, WA. Their insurance, Tricare, does provide postpartum insurance coverage for nutrition therapy and diabetes education; however, a quarterly support group seems to be more in-line with what participants are requesting. To financially support this group, either funds from the IH foundation, implementation of a low-cost fee, or volunteers to facilitate meetings would be

needed. Ideally, a community member would be asked eventually to voluntarily facilitate this support group with the diabetes educator as a resource and rotating educational speakers.

In addition to the postpartum support group, a GDM prevention class has been constructed with plans of implementation in May of 2023. The diabetes educator has coordinated with OB and IH community education to provide this low-cost class to women that are at-risk of GDM. The intent is to inform at-risk women of how to implement lifestyle change early to prevent GDM. Additionally, this class provides resources for support if a woman does become diagnosed with GDM, including online resources and the diabetes education department contact information.

During the focus group, participants all expressed challenges regarding the postpartum OGTT. Based on focus group suggestions, it is recommended that OB coordinates with the IH lab facility to pair a postpartum visit with the recommended 6–12-week OGTT. This allows the mother to complete two necessary appointments in one visit, which is critical for new mothers and those that may not live near the hospital. Since the OGTT necessitates an appointment, scheduling this appointment for the mother may help increase OGTT compliance.

As a result of completing the GDM focus group, it is apparent that the IH GDM program needs to address education about GDM and blood sugar monitoring prior to the initial diabetes education visit. A simple script has been constructed to help OB staff address this very issue (Appendix VIII). Additionally, a “How to Check Your Blood Sugar” handout (Appendix IX) has been constructed for OB to distribute to any women diagnosed with GDM. The hope is that this script and handout will address the concerns discussed in the focus group regarding the lack of education immediately after diagnosis.

Another intervention crafted from focus group information is further collaboration with lactation. Since the focus group, the diabetes educator has met with the IH lactation consultant for further partnership. This includes a referral from diabetes education to lactation after the initial visit to address any lactation questions and resource needs. Furthermore, lactation has agreed to participate in the GDM postpartum support group.

Additional program planning recommendations include a cohesive medication policy. In accordance with the American Diabetes Association and International Diabetes Foundation, the recommended priority for medication management in pregnancy would be insulin over oral medications, such as Metformin. Due to results of the Offspring Follow-up Study, it is unclear what implications Metformin may have long-term on children. Insulin does not cross the placental barrier to baby and should be the first line of management for hyperglycemia. The focus group indicated about 50% of participants needed insulin during their pregnancies to manage their gestational diabetes. They were first started on Metformin, which failed to appropriately manage their blood sugars. According to the ADA, Metformin is ineffective for about 25-28% of women. Implementing insulin can reduce the time that women are experiencing hyperglycemia due to failed Metformin treatment. If a mother is unable to inject insulin, oral medications should then be considered.

Last, process and summative evaluations have been created for implementing a system of evaluation for the IH GDM program. Process evaluations in the form of both checklists and referral tracking are recommended. The checklist includes topics that should be covered in each visit by the diabetes educator (Appendix X). This includes the new topic of lactation referral during the program. Another process evaluation developed includes tracking referral and visit activities. The ADA recommends that women with GDM receive nutrition therapy within one

week of diagnosis. An excel sheet has been developed to track when a referral is received, the first date of contact, days between referral and contact, first appointment date, and days between referral and scheduling (Appendix XI). Utilizing this document can reveal what the current timeline looks like for GDM scheduling and if changes are needed to implement improvements. Last, summative evaluations have been constructed and added upon. An initial questionnaire has been developed, which includes a short pre-test evaluation regarding the participants self-evaluated knowledge about blood sugar monitoring, cause of GDM, diet/exercise recommendations, and postpartum recommendations (Appendix XII). After the participant has completed the GDM program, the same self-evaluated knowledge test will be provided as a post-test for comparison (Appendix XIII). Moreover, a satisfaction survey has been created to determine how the program can be improved (Appendix XIV). This survey will be mailed to participants after completion of the program to keep information anonymous. Finally, OGTT completion has been added to the summative evaluations for the program, along with maternal weight gain, neonate weight, and neonate hypoglycemic events.

Limitations: Focus Group Limitations

There were a variety of limitations of the focus group. First, the focus group was small. Of the forty-six program participants, only four were able to attend the focus group. Originally seven had committed and another six indicated they may be able to attend. The focus group was held on a Friday afternoon prior to a holiday weekend. This may have impacted participation. Another notable limitation is the relationship between participants and the principal investigator. Since participants are aware that the investigator is also the diabetes educator/program coordinator, they may not be completely forthcoming about critiques of the program. Last, all

participants were from the same community, military families in Oak Harbor, WA. Though this is likely a realistic depiction of the most prominent GDM population served at IH there have been other communities served by this program, and those individuals were not represented in the focus group.

Conclusion

Based on the GDM focus group findings, the GDM program at IH is providing an essential service that provides education and support for women experiencing GDM. Despite this, women are not feeling supported prior to their initial diabetes education visit or after the program. Additionally, women are finding it difficult to complete the recommended postpartum OGTT to screen for diabetes postpartum. This may have critical implications when women have diabetes but are not diagnosed or treated postpartum. Furthermore, women are struggling with breastfeeding challenges and may need the support of peers and a lactation consultant. Implementing the discussed interventions may help improve GDM outcomes and expand the support provided to these women in such a critical time.

A strength of this study includes the variety of experiences demonstrated in the focus group. Three women had already completed the program and one was currently at the end of the program. Additionally, half of the participants had to use insulin to manage their blood sugars and two utilized lifestyle changes alone for management. This provided an array of insights regarding experience of GDM and programming. Another strength is the comfortability of the participants with the principal investigator. Since each participant had met with the investigator

as a diabetes educator, the participants seemed very comfortable sharing their perspectives and experiences with GDM and the program.

Notably, prior to this project the GDM program was limited in medication policy recommendations and program evaluations. In presenting evidenced-based data on medication recommendations, diabetes education and the OB team can provide more cohesive and effective care. Also, by implementing evaluation processes, the diabetes educator can determine if the program is being implemented as intended.

With improved programming and evaluation of the GDM program at Island Health women with GDM can receive care that is supportive, effective, and evidenced based.

Master of Public Health (MPH) Six Competencies

In completing the program planning and evaluation for the GDM program at IH, six MPH competencies have been satisfied. This includes four foundational and two community health concentration competencies.

Four Foundational Competencies

1. (2) Select quantitative and qualitative data collection methods appropriate for a given public health context

To properly evaluate the effectiveness of the program quantitative information must be measured. This includes adding rates of OGTT completion to the already measured maternal weight gain, neonatal hypoglycemia, and birth weight. OGTT completion can be determined by

EMR review and postpartum survey. Weight is measured during the visit or collected from last provider visit via EMR. Neonatal blood sugar and birth weight are both collected by EMR review after the baby is born.

Qualitative data collection for this program includes the GDM focus group, questionnaires to collect personal medical history, diet recall information, and pre/post program evaluation surveys. The focus group was implemented by recruiting women with GDM and those with a history of GDM. Questionnaires can be provided prior to initial visit via mail, email, or EMR. Diet recall information can be collected during initial assessment. Preprogram surveys can be embedded into initial questionnaire, and post program surveys can be distributed at the last visit or by mail, email, or EMR.

2. (11) Select methods to evaluate public health programs

In planning this program, evaluation will be essential in determining program effectiveness and quality improvement. Process evaluations have been created to improve program procedures. This includes activity logs, checklists, and intent to use organizational records (Issel et al., 2022). Summative evaluations will be vital in reviewing health outcomes and determining how successful the program is in managing gestational diabetes. Questionnaires with pre and post-tests, satisfaction surveys, and participant EMR records are utilized for this purpose.

3. (19) Communicate audience-appropriate public health content, both in writing and through oral presentation

This program provides an opportunity to communicate diabetes and nutritional health content in both writing and oral presentation. Some examples of written content would include handouts

to patients, including those describing how to check blood sugars and recommendations to reduce type two diabetes postpartum. An example of oral presentation would include implementation of the at-risk GDM class to reduce GDM diagnoses and increase awareness of GDM prior to diagnosis.

4. (20) Describe the importance of cultural competence in communicating public health content

Cultural competence is important when communicating gestational diabetes health information. GDM disproportionately impacts women of color (CDC, 2022). Being culturally sensitive can build rapport and help the participant implement health changes that are realistic for them. Tailoring information to include culturally appropriate resources is vital. Using preferred language handouts and creating meal plans incorporating culturally appropriate foods helps participants better adhere to recommendations. Program planning will include handouts and surveys that demonstrate cultural sensitivity at appropriate reading levels for participants. A readability calculator, Readable, was used to determine appropriate reading levels for the program handouts and scripts. Each document scored below a seventh-grade reading level (Appendix I).

Two Community Health Concentration Competencies

1. (25) Justify the need for proper evaluation of programs and policies for the allocation of necessary resources (time, financial, personnel, planning, etc.)

During the program and evaluation process for this project, allocation of time, personnel, and finances will need to be considered. Improving program processes by evaluation can improve health outcomes. With improved programming and better prenatal care, reductions in medical

interventions (i.e., c-sections, treatment of neonatal hypoglycemia) may be an incentive for allotting time and personnel. For example, mothers with GDM may have increased length of stay, which can be costly to the hospital (Dall et al., 2014). A program that better addresses medication interventions and diabetes care may help reduce length of stay.

Financial considerations must be included to cover personnel time. Staffing for the program includes the diabetes educator and potentially a lactation consultant for the postpartum class or support group. Determining class insurance reimbursement is a financial resource that can help cover such costs. Additionally, utilizing volunteers to continue support group efforts can contribute to cost savings.

2. (27) Evaluate community assets and resources that can be used to enable community organizing and improve the health in a community

Evaluating community assets and resources has been critical in program planning for women with GDM in the rural islands of Washington. Determining diabetes support groups both online and in-person can support patients in their GDM and postpartum diabetes journey. Furthermore, since breastfeeding can reduce risk of type two diabetes later in life, connecting with lactation consultants and identifying local breastfeeding support groups has provided potential to enhance programming to improve women's health. Due to the rural nature of this population, there will need to be considerations for resources on specific islands and logistics for transportation or virtual support, as needed.

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Appendices

Appendix I: Content Readability Scores

Document	Flesch-Kincaid Grade Level
GDM Satisfaction Survey	6.5
Initial Questionnaire	6.9
GDM Postpartum Handout	5.9
How to Check Your Blood Sugars Handout	4.72
OB GDM Diagnosis Script	6.4

Appendix II: Phone Call Script

“Hello, this is Amanda Lungren calling from diabetes education at Island Health. May I speak with (participant name)? Hello (participant name) I hope you have been doing well. I am conducting a focus group with past and present women that have participated in the gestational diabetes program here at Island Health. Participating in this focus group will help improve the program. Would you be interested attending?”

Appendix III: Confirmation Email

Hello (participant name),

Thank you for joining us for the upcoming focus group meeting. The purpose of this focus group is to gather information about your experience with the gestational diabetes program at Island Health and for you to share what knowledge you may have about diabetes. This meeting will be recorded for educational purposes with the goal of improving the program. We appreciate your participation. Please print and sign the consent waiver attached. Bring this document with you on the day of the focus group.

Please see the details for our focus group below:

When: (date and time)

Where: Island Hospital, Cypress Room.

*Please meet in the main lobby off of 24th Street.

Please contact me directly with any questions.

Thank you,

Amanda Lungren

Appendix IV: Email Reminder

Hello (participant name),

Thank you again for joining us for the upcoming focus group meeting scheduled for (date). Please message with any questions or if you are unable to attend.

Please see the details for the focus group below:

When: (date and time)

Where: Island Hospital, Cypress Room.

*Please meet in the main lobby off of 24th Street.

Thank you,

Amanda Lungren

Appendix V: Reminder Call Script

“Hello (participant name), this is Amanda calling to remind you about our focus group meeting this (day of the week). I am looking forward to seeing you there! Please let me know if you have any questions, or if you are unable to attend.”

Appendix VI: Focus Group Questions.

- a. How would you describe GDM to another person?
- b. What was the most helpful resource you had when trying to manage GDM?
- c. What was most helpful about the GDM program here at Island Health?
- d. How could the GDM program improve?
- e. As you feel comfortable, please share with me your experience with gestational diabetes (GDM).
- f. What do you think is the hardest part about having GDM?
- g. Please tell me anything you may know about type two diabetes.
- h. How are GDM and type two diabetes related?
- i. What do you know about the postpartum Oral Glucose Tolerance Test?
 - i. What might help encourage women to complete this lab work postpartum?
- j. What are some benefits of breastfeeding?
- k. What kind of resources do you know about for breastfeeding?
- l. If you attended a postpartum class, what topics would you like to learn about?
- m. After having your baby, would it be helpful to have a group class or support group for women that have experienced gestational diabetes? Why or why not?
- n. What are some things that may get in the way of you attending a postpartum class?
 - i. How might those barriers be helped?
- o. What time and day would be realistic for a class for you?

- p. How long of a class would be ideal?
- q. Where would you recommend this class take place?
- r. Is there anything else you would like to share?

Appendix VII: Support Group Schedule and Agenda

GDM Support Group Schedule

This support group is intended for women that have gestational diabetes or have had gestational diabetes. Classes begin with a 20-minute speaker and will end with time for moms to ask questions and discuss their own experiences. Children and infants are welcome to attend. For more information, call 360.299.4934.

Where: Island Hospital, Cypress Room

When: Quarterly Meetings from 3:30-4:30pm

January

Speaker: Dietitian

Topic: Nutrition for Pregnancy, Postpartum, and the Whole Family

April

Speaker: Lactation

Topic: Breastfeeding Tips and Resources

July

Speaker: Diabetes Educator

Topic: Reducing Type Two Diabetes Risk

October

Speaker: Pediatrician

Topic: Parenting and Early Childhood Development

GDM Support Group Agenda

Room set-up: 3:15pm

Speaker: 3:30pm

Support Group Discussion: 3:50-4:30pm

Clean up: 4:30-4:45pm

Appendix VIII: OB Script for Newly Diagnosed GDM

Explain that the patient has gestational diabetes and will see the diabetes educator within one week:


- Your oral glucose tolerance test was positive. This means you have gestational diabetes. We have placed a referral for you to see the diabetes educator. This appointment should be scheduled within one week.
- Gestational diabetes is very manageable.
- You will be asked to check your blood sugar four times per day. Fasting, which means before you eat anything in the morning. Then one or two hours after any meal.
- We will send you a handout on how to check your blood sugar. You will also review this at your first diabetes education visit.


*Provide the patient with the blood glucose self-monitoring handout via email or IH portal.


Appendix IX: "How to Check Your Blood Sugar" Handout





How to Check Your Blood Sugar


#1  Wash your hands.

#2  Insert lancet (needle) into lancing device according to manufacturer instructions.

#3  Insert test strip into meter.

#4  Using the lancing device on the side of your finger tip, get a drop of blood.

#5  Touch and hold the tip of the strip to the drop of blood and wait for results.

#6  Results should display on the meter.

Island Health Diabetes Education 360.299.4934

Appendix X: Process Evaluation Checklist



GDM EDUCATION CHECKLIST



Activities	Date
Visit 1	
Complete intake paperwork	
Obtain diabetes family history	
Determine patient understanding of diagnosis	
Provide pathophysiology of GDM	
Discuss risk of hyperglycemia to mom and baby	
Review blood sugar checking technique and goals	
Provide nutrition recommendations	
Provide physical activity recommendations	
Discuss potential for prenatal lactation visit	
Visit 2	
Determine/review blood sugar trends	
Review nutrition changes and recommendations	
Determine physical activity progress and goals	

Updated 4/2023

Island Health Diabetes Education



GDM EDUCATION CHECKLIST



	Activities	Date
	Visit 3	
	Review blood sugar trends	
	Review nutrition changes and recommendations	
	Determine physical activity progress and goals	
	Review postpartum support group resources	
	Provide postpartum GDM recommendations	

Appendix XI: Process Evaluation Referral Tracking

	A	B	C	D	E
1	Referral Received	Date Contact Date	Days Between Referral and Contact	First Appointment Date	Days Between Referral and Scheduling
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					

Appendix XII: Pre-test within Initial Questionnaire

Gestational Diabetes Knowledge

I feel comfortable checking my blood sugar at home.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Very | Somewhat | Somewhat | Very |
| Comfortable | Comfortable | Uncomfortable | Uncomfortable |

I know what causes gestational diabetes.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at all |

Name 1-2 factors that may causes gestational diabetes: _____

I know what diet and exercise program to follow to improve my blood sugar.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at all |

Name 1-2 things you can do to improve blood sugars: _____

I know what I need to do after baby arrives to avoid getting diabetes.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at <u>all</u> |

Name one thing you can do to prevent diabetes: _____

Appendix XIII: Post-test

Gestational Diabetes Knowledge

I feel comfortable checking my blood sugar at home.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Very | Somewhat | Somewhat | Very |
| Comfortable | Comfortable | Uncomfortable | Uncomfortable |

I know what causes gestational diabetes.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at all |

Name 1-2 factors that may causes gestational diabetes: _____

I know what diet and exercise program to follow to improve my blood sugar.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at all |

Name 1-2 things you can do to improve blood sugars: _____

I know what I need to do after baby arrives to avoid getting diabetes.

- | | | | |
|-----------------------|-----------------------|-----------------------|-----------------------|
| <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Yes | Somewhat | Very little | Not at <u>all</u> |

Name one thing you can do to prevent diabetes: _____

Appendix XIV: Satisfaction Survey

GDM Survey

Please fill out the following satisfaction survey to help us improve the gestational diabetes program at IH. Please circle an answer: Yes, Maybe, or No.

I was educated on how to check my blood sugar before seeing the diabetes educator.

Yes Maybe No

The diabetes educator answered all my questions about gestational diabetes.

Yes Maybe No

I completed my glucose tolerance test at six or twelve weeks after my baby was born.

Yes Maybe No

I would recommend the gestational diabetes program for women with diabetes.

Yes Maybe No

Why? Or why not? _____

I would attend a gestational diabetes support group.

Yes Maybe No

Best time for me: _____ Best day for me: _____

Any additional comments: _____

