

## **45th Biennial Convention (16-20 November 2019)**

### **Delayed Lactogenesis II in Women With Gestational Diabetes Mellitus**

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**Background:** In a dose dependent manner, breastfeeding is associated with protection against the development of type 2 diabetes in women with a history of gestational diabetes mellitus. While exclusive breastfeeding is optimal, women with gestational diabetes have lower exclusive breastfeeding rates than non-diabetic women. Multiple factors have been found to negatively influence transition to increased milk production, also known as lactogenesis II, in women with diabetes. While women with gestational diabetes have expressed that they perceive a delay in their milk “coming in,” the biochemical validation of their perception has not been conducted. The metabolite concentrations of lactose and citrate indicate the transition to lactogenesis II, although their association with women’s perceived timing of their milk “coming in” is unclear. There is a paucity of information regarding the effect of gestational diabetes on the metabolite composition of colostrum and the association with early breastfeeding. As gestational diabetes rates are rising globally, there is an increased need to address the breastfeeding challenges facing women with gestational diabetes.

**Purpose:** The purpose of the study was to examine and compare early breastfeeding practices and metabolite levels of colostrum of women with and without gestational diabetes by an interdisciplinary team of international experts led by a nurse researcher. **Methods:** A prospective case-control study of breastfeeding women, 19 with gestational diabetes and 31 without diabetes who had provided a colostrum sample within 72 hours of delivering a singleton, term ( $\geq 37$  weeks’ gestation) infant in a major Israeli medical center between January and July 2014. The women were fluent in English, Hebrew, or Arabic. The researchers examined differences in early breastfeeding practices using a structured questionnaire and compared colostrum metabolite levels using enzymatic methods. The collaborative study was conducted by an international, interdisciplinary team of a nurse researcher and epidemiologist in the United States working with a nurse-lactation consultant, neonatologist, and biochemists in a university medical center and affiliated research laboratory in Israel.

The international, interdisciplinary research team regularly communicated prior to study initiation to plan the study protocol and obtain institutional review board approval at the university medical center in Israel. The nurse researcher from the United States spent a half year in Israel to supervise and conduct the data and colostrum sample collection with the research team members in Israel, where the sample analysis was conducted at the laboratory. Upon returning to the United States, the nurse researcher and epidemiologist conducted the data analysis and communicated regularly with the team members to discuss the findings and interpret the results.

**Results:** Compared to women without diabetes, a significantly higher proportion of women with gestational diabetes perceived a delay of their milk “coming in” (6.5% versus 36.8%,  $p=0.018$ ), only infants born to women with gestational diabetes experienced neonatal hypoglycemia, defined as blood glucose levels  $<45$  mg/dL (0.0% versus 36.8%,  $p=0.001$ ), and a higher proportion of the infants born to gestational diabetes women received formula during the postpartum hospital stay (61.3% versus 89.5%,  $p=0.050$ ). Likewise, compared to women without diabetes, women with gestational diabetes had significantly lower mean concentrations of the specific metabolites of lactose and citrate associated with the shift to lactogenesis II and increased milk production at 72 hours postpartum in their colostrum: lactose (mM) 142.4 versus 170.8 ( $p=0.043$ ) and citrate (mM) 3.3 versus 5.2 ( $p=0.005$ ), respectively.

**Discussion:** Findings of the study regarding a perceived delay in their milk “coming in” among women with gestational diabetes compared to non-diabetic women support the results of a prospective cohort study of women with gestational diabetes, wherein approximately one-third of the women reported that they experienced delayed lactogenesis II. These findings are further supported by the significantly lower levels of the metabolites lactose and citrate, biochemical markers that usually increase with transition to lactogenesis II. Lower levels of colostrum lactose and citrate concentrations along with maternal report of perceived delay in their milk “coming in” suggest that women with gestational diabetes are at risk of experiencing delayed lactogenesis II which may negatively impact breastfeeding outcomes in women with gestational diabetes. Early initiation of breastfeeding and continued, frequent breastfeeding and/or pumping stimulates milk production and may reduce the risk of delayed lactogenesis II.

**Implications for practice:** Nurses and other healthcare providers working with women diagnosed with gestational diabetes should encourage early, frequent breastfeeding and pumping to facilitate the transition to lactogenesis II and promote breastfeeding in this at-risk population. As gestational diabetes rates increase globally, it is imperative that healthcare providers and health researchers around the world work together to address the lactation needs of this at-risk population to promote maternal-infant health outcomes associated with breastfeeding.

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**Title:**

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**Keywords:**

breastfeeding, gestational diabetes and lactation

**References:**

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### **Abstract Summary:**

Presentation of findings regarding early postpartum breastfeeding and colostrum biomarkers of women with and without gestational diabetes mellitus to examine differences in perceived milk “coming in” and metabolite concentrations. Discussion of international, interdisciplinary collaborative study including facilitators, barriers, and lessons learned.

### **Content Outline:**

#### I. Introduction

A. Breastfeeding rates among women with gestational diabetes compared to non-diabetic women

B. Early breastfeeding challenges of women with gestational diabetes

#### II. Benefits of breastfeeding

A. Overall population benefits

B. Benefits for maternal-infant dyads affected by gestational diabetes

#### III. Delayed lactogenesis II and perceived delay in milk “coming in”

A. Symptoms of delay

B. Biomarker evidence of delay

#### IV. Approaches to overcome delayed lactogenesis II

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### **Primary Presenting Author**

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**Author Summary:** Dr. Ilana Chertok is a Professor and Associate Director of Nursing Research and Scholarship at Ohio University, School of Nursing. As a nurse-researcher, epidemiologist, and lactation consultant, her primary focus is maternal-infant health research. She engages in interdisciplinary research in the United States and abroad and has mentored students and professionals of various disciplines in health research. Dr. Chertok has published and presented her work in national and international journals, conferences, and other professional forums.

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**Author Summary:** Dr. Haile has extensive experience with both primary and secondary data analyses using epidemiological methods with expertise in research designs and methodology, statistical data analysis and statistical computing. Primarily, his work has focused on factors influencing maternal-infant health outcomes. He also has extensive experience working collaboratively on health research in various African countries.