AADE Webinars

Gestational Diabetes: Successful Pregnancies

Program Overview

Gestational diabetes affects about 4% of all pregnant women, which translates to about 135,000 cases of gestational diabetes in the United States each year according to the American Diabetes Association. During this webinar, you will learn how to integrate current concepts for treatment guidelines, evidence-based practice, and education strategies to focus on optimal outcomes during pregnancy as well as post pregnancy in women with gestational diabetes.

Program Goals

The goal of this program is to help clinicians understand how treatment and education can minimize the impact of gestational diabetes during pregnancy.

Learning Objectives

Upon completion of this knowledge-based program, the participant will be able to:

- Describe current practice trends for treating gestational diabetes
- Identify potential gestational diabetes complications and outcomes.
- Explain how to implement gestational diabetes education strategies in daily practice.
- Care of the post partum woman with gestational diabetes

Disclaimer

The information presented in this webinar/webcast is intended to inform you about the knowledge, techniques, and experiences of professionals who are will to share such information with colleagues. It is not intended to be a substitute for independent medical judgment relative to medical diagnostic and treatment of a specific condition under the guidance of a physician.

This presentation may contain discussion of off-label use of a product, investigational use or indications not approved by the FDA. It should be understood that such dialogue does not represent the viewpoints or constitute endorsement by the American Association of Diabetes Educators. It should also be understood that AADE does not endorse specific brands or products that may be referenced in the dialogue.

Viewpoints and opinions discussed during the webinar/webcast are entirely those of the speaker and don't represent the opinions and viewpoints of AADE. The AADE cannot be held liable or responsible for any problems that may arise in the participation of this activity or following treatment recommendations presented. All faculty and planner disclaimers will be available to the participants.

Faculty

Laura Hieronymus, MSEd, RN, BC-ADM, CDE
Diabetes Nurse Specialist, Medical Information Senior Specialist
Amylin Pharmaceuticals, Inc.
Nicholasville, Kentucky

Laura Hieronymus is an active member of the American Association of Diabetes Educators and American Diabetes Association and has served as faculty, as well as in a variety of volunteer leadership roles. She also has experience as a Sigma Theta Tau Nursing Honor Society media expert and has participated as an item reviewer for the National Certification Board for Diabetes Educators.

Laura has received numerous awards, including 2006 American Diabetes Association's Cure, Care, and Commitment Award, the 2006-07 American Association of Diabetes Educator's Diabetes Educator of the Year and the 2008 Kentucky Hall of Fame Award presented by the American Diabetes Association. During her career, Laura has presented a variety of professional/consumer programs/webinars as a national, regional, and local speaker and has authored many articles and publications and has also written or contributed to six books, including Diabetes Staff Inservice and Patient Education Manual (2002) and 8 Weeks to Maximizing Diabetes Control (2008). She currently serves on the editorial board and as co-author for a diabetes consumer magazine, Diabetes Self-management, bi-monthly magazine column-"Diabetes Basics".

Claudia Shwide-Slavin, MS, RD, BC-ADM, CDE
Advanced Practice Dietitian Diabetes Educator
Private Practice
New York City, NY

Claudia Shwide-Slavin is an advanced practice Registered Dietitian specializing in the fields of Diabetes and Pregnancy for over twenty years. Ms. Slavin developed her interest in diabetes, pregnancy and carbohydrates while working with gestational patient at her internship with Columbia Presbyterian Medical center.

For the past 10 years she has helped teach women and physicians from all the major hospitals in the New Metropolitan area to safely manage blood glucose during pregnancy. Ms. Slavin is currently serving as an AADE Board of Director through 2011.

Faculty Disclosures

It is the policy of the American Association of Diabetes Educators to require that anyone who has an opportunity to affect continuing education activities content (e.g. authors, presenters and program planners) with products or services from a commercial interest with which s/he has financial relationships, discloses those financial relationship/s with commercial entities to participants.

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- Claudia Shwide-Slavin, MS, RD, BC-ADM, CDE, serves as a consultant and on the Diabetes Interactive Network Leadership Team for Eli Lilly and Company USA; serves as a consultant and is on the Global Diabetes Education Advisory Board for Eli Lilly and Company Global; is an insulin pump trainer for Animas Corp and Medtronic Minimed Corp; and is a nutition expert consultant for MacNeil Nutritionals.
- Laura Hieronymus, MSEd, RN, BC-ADM, CDE, is a medical development employee of Amylin Pharmaceuticals, Inc.
- Vicki Weiss has no disclosures to report.

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REGISTERED NURSES
The American Association of Diabetes Educators is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

This educational program will provide 1.5 contact hours of continuing education credit.

AADE is accredited as a provider of continuing nursing education by the California Board of Registered Nursing (CEP # 10977).

REGISTERED DIETITIANS
The American Association of Diabetes Educators is a Continuing Professional Education (CPE) Accredited Provider with the Commission on Dietetic Registration (CDR). Registered dietitians (RDs) and dietetic technicians, registered (DTRs) will receive 1.5 of continuing professional education units (CPEUs) for completion of this program/material.

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The American Association of Diabetes Educators is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. This program provides 1.50 contact hours (0.150 CEU's) of continuing education credit.
ACPE Universal Program Number: 0069-0000-10-143-H01-P
Effective Dates: 5/5/2010 - 5/5/2012

Certified Diabetes Educators: To satisfy the requirements for renewal of certification for the National Certification Board of Diabetes Educators (NCBDE), continuing education activities must be diabetes related and approved by a provider on the NCBDE list of Approved Providers (~~www.ncbde.org~~). NCBDE does not approve continuing education. The American Association of Diabetes Educators (AADE) is on the NCBDE list of Approved Providers.

Instructions for Receiving CE Credit

In order for each participant to receive continuing education credit for this program, each participant must:

- Sign in to register on the appropriate discipline sign-in sheet
  - The site registrant should mail or fax the sign-in sheets to AADE per the instructions on the bottom of the sheets. The sign-in sheets are located at the end of this booklet.
- Participate in the entire 90-minute webinar
- Complete the online program evaluation at the following links:
  - **All participants EXCEPT pharmacists**:
    https://www.surveymonkey.com/s/7NLKVKY
  - **Pharmacists**:
    https://www.surveymonkey.com/s/7NJ2NPF
  - Following completion of the evaluation, a Statement of Credit will display for you to print and maintain in your professional files

Gestational Diabetes: Successful Pregnancies

AADE Webinar
Wednesday, May 5, 2010
1:00 – 2:30 pm EST

Faculty

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Diabetes and Nutrition Private Practice
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Program Goal

- The goal of this program is to understand how treatment and education can minimize the impact of gestational diabetes during pregnancy.

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Program Objectives

- At the end of this session, the participant will be able to:
  - Describe current practice trends for treating gestational diabetes
  - Identify potential gestational diabetes complications and outcomes
  - Explain how to implement gestational diabetes education strategies in daily practice
  - Describe post partum care in the woman with gestational diabetes

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"A mother is she who can take the place of all others but whose place no one else can take."

-- Cardinal Mermillod

Momscape: Top 50 Mother Quotes. Accessed at :http://www.momscape.com/articles/mother-quotes.htm (2010).

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What is Gestational Diabetes Mellitus?

Gestational Diabetes Mellitus (GDM) is any degree of glucose intolerance with onset or first recognition during pregnancy.

- **GDM is a common medical problem during pregnancy**
- **In GDM, progressive insulin resistance due to increased placental hormone secretion and weight gain occurs, exceeding the capacity of the beta-cell to respond**

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010.

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GDM: By the Numbers

- **GDM affects ~ 7% of all pregnancies**
- **~ 7% = ~ 200,000 cases diagnosed in the US annually**
- **Occurs more frequently among African Americans, Hispanic/Latino Americans and Native Americans**
- **Women with a history of GDM have a 66% chance of developing GDM with subsequent pregnancies**
- **Women with GDM have a 40-60% chance of type 2 diabetes in 5-15 years post GDM**

American Diabetes Association: Gestational diabetes mellitus (Position Statement).Diabetes Care 33 (Suppl. 1):S15, 2010.
Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 157.

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Normal Insulin Requirement During Pregnancy

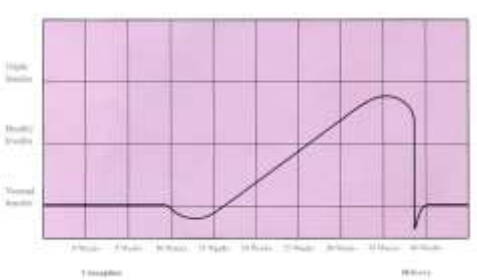

Diagram from *Diabetes Management for Mothers-to-Be. "You can do it"*. Bayer Corporation, 2006.

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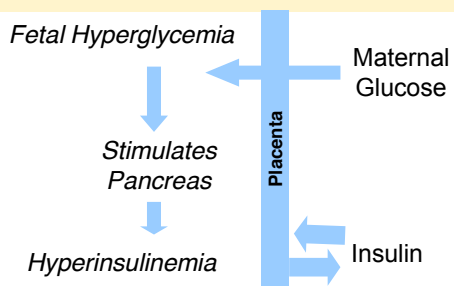
GDM: "Abnormal" Glucose Metabolism and Insulin Secretion in Pregnancy

- Women with GDM have abnormal 1st phase insulin release
- Absent 1st phase insulin release can exaggerate 2nd phase response
  - Rapid appearance of meal carbohydrates
  - Unrestricted hepatic glucose production
- Rapid fall in blood glucose 2-3 hours later triggers hunger and the cycle of high-low blood glucose

RW Huff, CJ Pauerstein (ed): Human Reproduction- Physiology and Pathophysiology, John Wiley and Sons, 1979.

10

Effect of Maternal Glucose on Fetus



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The HAPO Study

HAPO – Hyperglycemia and Adverse Pregnancy Outcome Study

- Study Objective — To clarify associations of levels of maternal glucose lower than those diagnostic of diabetes with perinatal outcome
- Study — Accomplished by performing 75-gram OGTT on a heterogeneous, multinational, multicultural, ethnically diverse cohort of ~25,000 women in 3rd trimester
- Data — Collected on associations between maternal glycemia and risk of specific adverse outcomes
- Goal — Use data to derive internationally acceptable criteria for diagnosis and classification of GDM

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010.

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HAPO Cohort: Adverse Outcomes Evaluated

- **Primary**
  - Birth weight >90th percentile
  - Primary C-section delivery
  - Clinically defined neonatal hypoglycemia
  - Cord C-peptide >90th percentile
- **Secondary**
  - Preeclampsia
  - Preterm delivery
  - Shoulder dystocia / birth injury
  - Hyperbilirubinemia
  - Intensive neonatal care

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010

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HAPO Study: Determining Diagnostic Thresholds

- When any of the glucose values were ≥ the threshold, the frequency of birth weight, C-peptide, or % infant body fat >90th percentile was ~2-fold greater
- When one or more glucose values were ≥ the threshold:
  - the frequency of preeclampsia as 2-fold higher
  - the frequency of preterm delivery and primary C-Section were >45% higher
- Strong associations between maternal glucose and maternal glucose and preeclampsia and shoulder dystocia and/or birth injury were observed

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010.

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Threshold Values for Diagnosis of GDM

HAPO data show strong linear association of risks for >90th percentiles of birth weight, cord C-peptide and percent body fat with each of three measures of maternal glucose (FPG, 1-h and 2-h post-75-g load).

Glucose measure	Glucose concentration threshold*
Fasting	≥92 mg/dL
1 hour	≥180 mg/dL
2 hour	≥153 mg/dL

*** Once or more of these values from a 75-g OGTT must be equaled or exceeded for the diagnosis of GDM.**

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010.

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Diagnosis: Hyperglycemia in Pregnancy

First Prenatal Visit

- **Measure FPG, A1C, or random plasma glucose on all or only high-risk women**
  - **If results indicate overt diabetes: Treatment and follow-up as for pre-existing diabetes**
  - **If results not diagnostic of overt diabetes:**
    - **and FPG ≥ 92mg/dL, but ≤ 126mg/dL: Diagnose as GDM**
    - **or FPG ≤ 92mg/dL: Test for GDM from 24-28 weeks with 75-g OGTT**

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010

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Diagnosis: Hyperglycemia in Pregnancy

24-28 Weeks' Gestation: Diagnosis of GDM

- 2-h 75 OGTT: perform after an overnight fast on all women not previously found to have overt diabetes or GDM during testing (earlier in this pregnancy)
  - **Overt diabetes** if FPG ≥ 126mg/dL
  - **GDM** if one or more values equals or exceeds diagnostic thresholds
  - **Normal** if all values on OGTT less than diagnostic thresholds

Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010

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Managing Gestational Diabetes Mellitus:

A Case Study*

***Patient prototype, not an actual patient**

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Case Study: "Anjali"* Assessment

- Indian female, raised in the United States, referred at Week 28, first pregnancy
- Age: 35 years
- Height: 60 inches
- Weight: 141 lb, pre-pregnancy weight 130 lb
  - 15 lb weight gain over past 5 years
  - Sedentary job with extensive travel
- BMI = 25.5

*Patient prototype, not an actual patient

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Case Study: "Anjali"* Assessment

- Family history of type 2 diabetes mellitus
- Results of 75 g OGTT:
  - Fasting: 92 mg/dL
  - 1 hour: 210 mg/dL
  - 2 hour: 215 mg/dL
- A1C: 5.6%
- Iron deficiency anemia (additional laboratory values are within normal range for pregnancy)
- Medication: Prenatal Vitamin with Iron

*Patient prototype, not an actual patient

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Healthy Eating
Being Active
Monitoring
Taking Medication
Problem Solving
Healthy Coping
Reducing Risks

American Association of Diabetes Educators, www.diabeteseducator.org accessed March, 2010

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Self Care Behavior: Healthy Eating

- The goal of Medical Nutrition Therapy (MNT) is to keep the peak postprandial glucose response in the normal range
- To deliver healthy babies without adverse primary and secondary outcomes
- To decrease pregnancy-related discomforts, such as hypoglycemia, nausea, vomiting, constipation & heartburn
- To maintain the pleasure of eating

Uplinger N. Current Diabetes Reports 2009,9:291-295. Nutritional Management of the Pregnancy Complicated by Diabetes;The Controversy Continues:Nutritional Management of the Pregnancy Complicated by Diabetes.
Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition 22

Self Care Behavior: Healthy Eating

- Nutritional recommendations are based on individual nutrition assessment within 48 hours of GDM diagnosis
- To meet energy, protein, fat, vitamin and mineral needs for growth and maintenance of the fetus, placenta and maternal tissues
- To limit excess carbohydrates in meals
- To consume adequate calories to avoid maternal ketosis (1700-1800/day)

American Diabetes Association: Nutrition Reccommendations and Interventions for Diabetes. A position statement of the American Diabetes Association. Diabetes Care 2008,31(Suppl):S61-78. 23

Recommended Total Pregnancy Weight Gain By Prepregnancy Body Mass Index (BMI)$_{kg/m2}$:

- Underweight (<18.5 BMI): 28-40 lb
- Desirable Body Weight (18.5-24.9 BMI): 25-35 lb
- Overweight (25-29.9 BMI): 15-25 lb
- Obese (>30 BMI): 11-20 lb
- Twin pregnancies : 35-45 lb

IOM (institute of Medicine) Weight Gain During Pregnancy: Reexamining the Guidelines. Washington DC: The National Academies Press. Posted online May 28, 2009. Accessed March 20, 2010. 24

Self Care Behavior: Healthy Eating

- Daily caloric intake based on pre-pregnancy weight status:
  - BMI <18.5: 36-40 kcal/kg/day
  - BMI 18.5-24.9: 30 kcal/kg/day
  - BMI 25-29.9: 24 kcal/kg/day
  - BMI >30: 12-18 kcal/kg/day

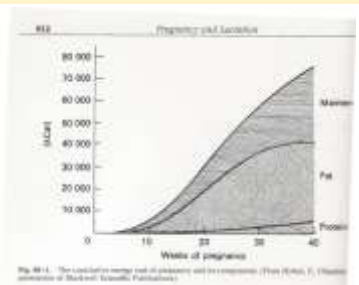
American Diabetes Association: Gestational diabetes mellitus (position Statement).Diabetes Care 27 (Suppl. 1):S88-90, 2004.

Institute of Medicine Nutrient Recommendations for Pregnancy

- Energy: +340 cal/day 2nd trimester
  +452 cal/day 3rd trimester
- Carbohydrate: 175 grams/day
- Fiber: 28 grams/day
- Protein: 1.1 grams/kg/day
- Fat 20-35% calories per day
- Fluid : 8-10 cups/day to prevent dehydration

2006 IOM Dietary Reference Intakes (DRI) *The Essential Guide to Nutrient Requirements 2006.* 26

"Normal" Carbohydrate Metabolism in Pregnancy



Shils ME, Young VR. Modern Nutrition In Health And Disease , 7th edition, p.932 27

Institute of Medicine
Vitamin & Mineral Recommendations for Pregnancy

Focus on healthy eating. Inadequate evidence to support use of prenatal supplements but should meet pregnancy needs when taken:

- ***Iron: 30 mg***
- ***Zinc: 15 mg***
- ***Calcium: 1000 mg***
- **Sodium :1500 mg**
- **Chromium 30 ug**
- ***Vitamin B-6: 2 mg***
- ***Folate: 600 ug***
- ***Vitamin C: 85 mg***
- ***Vitamin D: 5 ug***

Institute of Medicine, *Dietary Reference Intakes, The Essential Guide to Nutrient Requirements 2006.*
Position of the American Dietetic Association: Nutrition and Lifestyle for a Healthy Pregnancy Outcome *J Am Diet Assoc. 2008;108:553-561. Accessed March 20, 2010.*

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Self Care Behavior:
Healthy Eating

- **Carbohydrate is the primary nutrient affecting blood glucose**
- **Distribute carbohydrate based on glycemic control**
- **Encourage fiber in whole grains, legumes, fruit and vegetables**
- **Self blood glucose monitoring to evaluate / modify meal plan**

Kitzmiller J, Jovanovic L, Brown F et al (Editors). Managing Preexisting Diabetes and Pregnancy Technical Review and Consensus Recommendations for Care. Amer Diabetes Assoc 2008.

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Self Care Behavior:
Healthy Eating

- **175 grams per day RDA for Carbohydrates in Pregnancy**

	CALORIES	CHO
Breakfast	**10-15 %**	**18-26 g**
Snack	**5-10 %**	**9-18 g**
Lunch	**20-30 %**	**35-52 g**
Snack	**5-10 %**	**9-18 g**
Dinner	**30-40 %**	**52-70 g**
Snack	**5-10 %**	**9-18 g**

IOM 2002 RDA's for Pregnancy
Kitzmiller J, Jovanovic L, Brown F, et al (Editors). Managing Preexisting Diabetes and Pregnancy Technical Review and Consensus Recommendations for Care. Amer Diabetes Assoc 2008.
Jovanovic-Peterson L, Sparks SP, Peterson CM:Dietary manipulation as a primary treatment strategy for pregnancies complicated by gestational diabetes. J Am Coll Nut 9:320-25, 1990

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Case Study: Anjali* BMI 25.5
Diet History Assessment

Current intake 350 grams of CHO, >3000 calories

- Breakfast: Fiber One Raisin Bran cereal, skim milk
- Snack: 8oz fruit juice and 2 turkey sausage
- Lunch: prepared food "chicken with citrus soy sauce and brown rice" with a regular soft drink
- Snack: 1 peach and 1 small box raisins from the office vending machines
- Supper: prepared food 2 Chinese fried chicken wings, 1 veggie dumpling, chicken and vegetables in chili sauce, rice with Chinese/Indian cheese dish/heavy tomato sauce
- Bedtime snack: whole wheat toast with butter

*Patient prototype, not an actual patient

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Case Study: Anjali*
1450 Calorie Meal Plan
45% CHO, 30% PRO, 25% FAT

- Breakfast 30g cho
  - 1 scrambled egg
  - 1 slice whole grain bread
  - 1 tsp. butter in cooking
  - 1 cup skim milk
- Lunch 30g cho
  - 3-4 oz. white meat chicken
  - 2 tsp. mayonnaise
  - 2 slices wheat bread or pita
  - Green salad
  - 1 Tbl. Oil and vinegar dressing
- Mid-Morning Snack 15g cho, 1oz protein
  - Homemade "trail mix"
    - 1/4c cottage cheese
    - 2 Tbl dried fruit
    - 10 peanuts
    - or 8oz sugar-free yogurt
- Afternoon Snack 30g cho, 1oz protein
  - 1 medium (8oz) apple
  - 1 cheese stick

*Patient prototype, not an actual patient

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Case Study: Anjali*
1450 Calorie Meal Plan
45% CHO, 30% PRO, 25% FAT

- Dinner 45g cho
  - 3-4 oz. ground beef patty or fish
  - 1 cup cooked rice
  - 2 tsp. olive oil
  - 1 cup cooked broccoli
- Bedtime Snack 15g cho
  - ½ cup vanilla ice cream or
  - ½ cup sugar free pudding

*Patient prototype, not an actual patient

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Case Study: Anjali*
Behavior Change Goal

"I will limit my carbohydrate portions at each meal and snack and monitor my (after meal) blood glucose test results."

*Patient prototype, not an actual patient

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Self Care Behavior:
Healthy Eating

Glycemic Index

- **ADA consensus statement GI food effects can benefit blood glucose control when total carbohydrate considered alone**
- **Food ranking based on percent increase in blood glucose after eating food as compared to a 100 gram sugar or white bread**
- **Whole grains, leafy green and yellow vegetables, starch is recommended over sugar in meals to help glucose swings**

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 113-137.

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Self Care Behavior:
Healthy Eating
5 FDA Nonnutritive Sweeteners

Acesulfame K, Aspartame, Neotame, Saccharin and Sucralose are approved for pregnancy

American Dietetic Association position:

- Avoid Saccharin; it crosses the placenta, is slow to clear fetal tissues and crosses into breast milk
- Avoid Ace-K in breast milk
- Avoid Aspartame with risk of unknown PKU
- Moderate consumption is encouraged

American Dietetic Association: Evidence analysis library. Available at http:/www.adaevidencelibrary.com . Accessed March 20, 2010.

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Self Care Behavior:
Healthy Eating
Herbal Supplements

- No controlled research studies to determine safety and efficacy in pregnancy
- Commonly used herbals may cause side effects and drug interactions
  - Uterine stimulation, Tachycardia, Hypotension, Bleeding, Preterm labor and Intrauterine growth retardation

Shane-McWhorter L. Complementary & Alternative Medicine (CAM) Supplement Use in People With Diabetes. 2007

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Self Care Behavior:
Healthy Eating
Pregnancy Precautions

- Mercury
- PCBs
- Bacteria
- Food preparation

http://www.epa.gov/fishadvisories/advice/. Accessed April 1. 2010
http://www.americanpregnancy.org/pregnancycomplications/listeria.html

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Self Care Behavior:
Healthy Eating
Pregnancy Precautions

- Caffeine
  - Limit to less than 200 mg/day
  - Absorption of calcium, zinc and iron is decreased by caffeine
- Alcohol
- Smoking
- Recreational Drugs

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Self Care Behavior: Being Active

- Safest form of exercise does not cause fetal distress, low infant birth rate, uterine contractions or maternal hypertension
- Appropriate exercises use upper body muscles or place little mechanical stress on the trunk region during exercise

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition;127-128.)

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Self Care Behavior: Being Active

- Women with GDM have 40-60% chance developing T2DM in 5-15 years
- Prevalence rate drops to 25% if after delivery the woman becomes lean and fit

Metzger BE:Summary and recommendations of the Fifth International Workshop-Conference on Gestational Diabetes. Diabetes Care 30 (Suppl. 2):197-201,1991
Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition;127

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Self Care Behavior: Monitoring

Glucose monitoring is paramount in the gestational diabetic woman.

Self-monitoring of Blood Glucose (SMBG) Goals in GDM

	SMBG Goals
Fasting	60- 90 mg/dL
1 hour post-prandial	≤ 120 mg/dL

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 115.
Metzger BE, et.al: International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* 33(3):676-682, 2010.

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Self Care Behavior: Monitoring

- Blood glucose monitoring
  - At least four times daily
  - Meters with memory capability
  - Ongoing SMBG surveillance (weekly)
  - Consideration of lag-time if alternative site testing used
  - Validate accuracy of meter and monitoring technique
- Urinary ketone testing
  - Use with severe hyperglycemia, weight loss during treatment (or other concerns for starvation ketosis)

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 130-132.

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Case Study: Anjali* Self Care Behavior: Monitoring

	Breakfast		Lunch		Supper	
	Pre	Post	Pre	Post	Pre	Post
Monday	94	160		118		123
Tuesday	113	137		111		123
Wednesday	95	121		103		103
Thursday	93	152		102		117
Friday	102	112		101		106
Saturday	99	134		121		105
Sunday	102	120		103		

Comments: Ketone Testing: 4 out of 7 days are "trace" or "small".

*Patient prototype, not an actual patient

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Self Care Behavior: Taking Medication

Two or more glucose measurements within 1 or 2 wk that exceed the recommended goals should prompt either reassessment of glycemia within the next few days or the institution of insulin therapy.

Guidelines for Insulin Initiation in GDM

	SMBG
Fasting	**≥ 90 mg/dL**
1 hour post-prandial	**≥ 120 mg/dL**

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 130-132.

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Self Care Behavior:
Taking Medication: Insulin

Insulin preparations of low antigenicity will minimize the transplacental transport of insulin-antibodies.

- ***Human insulin*** **is the gold standard for use in pregnancy**
- ***Lispro*** **and** ***aspart*** **are accepted as part of general diabetes pregnancy care**
- **Glargine and detemir are category C in pregnancy; thus** ***human NPH*** **should be used as longer-acting insulin choice**

Insulin molecule

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 128-130.
What is Insulin? http://www.3dchem.com/molecules.asp?ID=196#.

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Self Care Behavior:
Taking Medication: Oral Agents

- **Glyburide (glibenclamide)**
  - **Minimal (4%) transfer across human placenta**
  - **Level "A" evidence for use**
  - **More research is needed**
- **Metformin**
  - **Crosses the placenta**
  - **No evidence to support recommendation**
- **Acarbose**
  - **Reduction in PPG, abdominal cramping**
  - **Further study to evaluate potential placental passage**

Use of TZDs, glinides, and GLP-1 during pregnancy is considered **experimental.** There are no controlled data available in pregnancy for these medications.

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 128-130.

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Case Study: Anjali*
Self Care Behavior:
Taking Medication

	Breakfast		Lunch		Supper	
	Pre	Post	Pre	Post	Pre	Post
Monday	94	160		118		123
Tuesday	113	137		111		123
Wednesday	95	121		103		103
Thursday	93	152		102		117
Friday	102	112		101		106
Saturday	99	134		121		105
Sunday	102	120		103		

Comments: Ketone Testing: 4 out of 7 days are "trace" or "small".

***Patient prototype, not an actual patient**

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Self Care Behavior:
Problem Solving

Anjali's* Questions:

- Will my baby be OK?
- Will my baby have diabetes?
- Can I exercise?
- Will I have to have a "C-Section"?
- Should I not eat if my blood glucose is too high?, When do I call?
- What do I do if I have ketones?
- Will my diabetes go away?

*Patient prototype, not an actual patient

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition;130-134. 49

Self Care Behavior:
Healthy Coping

Tips for Dads

- One, two, tie her shoe
- Three, four, open her door
- Five, six, support her fingersticks
- Seven, eight, don't ask about her weight
- Nine, ten, start this list again

Adapted from: Dunton, D. *What You Can Do For Her When She is Expecting.* 50

Self Care Behavior:
Healthy Coping

Diabetes education walks a fine line between hope and reality…

-- Lois B. Jovanovic

- GDM diagnosis increases stress levels
- Anxiety and fear of insulin
- Use open-ended questions
- Repeat and reinforce messages
- Get the woman involved in day-to-day problem solving and decision making

Self Care Behavior: Reducing Risks

- Setting an initial follow-up appointment
- Frequency of return visits until delivery
- Setting postpartum follow-up appointment

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Self Care Behavior: Reducing Risks

Evaluation of:

- Meal plan changes needed
  - Hunger
  - Adequacy
- Self-monitoring of blood glucose
  - Frequency
  - Goals
- Assess treatment plan
  - Adequate carbohydrate in meal plan
  - Adequate available insulin

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Self Care Behavior: Reducing Risks (Insulin Treatment)

If the patient is treated with insulin…

- Treatment recommendations for hypoglycemia:
  - If BG is <60 mg/dL, consume 15 grams carbohydrate
  - Recheck BG in 15 minutes
  - Repeat 15 grams carbohydrate if BG remains <60 mg/dL
  - If hypoglycemia occurs within 30 minutes of meal or snack, eat sooner
  - All women should be instructed to carry at least 15 grams of carbohydrate

American Dietetic Association *Guide to Gestational Diabetes Mellitus*. p.73, box 7.2, 2005.

54

Self Care Behavior: Reducing Risks (Postpartum)

Timing and mode of delivery are not only decided by the classic obstetric indications but also by the glycemic control of the mother.

- Breast feeding is recommended for women with GDM
- Exclusive breast feeding may protect against Type 2 diabetes in the offspring of women with GDM
- Breast feeding may reduce the risk of Type 2 diabetes in mothers by improving glucose homeostasis

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 115.
American Dietetic Association *Guide to Gestational Diabetes Mellitus*. p.104-106, 2005.

55

Case Study: Anjali* Reducing Risks (Postpartum)

- Monitor Anjali's* blood glucose levels until discharge (post delivery)
- SMBG X 1 wk postpartum, Anjali* should report any elevation to the physician
- Spot-check (SMBG) as directed
- Anjali* (previous GDM) should have:
  - OGTT 6-8 wk postpartum
  - Annual laboratory plasma glucose measurements

*Patient prototype, not an actual patient

Medical Management of Pregnancy Complicated by Diabetes. Editor Jovanovic L. 2009,4th edition, 115.

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The Ultimate Outcome Measurement…

A Healthy Baby!!!

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Questions?

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- 10/13: Depression and Stress: A Distressing Duo

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