NUTRITIONAL MANAGEMENT OF DIABETES DURING PREGNANCY

LILY NICHOLS, RDN, CDE

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DISCLOSURE/AFFILIATIONS

• Lily Nichols is the author the book, Real Food for Gestational Diabetes

• This webinar is considered a resource, but does not define the standard of care in California. Attendees are advised to adapt the guidelines and resources based on their local facility’s level of care and patient populations served and are also advised to not rely solely on the guidelines presented here.
OBJECTIVE

- Participants will be able to:
  - Discuss basic components of Medical Nutrition Therapy (MNT) and exercise in management of gestational diabetes
  - Describe MNT interventions during and after pregnancy complicated by gestational diabetes that can reduce lifetime risk of obesity and type 2 diabetes
OVERVIEW

• Discuss key dietary changes for women with GDM
• Tips for managing holidays/celebrations
• Review role of safe exercise in managing GDM
• Brief discussion of postpartum nutrition
GOALS OF MEDICAL NUTRITION THERAPY

- Individualized, balanced meal plan
- Evidence-based recommendations
- Adequate maternal and fetal nutrition
- Vitamin/mineral supplementation as needed
- Appropriate weight gain
- Normoglycemia
- Promotion and support of breastfeeding
## Prenatal Weight Gain
*(Based on 2009 IOM Guidelines)*

<table>
<thead>
<tr>
<th>Category</th>
<th>BMI</th>
<th>Recommended total wt gain ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Singleton</td>
</tr>
<tr>
<td>Underweight</td>
<td>&lt;18.5</td>
<td>28-40 lbs</td>
</tr>
<tr>
<td>Normal</td>
<td>18.5-24.9</td>
<td>25-35 lbs</td>
</tr>
<tr>
<td>Overweight</td>
<td>25.0-29.9</td>
<td>15-25 lbs</td>
</tr>
<tr>
<td>Obese</td>
<td>≥ 30</td>
<td>11-20 lbs</td>
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</table>
PRENATAL NUTRIENT NEEDS

CALORIES

• 1st trimester (0-12 wks) energy needs remain the same as during preconception

• 2nd and 3rd trimester energy (kcal) requirements gradually increase from 13+ weeks
  • Debatable, approximately 300-500 kcal extra
MACRONUTRIENTS

• Protein - 1.1g/kg from 13+ weeks
• Carbohydrate –
  • 130g/day preconception through 1st trimester
  • 175g/day in 2nd and 3rd trimester
• Fat – emphasize monounsaturated fats, limit trans fats (found in shortening, fried foods, etc)
  • Trans fats may worsen insulin resistance
PRENATAL OBESITY

- No consensus on determining energy needs for overweight and obese pregnant women
  - Minimum 1800 kcal for adequate nutrition
  - Careful monitoring to ensure adequate intake
  - Track rate of weight gain

- Morbidly obese (BMI > 40) may benefit from stricter weight gain goals
GENERAL RECOMMENDATIONS

- 3 small meals and 3+ snacks eaten 2-3 hours apart
- Consistent schedule
- Avoid more than 10 hours between bedtime snack and breakfast
- Synchronize meals + snacks with meds/insulin
- Encourage pattern management + food records
CARBOHYDRATES

- Spread carbohydrate load over 3 small meals and 3 or more snacks.
- Portion control
- CHO not well tolerated at breakfast (as low as 15g)
- No more than 15-30g CHO at snacks
- Flexible CHO intake with the use of insulin
- Individualized, realistic meal plan
NUTRITION GUIDELINES FOR GDM CONTINUED

CARBOHYDRATES
• Fruit: 2+ servings daily of fresh fruit, not at breakfast
  • No juice

• Milk/yogurt: 3-4 servings daily, not at breakfast
  • For soymilk or non-dairy milk: read labels, unsweetened

• Starch/Bread: 7 servings daily. Whole grain, high fiber, not “instant”
NUTRITION GUIDELINES FOR GDM CONTINUED

- Protein/Meat and Vegetarian alternates: 7 or more ounces.
  - Spread throughout the day

- Vegetables: liberal amounts of non-starchy green vegetables.

- Fats: 6+ portions/day.
  - Avoid trans fats
RECOMMENDATIONS: FOODS TO LIMIT

- Cold/instant hot cereals, instant rice, instant noodles, instant potatoes
  - Elevated glycemic index = elevated postprandial BG = higher risk for macrosomia
- Sweetened Beverages
  - Sports drinks
  - Energy drinks
- Fruit juice, even 100% juice
My Plate for Gestational Diabetes
VISUALIZE A HEALTHIER PLATE
California
MyPlate for Gestational Diabetes

When you are pregnant and have diabetes, you have special nutrition needs. Use MyPlate for Gestational Diabetes to help you manage your blood sugar. This will help keep you and your baby healthy. Every day, eat the number of servings/choices of food shown below. Talk to a registered dietitian (RD) to develop a meal and exercise plan that will meet your needs.

⚠️ Limit Your Carbohydrates. When you have gestational diabetes, the type and amount of carbohydrates matter. Vegetables, Grains, Fruits, and Dairy contain carbohydrates. Some have more and some have less. Eating too many or the wrong type of carbohydrate may raise your blood sugar. Avoid foods with added sugar or white flour, such as cookies, candy and soda.

**Vegetables**
Eat non-starchy vegetables.

- Use fresh, frozen or low-sodium canned vegetables.
- For diabetes, starchy vegetables like potatoes, sweet potatoes, yams, peas, corn & winter squash count as a Grain, not a Vegetable.

**Daily Amount**
- 6 or more of these choices:
  - 2 cups raw leafy vegetables
  - 1 cup raw vegetables
  - 1/2 cup cooked vegetables

**Protein**
Choose lean protein.

- Avoid bacon, hot dogs & bologna.

**Daily Amount**
- 6 or more of these choices:
  - 1 ounce fish, poultry, lean meat, or cheese
  - 1/4 cup cottage cheese
  - 1 egg
  - 1 ounce nuts
  - 1/2 cup tofu
  - 2 Tablespoons nut butter

**Grains**
For diabetes, beans & starchy vegetables count as Grains.

- Eat 100% whole grains.
- Avoid cold breakfast cereals.
- Avoid instant rice, noodles & potatoes.

**Daily Amount**
- 6 or more of these choices:
  - 1 slice whole wheat bread
  - 1/2 cup potato or yam
  - 1 small whole grain tortilla
  - 1/2 cup cooked dried beans, non-instant cereal, corn or peas
  - 1/3 cup cooked pasta, rice

**Fruits**
Eat unsweetened fruits of all colors.

- Do not drink fruit juice. Avoid fruit at breakfast. Limit dried fruit to 1/4 cup a day.

**Daily Amount**
- 6 or more of these choices:
  - 1 small apple
  - 17 small grapes
  - 1 cup papaya
  - 1/2 banana

**Dairy**
Choose only pasteurized plain milk or yogurt.

- For diabetes, cheese is in the Protein group. Do not eat yogurt or drink milk at breakfast.

**Daily Amount**
- 3 of these choices for women
- 4 of these choices for teens:
  - 1 cup 1% or fat free milk
  - 1 cup soy milk with calcium
  - 3/4 cup of plain yogurt

**Fats & Oils**
Fish has healthy fats. Eat cooked fish at two meals each week.

- Limit oils to 6 teaspoons each day.

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April 24, 2012
California
My Nutrition Plan for Gestational Diabetes

This is my plan until I meet with a registered dietitian (RD) for my personal meal and exercise plan.

EVERY day, I will:
- Eat 3 meals and 3 snacks, 2 to 3 hours apart.
- Eat my bedtime snack so that no more than 10 hours pass before I eat breakfast the next day.
- Drink plenty of fluids. I will choose caffeine-free, sugar-free beverages. I will limit coffee to 2 cups daily & not drink alcohol.
- Limit artificial sweeteners to 1 - 2 servings a day.
- Try to walk for 10 - 15 minutes after each meal, especially breakfast.

Include protein and carbohydrates at each meal and snack.
Eat at least 175 grams (g) of carbohydrates a day. For the amount of carbohydrates in one serving of food, see below:
- **Non-starchy Vegetables** = 5g
- **Protein** = 0g
- **Grains, Beans and Starchy Vegetables** = 15g
- **Fruit** = 15g
- **Dairy** = 15g

As a sample, meals may look like this:

**Breakfast**
- Eat 15g carbohydrates from the Grains group
  - Include:
    - 1-2 servings Protein
    - unlimited servings of non-starchy Vegetables
  - Do not eat Fruit, yogurt or drink milk.
  - Example of a breakfast:
    One egg omelet with cheese & vegetables and one slice toast

**Lunch and Dinner**
- 0-1 serving Fruit
- unlimited servings non-starchy Vegetables
- Eat 45g carbohydrates, not including non-starchy vegetables
  - Choose only one serving fruit, milk or yogurt at lunch and at dinner
- 0-1 serving milk or yogurt
- 2 servings Grains, beans or starchy vegetables
- 2-3 servings Protein

**Snacks**
- Eat 15g-30g carbohydrates from Fruit, Grains, or Dairy group
  - Include:
    - At least 1 serving Protein with every snack
    - unlimited servings of non-starchy Vegetables
  - Examples of snacks:
    - 1 small tortilla + 1 ounce cheese
    - 2 rice cakes + celery + 2 tablespoons nut butter
    - 1/2 banana + 24 almonds

Use MyPlate for Gestational Diabetes for serving sizes and the total number of servings from each group you need every day.

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TYPICAL CARB DISTRIBUTION

- Breakfast: 15+g (generally not fruit or milk)
- Snack: 15-30g
- Lunch: 45g
- Snack: 15-30g
- Dinner: 45g
- Snack: 15-30g

- Include protein + fat source with each meal/snack
- Choose high-fiber, unrefined carbs
- Unlimited non-starchy vegetables
EXAMPLE DAY (OMNIVORE)

- Breakfast: spinach-tomato omelet*, 1 slice whole wheat toast, butter
- Snack: **Greek yogurt*** + ½ cup berries
- Lunch: chicken*, ½ cup beans, 1 small tortilla, salsa, side salad with avocado, balsamic dressing, 1 cup milk*
- Snack: apple with peanut butter*
- Dinner: steak*, cooked green beans, onions, and bell peppers, 1 cup roasted potatoes (roasted in olive oil), 1 orange
- Bedtime snack: **whole grain crackers** and string cheese*

* = protein; **bold** = carb
EXAMPLE DAY (VEGETARIAN)

• Breakfast: spinach-tomato omelet*, 1 slice whole wheat toast, butter
• Snack: Greek yogurt* + ½ cup berries
• Lunch: 1 cup beans*, ½ cup corn, 1 small tortilla, salsa, side salad with avocado, balsamic dressing, 1oz shredded cheese* Snack: apple with peanut butter*
• Dinner: 1 cup lentils*, 2oz paneer or ricotta cheese*, cooked green beans, onions, and bell peppers, 1 orange
• Bedtime snack: whole grain crackers and almonds*

• Educate on carbohydrate content of vegetarian protein foods (legumes, dairy + dairy alternatives, nuts, meat alternatives, etc.)
• * = protein; bold = carb
SAMPLE SNACKS

• Apple + almonds
• ½ banana + peanut butter (no trans fat)
• Berries + cottage cheese or plain Greek yogurt
• Flavored Greek yogurt (check label for CHO's)
• Whole grain crackers + string cheese
• Small corn tortilla + cheese + salsa (quesadilla)
• Small corn tortilla + chx/beef + avocado (taco)
• 1 slice WW toast + hard boiled egg + butter
• 1 slice bread + tuna or salmon salad (1/2 sandwich)
• ½ cup refried beans + avocado + salsa
• ½ cup banana chips (no sugar added) + mixed nuts

* Can always add non-starchy vegetables!
NUTRIENTS OF CONCERN

• Vitamin D – mainly sunlight or supplements
• Calcium – dairy, leafy greens, almonds, etc
• Folate – 600 mcg/day
• Vitamin B12 – animal products or supplements

• All pregnant women should take a prenatal vitamin
• **Choline** – promotes brain development
  - RDA = 450mg when pregnant; 550mg/day breastfeeding
  - Best food sources: egg yolks, liver*
  - 2 whole eggs provide over ½ of daily needs
Nutrients of concern, Cont’d

• Omega-3 fats (DHA) – may enhance cognitive and vision development
  • Salmon, sardines, fish oils, eggs labeled “omega-3” or from pastured chickens, grassfed beef
  • Plant-sourced omega-3 (flax, chia, walnuts...) do not contain DHA with exception of certain algae
  • Bodily conversion of ALA → DHA is poor (1.9-3.8%)

Am J Clin Nutr June 2006 vol. 83 no. 6 S1467-1476S.
UPDATES: VITAMIN D

- Institute of Medicine (IOM) updated Dietary Reference Intake for Vitamin D for pregnant and lactating women in 2010
  - RDA increased to: 600 IU/day
  - Upper Level Intake increased to: 4,000 IU/day

- CDAPP Guidelines for Care follow the new IOM values
VITAMIN D DEFICIENCY

• Estimated that 20-85% of pregnant women are deficient in vitamin D worldwide

• Rates of deficiency vary by country of origin, skin color, latitude, etc

• Women of color at highest risk. Black women have 6-fold higher risk of deficiency compared to white women
  • J Nutr. 2007.
VITAMIN D: SCREENING

- American College of Obstetricians and Gynecologists (ACOG):
  - Vitamin D screening and supplementation during pregnancy is not required unless women:
    - Live in cold climates
    - Reside in Northern latitudes
    - Wear sunscreen and protective clothing
    - Are ethnic minorities
    - Are vegetarian
  - Ask yourself what % of your patients meet at least one of the criteria above
UPDATES: STEVIA

Stevia-Derived Sweeteners are SAFE

- GRAS status from FDA granted in 2008 for rebaudioside A (Reb A) and other stevia glycosides
- Sold as a grocery item
  - Powder or liquid extract
  - Also mixed into foods and beverages
- Sweet, non-bitter taste (200-250x sweeter than sugar)
- Reb A is the sweetest stevia glycoside
  - Examples: Truvia (Reb A), PureVia (Reb A)
UPDATES: STEVIA

Whole Herb Stevia is NOT SAFE

• Sold as supplement in health food stores
• Not sold in regular grocery stores
• Green leaves or green powder
• Sweet with bitter aftertaste

• Natural Medicines Comprehensive Database:
  • “insufficient evidence for its safety in pregnancy”
## Acceptable Daily Intake of Non-Nutritive Sweeteners

<table>
<thead>
<tr>
<th>Sweetener</th>
<th>ADI mg/kg</th>
<th>Amount in 12oz can of soda</th>
<th>Cans of soda = ADI for 60kg person</th>
<th>Amount in packet of sweetener</th>
<th>Packets = ADI for 60kg person</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acesulfame–K</td>
<td>15</td>
<td>40mg</td>
<td>25</td>
<td>50mg</td>
<td>18</td>
</tr>
<tr>
<td>Aspartame</td>
<td>50</td>
<td>200mg</td>
<td>15</td>
<td>35mg</td>
<td>86</td>
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<tr>
<td>Saccharin</td>
<td>5</td>
<td>140mg</td>
<td>2</td>
<td>40mg</td>
<td>7.5</td>
</tr>
<tr>
<td>Sucralose</td>
<td>5</td>
<td>70mg</td>
<td>4.5</td>
<td>5mg</td>
<td>60</td>
</tr>
<tr>
<td>Reb A (stevia)</td>
<td>12</td>
<td>n/a</td>
<td>n/a</td>
<td>27mg</td>
<td>26</td>
</tr>
</tbody>
</table>

*CDAPP Sweet Success suggests limiting artificial sweeteners to 1-2 servings per day.*
MANAGING HOLIDAYS/Celebrations

- Discuss potential challenges your patients may face with friends/family ahead of time
  - Pressure to “eat for two” or eat a high-carb family dish
  - Educating friends/family before the party may ease stress

- Review favorite party foods
  - Portion sizes, carb-counting, meal planning
  - Plate method or mindful eating

- Anticipate barriers to monitoring
  - Embarrassed to check blood sugar (fear of judgment)
  - Planning for travel
Managing holidays/celebrations, Cont’d

• Focus on the fun, not the feast
  • Spend time outdoors, play games, walk at the park, help decorate for the party

• Maintain meal/snack schedule
  • Pitfalls of skipping meals (“saving room” for later backfires)
  • Pack snacks or a healthy dish to share

• Nobody’s perfect
  • Check blood sugar even if they know they “cheated” (use it as a learning tool, not to reprimand)
  • Strategize what to do if blood sugars come out high – 10 min walk?, change snack schedule?, adjust insulin dose?
QUESTIONS?

- NEXT: Exercise
American Congress of Obstetricians and Gynecologists (ACOG) recommends:

- “Pregnant women should engage in 30 minutes or more of moderate exercise on most if not all days of the week.”
EXERCISE DURING PREGNANCY

- All women without contraindications should be encouraged to participate in aerobic and strength conditioning exercises during their pregnancy. (ACOG 2003)

- Pregnancy is a unique time for positive behavior change
ROLE OF PROVIDER

• Explain benefits of exercise for mother & child
• Review impact on blood sugar; emphasize consistency
• Set expectations for patient
• Encourage record keeping
• Reassess goals regularly
GLYCEMIC BENEFITS

• Improves Glucose Control
  • Improved FBG after 6 wks

• Increases Insulin Sensitivity
  • Increases muscle insulin sensitivity
  • Less exogenous insulin needed

(ACSM, 2006; Carnethon, 2007; Dempsey, 2004; Gavard, 2008)
GLYCEMIC BENEFITS, CONTINUED

- **Increases Glucose Utilization**
  - ↑ insulin-independent glucose uptake at the cell level

- **Improves Carbohydrate Utilization**
  - ↑ muscle glucose uptake

(ACSM, 2006; Carnethon, 2007; Dempsey, 2004; Gavard, 2008)
MATERNAL BENEFITS

- Maternal Benefits of Exercise
  - ↑ Ability to meet the musculoskeletal demands of pregnancy including:
    - Increased girth
    - Increased lordosis
    - Altered center of gravity
  - Strengthens pelvic floor muscles
    - Physical fitness may impact pushing during labor (but does not shorten labor)

(Martens, 2006)
FETAL/CHILDHOOD BENEFITS

• Exercise helps prevent excess maternal weight gain and macrosomia, which reduces the risk of:
  • Childhood overweight (Moschonis, 2008)
  • Childhood type 2 diabetes
  • Childhood metabolic syndrome (Dempsey, 2004; Oken et al, 2007)
Safe Aerobic Exercise

- Walking
- Swimming
- Stationary bike
- Elliptical
- Step aerobics

- Use “talk test” to assess effort/limits
Safe Strength Exercise

- Light weights
- Resistance bands
- Prenatal Pilates
- Prenatal yoga – review risk of overstretching

- Good body mechanics/form prevents injury
Contraindicated Exercise

Any exercise that could result in abdominal trauma, such as:

- Scuba diving
- Ice hockey
- Gymnastics
- Horseback riding
- Downhill skiing
- Kickboxing
- Soccer

(ACOG, 2002)
Exercise Resources

ACOG website:

• For providers: “Exercise During Pregnancy and the Postpartum Period”

• For patients: Downloadable pdf file “Exercise During Pregnancy”

• www.acog.org
EXERCISE SUMMARY

- Ideally, pregnant women should engage in 30 minutes of total exercise every day in the absence of medical or obstetric complications.
- Include Aerobic and Strength exercise.
- Exercise has many benefits for both mother and child beyond simply achieving prenatal glycemic control.
POSTPARTUM NUTRITION

- Exclusively lactating women need an additional 200 kcal above pregnancy needs
  - 500 kcal above preconception needs

- Remember to eat! Consistent meals help prevent overeating or snacking on junk food

- Encourage increased fluids (unsweetened) if breastfeeding
  - Limit or avoid sweetened beverages – juice, soda, fruit drinks, hot chocolate, atole, etc
POSTPARTUM NUTRITION

- In general, continue to follow GDM meal plan
  - Consistent carbohydrates – may add fruit/milk to breakfast
    - Portion control still important!
  - Protein + fat source at each meal and snack
  - Unlimited non-starchy vegetables
    - Aim for ½ plate from vegetables
  - Balanced snacks when hungry – encourage mindful eating, hunger/fullness awareness
    - Women taking insulin should continue snacks
ENCOURAGE BREASTFEEDING!

• For GDMs, provide additional education on:
  • Benefits to mother – weight loss, lower type 2 diabetes mellitus (T2DM) risk
    • Equate energy use of 500 kcal to 2 hours walking/day
    • Equate energy use of 500 kcal to ~1# wt loss per week
    • Set goals for postpartum weight loss
  • Benefits to infant
    • Lower lifetime risk of obesity + T2DM
POSTPARTUM WEIGHT LOSS

- Gradual weight loss after delivery
  - Normal BMI: lose 1-2# per month
  - Overweight/obese: lose 4-5#/month

- Reasonable weight loss of 7-10% body weight
  - 10-15# for a woman weighing 150#
  - Reduces risk of T2DM >50%

- Long-term goal → achieve normal BMI
QUESTIONS?

- Additional free resources available at CDAPP Sweet Success Resource Center website: www.cdappswattlesuccess.org
  - CDAPP Sweet Success Guidelines for Care (pending)
  - Algorithm for diagnosis of GDM
  - My Plate for Gestational Diabetes in Eng/Sp
  - My Meal Plan
  - View archived webinars
SUMMARY

- Medical Nutrition Therapy is first line therapy for the management of Gestational Diabetes

- A balanced diet and exercise program can reduce prenatal complications

- Necessary to individualize meal plan and weight gain goals to each patient

- Postpartum lifestyle choices can reduce the risk of type 2 diabetes later in life