Type 1 Diabetes and the Effects of Psychosocial Factors on Glycemic Control

National Pediatric Hospital Case Study

Maria Tadic

3/20/2013
Presentation Outline

- Type 1 Diabetes: A Review
- Psychosocial factors and how they affect glycemic control in adolescents.
- Case Study of nutrition counseling for an 10 year old male in the Endocrinology Clinic
- Clinic Analysis of the patient and his ability to appropriately manage his DM1
- Conclusion and questions
Type 1 diabetes, also known as insulin dependent diabetes occurs worldwide and can appear at any age - even in adulthood.

- This is the most severe type of diabetes and requires a lifelong dependence on insulin therapy for survival.

- Type 1 diabetes occurs when the body's own immune system attacks a patient’s own body - specifically cells in the pancreas (islet cells) that produce insulin.

Out of the total number of people in the US with diabetes, only 5% of them have type 1 diabetes (2)
The cause of type 1 diabetes is still unclear at this time. However there are many studies that suggest that there are multiple factors that may contribute to the onset of this chronic illness.

Many of these factors include:

- Environment
- Genetics
- Possible exposure to certain viruses during pregnancy and childhood (2).
Family history plays a significant role in the prediction of type 1 diabetes. Patients with a parent or sibling with type 1 diabetes has an increased risk for developing the condition.

Genetic studies have shown that there are certain genes that may indicate an increased risk as well.

Also, studies between identical twins show that in addition to genetics, environment may also play a role in the onset or prediction of type 1 diabetes in children (2).
Infections or viruses during the gestational period have been linked to the increased risk.

In addition, viruses contracted during early childhood, such as Epstein-Barr virus, coxsackievirus, mumps virus or cytomegalovirus, have also been linked to an increase risk of the onset of type 1 diabetes (2).

Other risk factors during pregnancy and early life include:

- the mother being under the age of 25 at childbirth
- a mother who had preeclampsia
- being born with jaundice
- having a respiratory infection immediately after birth (2).
Psychosocial Factors Affecting Glycemic Control:

- A large percentage of children diagnosed with DM1 are noncompliant with the demands required by this chronic illness.
- This type of behavior may have a multitude of negative side effects such as DKA, neuropathy, nephropathy, retinopathy and cardiovascular disease.
- Overall, this poor compliance can result in increased morbidity and mortality in addition to higher medication dosages.
Psychosocial Factors Affecting Glycemic Control:

- There are many psychosocial factors that affect a child’s ability to effectively manage and care for their DM1.
- Due to DM1’s chronic nature, the child and their family have to manage a complex medical schedule and integrate this new schedule into their lifestyles.
- Families will need to deal with school, peer groups, culture and home life and how these are affected by a DM1 diagnosis.
Psychosocial Factors Affecting Glycemic Control:

- Due to the fact that many patients with DM1 are very young, they rely heavily upon their parents for proper care.

- When there is conflict and stress with the parents, it may have a negative impact on the glycemic control in the child.

- Studies have shown that parents exhibit high levels of anxiety and depressive symptoms at the time of the original diagnosis of DM1 in their child.
  - These studies have also shown a positive correlation between the increased stress in parents with poor compliance in the children.
Psychosocial Factors Affecting Glycemic Control:

- Some of the specific factors that have a large impact on the compliance with a diabetic regimen and glycemic control include:
  - parenting style
  - parent stress
  - in-home conflict
  - parent-child conflict
  - marital conflict
  - single-parent household status
  - additional behavioral disorders
Psychosocial Factors Affecting Glycemic Control:

- Children with DM1 may also exhibit multiple behavior problems including ADHD, depression, aggressive behavior, etc.
- Depression specifically may affect a child’s ability to appropriately manage their DM1 regardless of age.
  - Children may feel helpless, have decreased energy or a lack of motivation.
- Children presenting with any of these behavior problems have been associated with an increased risk of complications and negative side effects from DM1.
Psychosocial Factors Affecting Glycemic Control:

- Research on diabetes reviews the importance of educating parents on the management of their child’s diabetes
  - allowing for youth to take charge of their diabetes
  - set strict boundaries about what is expected (such as mandatory daily checking of glucose levels, maintaining dietary restrictions, etc.)

- Results in better adherence and improved glycemic control in youth with type 1 diabetes.

- Registered Dietitians need to be aware of all of these factors that may affect a patient and their family’s ability appropriately manage and care for a DM1 patient.
Case study: Type 1 Diabetes and the Implications of Psychosocial Factors on Glycemic Control
Subjective

- JM is an overweight 10 year old male child presenting to the Endocrinology clinic for a follow up on his DM1 management and care.

- JM was originally diagnosed with DM2 in December of 2010 when he was 8 years of age.

- Pt’s diagnosis was later changed to reflect appropriate condition of DM1.

- Pt also experienced several behavior problems, but there is no official diagnosis from psych as of November 2012.
Subjective

- He is present with his mother at this visit. JM seemed fatigued, not alert and uninterested in participating during the visit. His mother reported most of the new information.

- During the interview JM seemed to be hypoglycemic and the RD on staff provided him with a honey packet.

- Patient did not really perk up, but reported feeling better.

- Patient is at nutritional risk secondary to diagnosis of type 1 diabetes.
Diet Prior to Admission

- Mother reported patient diet still needs to improve.

- Due to current housing situation, pt spends most weekdays with his father. He was providing JM with 2 pieces of plain bread before arriving to school in order to prevent a hypoglycemic event.

- JM’s mother reported that he eats school breakfast and lunch. She has menu’s at home and reports reviewing the day's choices with JM.

- Patient denies any physical activity.
Anthropometrics

- Height: 159 cm (5’2”)
- Weight: 70.5 kg (155 lbs)
  - 140% of IBW (40 kg)
- BMI: 27.5
- BMI percentile: >99th

Growth Evaluation

- Weight trends: 11/10: 78.2 kg, 6/12: 62.8 kg, 2/13: 70.5 kg
- Height trends: 11/2\10: 151 cm, 6/12: 158.7 cm, 2/13: 159 cm
Notable Labs and Medications:

- Labs 2/13:
  - HgA1c: 8.1%
  - Low HDL: 44
  - LDL: 99
  - Total Cholesterol: 157
  - Triglycerides: 113

- Medications:
  - Novolin 70/30
  - Floxtina
  - Strattera
Assessment

- Estimated Energy Needs:
  - Kcals/kg - 47kcals/kg = 1,800 kcals/day
  - Grams Protein/kg - 0.95g/kg/day = 66 g protein/day
  - Fluid needs - 2,500 ml fluid/day

I used IBW to calculate both kcals/kg and the RDI for protein g/kg. I used the Holiday-Segar method to determine his fluid needs.
PES Statements

- **Abnormal nutrition lab values** related to poor food choices and lack of food/nutrition knowledge as evidenced by an HgbA1c of 8.1%.
  - JM initially had an HgbA1c of 14% which trended down to 11.8% and finally 8.1%. He is a young patient and cannot verbalize appropriate food choices or methods to manage his DM1.

- **Overweight/obesity** related to excessive energy intake/poor food choices as evidenced by a BMI of 25.4 which is over the 99th percentile for boys his age.
  - Pt reports to endocrinology clinic with a weight and BMI both over the 99th percentile for boys his age. Mother reports JM sneaking food and making poor food choices and decreased intake of fruits and vegetables.
Plan:

- The plan is to continue to monitor for improvement in weight and physical activity as well as sneaking of food.
- Additionally, continue to assess the patient’s ability to follow and care for his DM1 on a regular basis.
- Also continue to educate family members on how to manage JM’s diabetes at home.
Goals:

1. No sneaking food.
   a. Encourage JM to not sneak food at school or when home alone.

2. Think about carbohydrate sources and make healthy choices.
   b. Encourage JM and his family to continue to make healthy and appropriate food choices for his DM1. Also plan for better breakfasts and lunches while at school - continue to help JM read the school menus and plan appropriate choices.

3. Carb Amounts 40-50g/meal and 15-25g/snack.
   a. If there are 2 breakfasts 1) have around 15g and 2) have 25-35g in order to maintain stable blood sugars throughout the day and evenings.
Case Conclusion

- JM has been seen in the endocrinology clinic for a few years with some changes in his labs, weight and ability to manage his DM1.

- Due to his current social situation, it is important that JM and his parents continue to come to his outpatient appointments and the educational classes provided by the clinic.

- Also, in order to effectively manage his DM1, JM needs to continue to not sneak food, make healthy food choices at home and at school.

- Lastly, his parents need to help him continue to meet the recommended carbohydrate amounts in order to maintain a stable blood sugar throughout the day and an overall HgbA1c of around 7%.
Continued research on the psychosocial factors that affect glycemic control in youth is needed. This will provide insight for clinicians on how to better manage a patient's DM.

Studies have shown a multi-faceted approach to the care and management of DM can be effective in promoting better glycemic control.
Questions?
References:


- Tonja R. Nansel, PhD; Denise L. Haynie, PhD; Leah M. Lipsky, PhD; Lori M. B. Laffel, MD, MPH; Sanjeev N. Mehta, MD, MPH (2012). “Multiple Indicators of Poor Diet Quality in Children and Adolescents with Type 1 Diabetes Are Associated with Higher Body Mass Index Percentile but not Glycemic Control” Journal of the Academy of Nutrition and Dietetics.