Screening, diet, and exercise versus pharmaceutical management in pediatric diabetes

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Background information

• Overweight children and likelihood of diabetes
• Lack of preventative measures
• Lack of research on standard screenings
• Implementing screenings
Background information

• Key factors that go into preventative screening:
  – Importance of increasing exercise
  – Strict modification of diet
  – Family support
In pre-diabetic, diabetic, or obese adolescent children, is preventative screening and exercise more effective than pharmaceutical management, such as Metformin, in controlling or reducing long term effects of diabetes?
Methods

- Aspects of research to analyze PICO question:
  - Preventative screenings?
  - What plays the biggest role in prevention?
  - Pharmaceutical use?
Methods

• Searching the topics:
  – EBSCO host through the Bellarmine Library website
  • Databases selected: CINAHL, Health & Psychosocial instruments, HealthSource, Medline, PsychINFO, SPORT Discus
  – PubMed
    • RCT and Qualitative Study: 2015
Methods

- **Keyword combinations:**
  - Diabetes, AND pediatric, AND screening
    - 1,394 results
  - Screening, AND prevention, AND diabetes, AND children
    - 1,941 results
  - Exercise, AND diabetes, AND pediatric
    - 781 results
  - Obesity, AND children, AND prevention, AND diabetes
    - 1,613 results
  - Treatment, AND diabetes, AND children, AND metformin
    - 228 results
  - Metformin, AND pediatric, AND diabetes
    - 253 results
Methods

• Narrowing down the research: Inclusion Criteria
  – Recent articles within past 10 years
  – Journal publication impact factor
  – Use of pediatric subjects
  – Significant results
  – References
  – Review of the literature
Research Synthesized

- Systematic review\textsuperscript{2,4,5}
- Cohort Study\textsuperscript{3,6}
- Qualitative Study\textsuperscript{1}

\textbf{Impact Factor:}
- Pediatric Diabetes: 3.49
- Annals of Pharmacotherapy: 2.06
- Nutrition Research: 1.42
- Journal of Specialists in Pediatric Nursing: 0.92
- Journal of Pediatrics: 0.31
- Journal of Physical Therapy Science: 0.27
Results

Pharmaceutical management of Diabetes

• Metformin often used first$^4$
  – Weight loss

• Limited information on other types of drugs used in a pediatric population$^{1,4}$

http://countron2.com/2016/05/05/2-your-health-combination-of-drugs-reduce-risk-of-death-heart-attacks-for-people-with-type-2-diabetes/
Results

• If one drug does not produce adequate results:⁴,⁵
  – Combination(s)
• Risk potentially outweighs the benefit⁴
  – Drug combinations
  – Side effects
Results

• Screening\textsuperscript{1,3,4}
  – Earlier diagnosis
  – Earlier initiation of treatment
  – Better glycemic control is the main goal

http://healthyeatingforfamilies.com/know-your-childs-bmi/
Screening Example

Criteria:
“At risk for overweight”
• Body mass index > 85th percentile for age and sex; or weight for age, sex, and height > 85th percentile; or weight > 120% of ideal for height
PLUS any TWO of the following risk factors
• Family history of type 2 diabetes in first- or second-degree relative
• Race/ethnicity
  – Native American, African American, Hispanic American, Asian American, Pacific Islander
• Signs of insulin resistance or conditions associated with insulin resistance
  – Acanthosis nigricans, hypertension, dyslipidemia, polycystic ovary syndrome
• Age for initiation of screening
  – 10 years or at onset of puberty if puberty occurs at a younger age
• Frequency of screening: every 2 years
• Measurements
  – Fasting plasma glucose preferred
Results

Physical activity and DM²

- An increase of regular physical activity is associated with:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin A1c</td>
<td>↓</td>
</tr>
<tr>
<td>Body Mass Index (BMI)</td>
<td>↓</td>
</tr>
<tr>
<td>HDL Cholesterol</td>
<td>↑</td>
</tr>
<tr>
<td>Cardiovascular fitness</td>
<td>↑</td>
</tr>
<tr>
<td>Insulin Resistance</td>
<td>↓</td>
</tr>
<tr>
<td>Glucose Control</td>
<td>↑</td>
</tr>
</tbody>
</table>

http://www.momjunction.com/articles/warm-up-exercises-and-games-for-kids_00391677/#
Results

Lifestyle modifications\(^{1-6}\)

- Goals
- Education
- Nutritional counseling
- Dietary modification
- Systematic physical exercise
- Diet and exercise combined
- Diet potentially most important
Results

Parental involvement$^{1,6}$

- Importance of disease management
  - Example
  - Ways to assess parental participation
- Uncertainty, anxiety, and powerlessness
- Address parental needs and concerns
- Online professional and peer support
Discussion

- Comparison of pharmaceuticals versus screenings
- Preventative versus maintenance after diagnosis

https://goo.gl/images/xPhOIS
Discussion

- Bigger Impact = screening and lifestyle modification\(^3,6\)
- Critical for Care Plan\(^1-6\):
  - Diet
  - Exercise
  - Parental Involvement
  - Education
Areas for Future Research

• Influence of diet and exercise
• Better/universal screening measures
• Investigating parental involvement issues
  – Outcome measure use prior to treatment
  – Ways to improve support
• Longitudinal studies
QUESTIONS

https://goo.gl/images/tYH0pS


