PE/Physical Activity, Academic Performance, and Overweight/Obesity

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Wake County School Health Advisory Council (SHAC)

Background Information

- Introductions
  - Prior to DPT
  - FSU/USF
    - BA Chemistry – 1993
    - Chemist in RTP/Durham for 12 years
    - And then…

Background Information

- My family
  - Husband
    - Programmer
  - Kids
    - Jacob (4th grade)
    - Jessica (2nd grade)

PT Perspective on Childhood Overweight/Obesity

- Adverse biological effects[1-3]
  - Cardiovascular disease
  - Diabetes
  - Orthopedic/musculoskeletal conditions
  - Neurological & pulmonary conditions
- Adverse psychological effects[2, 3]
  - Depression/anxiety, decreased QoL
- Increased comorbidities, healthcare costs

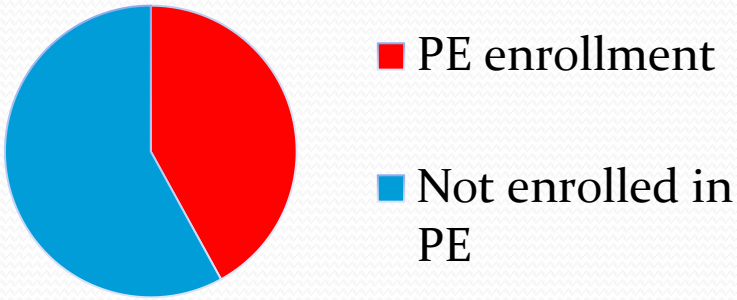
Overweight/Obesity in US Children

- Obesity rates
  - Tripled in last 30 years[5]
  - Statistics demo

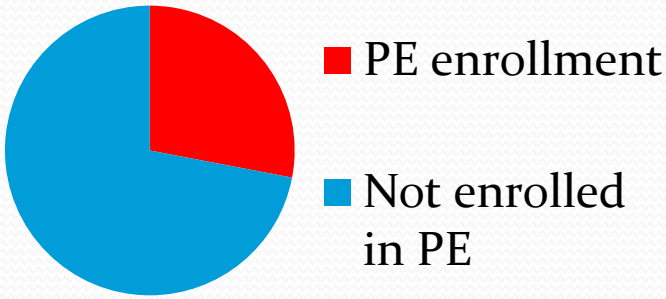
http://www.bing.com/images/search?q=overweight+children+pictures&qpvt=overweight+children+pictures&FORM=IGRE#a

PE in Schools

1991



2003



- Statistics[5]
  - <4% elementary schools
  - <8% middle schools
  - <5% of ALL US schools offer daily PE

Offer Daily PE

Levels of Evidence Pyramid

Cross-sectional studies

Source: SUNY Downstate Medical Center. Medical Research Library of Brooklyn. Evidence Based Medicine Course. A Guide to Research Methods: The Evidence Pyramid.

Evidence

- 16 studies
  - 6 Cross-sectional studies
  - 6 Longitudinal Cohort studies
  - 2 Cohort studies
    - 1 Randomized
    - 1 Non-randomized
  - 1 Systematic Review
  - 1 Meta-Analysis

Cross-Sectional Studies

- 1 Questionnaire
  - Teachers' attitudes of perceived PE success/frequency/duration
  - Is PE important?
  - What are the benefits?

Source: SUNY Downstate Medical Center. Medical Research Library of Brooklyn. Evidence Based Medicine Course. A Guide to Research Methods: The Evidence Pyramid.

Cross-Sectional Studies, cont.

- 5 studies/5 states/Grades K-12
  - State standardized tests for math and language arts/reading
  - Fitness measures
    - Fitnessgram
      - Aerobic capacity
      - Muscular strength/endurance
      - Flexibility
      - Body composition

Longitudinal Cohort Studies

- 6 studies
  - 1 Retrospective study (K-5)
  - 2 Quasi-experimental (K-5) US/Australia
  - 2 Prospective (K-5, 7-9) Taiwan
  - 1 Prospective (12 yr olds)

Source: SUNY Downstate Medical Center. Medical Research Library of Brooklyn. Evidence Based Medicine Course. A Guide to Research Methods: The Evidence Pyramid

Cohort Studies

- 2 Studies
- State standardized tests & Fitnessgram
  - Randomized (K-5)
  - Non-randomized (K-8)

http://www.bing.com/images/search?q=pictures+of+healthy+children+exercising&qpvt=pictures+of+healthy+children+exercising&FORM=IGRE#view=detail&id=F6FC44F6C5548AED0526F545A21CB68AC500766B&selectedIndex=0

Systematic Review

- Grades K-12
- School-based PE/physical activity & academic performance
- 43 studies ID'd
  - Experimental, quasi-experimental, descriptive, or case studies
  - No overlap

Meta-Analysis

- Ages 5-16 yrs
- School-based PE/physical activity & academic performance
- 59 studies ID'd
  - Experimental, quasi-experimental, or cross-sectional design
  - No overlap

Evidence Strength/Limitations

- Weak in research design, sample size, power
  - BUT: systematic review/meta-analysis
- Lack of generalizability
  - 8 studies: low income/SES or not representative of local demographics
  - BUT: 6 studies represented local demographics

Evidence Strength/Limitations, cont.

- 5 Studies included Gr6-12, BUT:
  - (+) relationships PA/academic performance
  - Classroom time ↓, and no ↓ in academic performance
- Inability to Demonstrate:
  - Causality due to design
  - Reproducibility
- BUT: Detailed measures delivery AND robust studies

Factors that Aid/Limit Influencing Advocacy

- Limiting Factors:
  - Variable generalizability
  - Inconclusive intervention choice
  - Further long term effects of PE/PA?
- Aiding Factors:
  - (+) relationships noted across all studies

http://inside.akronchildrens.org/wp-content/uploads/2014/01/family-exercising-together.jpg

Evidence Improvement Recommendations

- Randomized Control Trials:
  - Generalizability
  - Power analysis
  - Detailed intervention
  - Consistent measures:
    - Fitness
    - Academic Performance

http://bloximages.chicago2.vip.townnews.com/heraldextra.com/content/tncms/assets/v3/editorial/e/98/e984b214-328c-11e2-922a-0019bb2963f4/50aa9f4f13ebd.preview-620.jpg

Conclusion

- Promote increased PE/PA frequency
  - K-5, perhaps middle, high schools
- (+) association in 98.3% of studies
- No association in 1.7% of studies
- (-) association in 1.5%
  - Systematic review

http://www.allparentstalk.com/wp-content/uploads/2012/07/kids_exercising.jpg

Conclusion, cont.

- Causality/strong relationship = funding?
- Common Core
  - Allow comparison on national level?
- PE/PA are facilitators to academic performance
- Different forms physical fitness
- Start early

http://1.bp.blogspot.com/-7nj5GLyfMbY/UGIT-NUS5eI/AAAAAAAACmw/tokc7GOGmsk/s1600/healthy+kids.jpg

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