Objectives

- At the end of the session the learner will be able to:
  - Summarize the research findings of at least one journal article presented
  - Analyze the quality of the research of at least one research study
  - Identify the relevance and applicability of the research findings to the care of patients with childhood obesity

Definition of Overweight and Obesity

- Obesity = BMI at or above the 95th percentile for children of same age and sex
- Extreme Obesity = BMI at or above 120% of the 95th percentile for children of the same age and sex
- BMI Ranges
  - Underweight - <5th percentile
  - Normal weight - 5th to 85th percentile
  - Overweight - >85th to 95th percentile
  - Obese - at or above 95th percentile
- Not always a perfect measure

Prevalence of obesity among youth aged 2–19 years in 2011–2014?

- Among U.S. youth
  - 17.0% in 2011–2014 overall.
  - 8.9 % Preschool-aged children (2–5 years)
  - 17.5 % School age children(6–11 years)
  - 20.5 % Adolescents (12–19 years)
- The same pattern was seen in both males and females
- https://www.cdc.gov/obesity/data/childhood.html
Prevalence of Overweight and Obesity

- Children age 2 – 19 years in the 95th percentile or greater
  - Non-Hispanic Whites
    - 30.1% Males
    - 25.6% Females
  - Non-Hispanic Blacks
    - 36.9% Males
    - 41.3% Females
  - Mexican American
    - 40.5% Males
    - 38.2% Females

Study of Children Ages 10 to 17 (2016)

Most recent state-by-state data from the National Survey of Children’s Health (2016)

Nationally, 31.2 percent of youth in this age range are overweight or obese

https://stateofobesity.org/children1017/

Childhood Obesity

- Search terms
  - Childhood obesity
  - Pediatric obesity
- Limits
  - Human studies, English language, studies published between 2012 and 2017, newborn to adolescents
- Databases Used
  - Cochrane Database of Systematic Reviews, PubMed, Medline, Google
- Reviewed relevant studies found
  - Did NOT
    - Attempt to contact experts
    - Look for unpublished data

Results of Literature Review

- Studies divided into groups
  - Prevention of obesity
  - Interventions for the obese child/adolescents
    - Surgery

Effectiveness of home based early intervention on children’s BMI at age 2: randomized controlled trial

Objective:
- To assess the effectiveness of a home based early intervention on children’s body mass index (BMI) at age 2.
- Type of study
  - Randomized controlled trial
- Trial conducted in socially and economically disadvantaged areas of Sydney, Australia

Effectiveness of home based early intervention on children’s BMI at age 2: randomized controlled trial


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Effectiveness of home based early intervention on children's BMI at age 2: randomized controlled trial

Methods:

- Pregnant women in an antenatal clinic invited, given information, consented
- Selection Criteria
  - Age 16 years and above
  - Expecting first child
  - Between 24 and 34 weeks gestation
  - Able to communicate in English
  - Live in local area
- 409 women interviewed before birth and 258 women after birth (inadequate research staff)
- Women completed a registration form for baseline data collection before randomization

Effectiveness of home based early intervention on children's BMI at age 2: randomized controlled trial

Methods:

Randomization

- Random allocation concealed by sequentially numbered, sealed, opaque envelopes with group allocation
- Two blinded research assistants not involved with data collection implemented the intervention (Mothers not blinded)

Intervention group

- Interventions promoted breast feeding, appropriate timing of solid foods, tummy time, active play, family nutrition and family physical activity.

Control Group

- Received usual childhood nursing services from community health service nurses.

Primary Outcomes

- BMI at age 24 months

Secondary Outcomes

- Eating habits, intake of fruits and vegetables, consumption of chips and snacks, sitting in front of a TV, time spent in front of the TV, active play time, mother's eating behaviors, time spent watching TV and physical activity
- 337 mothers randomized to intervention group
- 330 mothers randomized to control
- 106 mothers lost to follow-up at age 6 months, 34 at 12 months and 30 at 24 months
- 82 from the intervention group, 88 from control

Results

- 337 mothers in intervention group more likely to eat 2 or more servings of vegetables/day (52% vs 38%; P<0.001)
- 48% vs 38% spent 150 minutes or more/week on physical activity (P=0.04)
- No significant differences in either group
- Other dietary behaviors

Conclusions

- Intervention effect on BMI prevents onset of childhood obesity. This study looked at several risk factors for early obesity
- Costs of home visiting program
- Possible long term follow up studies needed.

Unanswered questions

- Cost and effectiveness of home visiting nurse visits may decrease health costs in future. Longer term follow-up studies needed.
- Other dietary behaviors

Health Outcomes of Information System Use Lifestyles among Adolescents: Videogame Addiction, Sleep Curtailment and Cardio-metabolic Deficiencies

Health Outcomes of Information System Use Lifestyles among Adolescents: Videogame Addiction, Sleep Curtailment and Cardio-metabolic Deficiencies

Proposal

• Videogame addiction is one factor that can be linked to obesity and this association is at least partially mediated through sleep curtailing. Obesity is linked to poor cardio-metabolic health indicators.

• Videogame addiction is linked to sleep curtailing,
• Strong cravings to play
• Constant need to increase time
• Avoid withdrawal symptoms when not playing
• Delay sleep to keep playing or
• Preoccupied and difficult to fall asleep
• May be related to Melatonin suppression due to the light from screen which emulates daytime light.

• Cohort study
• Adolescents aged 10-17 year old
• Recruited from 2 clinics at a large research hospital in North America

Methods

• Methods
  - 94 (75%) participated in the Fitbit with sleep data recorded
  - Blood tests:
    - Lipids and insulin resistance
  - Physical measurements taken 1 to 8 weeks post
    - Waist circumference
    - Height
    - Blood pressure
  - Sampling
    - 94 online videogame playing children
    - 57 (60.6%) from weight management clinic
    - 37 (39.4%) from lipid clinic
  - Baseline survey to capture demographics (annual income)

Results

• Results
  - Participants were given Fitbit devices
  - Participants wore Fitbit for 1 week, on non
  - Waits circumference
  - Blood pressure
  - Medications

• Limitations
  - Findings may not be applicable to other adolescent populations since participants attended specific clinics
  - Study focused on only one key, relatively stable predictor of curtailed sleep—videogame addiction
  - Each variable was captured at one point in time—suggest future studies using longitudinal or experimental designs
  - Assumed direct effects between variables even though there may be other mechanisms such as hormonal processes affecting cortisol, melatonin and leptin effects or light effects on the pineal gland. Sedentary time and lack of physical activity may mediate associations between videogame playing and obesity.

Physical and Cardio-metabolic measures

• Physical and measurement data taken 1 to 8 weeks post
  - Waist circumference
  - Height
  - Blood pressure

• Results
  - Participants wore Fitbit for 1 week, on non
  - Waits circumference
  - Blood pressure
  - Medications

• Limitations
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Telemedicine and Pediatric Obesity Treatment: Review of the literature and lessons learned

In 2007 experts recommended staged approach to prevention and treatment of childhood obesity
- Stage 1: Prevention Plus by PCP
- Stage 2: Referral to Tertiary Care Centers with obesity clinicians
- Stage 3: Comprehensive multidisciplinary interventions with weekly visits for 2-3 months then monthly follow-up
- Stage 4: Longer in duration and more frequent visits

Telemedicine is the use of telemonitors at distant site to allow teleconferencing between providers and patients
Pediatric telepsychology and telepsychiatry around for nearly 20 years
- Satisfaction surveys showed overall acceptability
- Questionnaires show telemedicine are feasible, cost effective and satisfying to families
- Sustainability difficult due to low levels of reimbursement

Telemedicine and Pediatric Obesity Treatment: Review of the literature and lessons learned

Systematic review
- Study selection
  - Identified and summarized the literature on the use of telemedicine in the treatment of pediatric obesity
  - Considered all studies between 1990 and 2011
  - Studies needed to include pediatric patients <18 years, overweight and obesity
  - Use of telemedicine technology
  - Prevention and treatment studies
  - Three investigators independently screened titles and abstracts
  - Full-text articles obtained if they met inclusion criteria or more information needed to determine inclusion
  - Disagreement among researchers was resolved by consensus

Results
- 2873 abstracts
- 112 studies potentially met inclusion criteria on initial review
- 25 were included for full-text review
- 4 studies met exclusion criteria

Conclusion
- Author: Davis
- Site: 2 urban and 2 rural schools in Kansas
- Random assignment of families to telemedicine or physician visit
  - Telemedicine: Four 1 hour group sessions over 8 weeks
  - Physician visit: Single visit to PCP who gave a list of suggested topics
- Results
  - Parents very satisfied, attended all sessions
  - No change in BMI in either group
- Conclusion
  - Intervention highly feasible and well received
  - Parents preferred reduced travel to school
  - No positive clinical results
Telemedicine and Pediatric Obesity Treatment: Review of the literature and lessons learned

Author: Irby
Site: Brenner Fit Clinic (Tertiary Care Weight Management Clinic) Children's Hospital with rural remote clinics throughout NC
Database review to assess the impact of implementing telemedicine sites in rural areas on patient enrollment, attrition and clinical outcomes
- TeleFit: Roughly 80% of families treated via telemedicine at rural clinical sites 1-2 times/month with Fit team at main clinic
- BrennerFit: Families attended in-clinic treatment 1-2 times/month face to face with Fit team
Results
- 95% attrition in rural families prior to TeleFit; 30% attrition with TeleFit.
Conclusion
- TeleFit feasible to reduce attrition rate in rural area with comparable scores in BMI z-score compared to patients in traditional clinics

Telemedicine and Pediatric Obesity Treatment: Review of the literature and lessons learned

Author: Mulgrew
Site: UC Davis multidisciplinary weight management clinic and rural remote clinics in CA
Pilot study; cross-sectional survey to assess if a difference exist in quality of care between face to face and telemedicine treatments measured by parent satisfaction
- Face-to-face group: patient and family met with RD and pediatrician weight management specialist
- Telemedicine: Same, via telemedicine with a rural healthcare provider present
Results
- Not statistically significant difference between both groups. Telemedicine group less satisfied with provider's ability to explain things...
Conclusion
- Telemedicine as effective as face-to-face care. Parents highly satisfied with this approach

Telemedicine and Pediatric Obesity Treatment: Review of the literature and lessons learned

Author: Shaikh
Site: University affiliated Children's Hospital at UC Davis and 18 rural hospitals
Retrospective review of patient medical records to assess where consultations via telemedicine can improve quality of care: the effect on diagnostic and management decisions and clinical outcomes
- One-on-one patient evaluations by weight management specialist or endocrinologist by telemedicine with rural health care provider present at remote site
Outcome measures
- Changes in diagnoses; diagnostic evaluations or treatment, improvement in diet, activity or weight
Conclusion
- Telemedicine weight management services can result in changes to care plans and outcomes, possibly replacing “outreach clinics”

Overall Conclusion
- Limited data in pediatric obesity practice but even limited data support telemedicine as potentially effective
- Telemedicine may increase access to treatment centers but may not work for all populations
- Clinicians must be flexible when using this approach, establish partnerships and protocols to deliver care and prevent technical difficulties
- Providers need to understand the need to overcome less personalized nature of telemedicine
- More research in telemedicine for pediatric obesity is needed

Effectiveness of Peer-Based Healthy Living Lesson Plans on Anthropometric Measures and Physical Activity in Elementary School Students: A Cluster Randomized Trial


Objective
- Healthy Buddies is a peer-led healthy living program
- Cluster randomized trial to assess the effectiveness of Healthy Buddies on weight gain and its determinants when disseminated to elementary school children
Effectiveness of Peer-Based Healthy Living Lesson Plans on Anthropometric Measures and Physical Activity in Elementary School Students: A Cluster Randomized Trial

- **Study Population**
  - 60 elementary schools in Manitoba with
- **Eligibility**
  - Within the provincial jurisdiction
  - Minimum of 200 students per school
  - Grades 1 through 6
- 20 schools randomly selected to receive the Healthy Buddies Curriculum
  - 10 schools (5 rural, 5 urban) or serve as a waiting list control group receiving regular curriculum (4 rural-6 urban)
  - Intervention lasted 10 months (school year)

- **Primary Outcomes**
  - Collected at beginning and end of school year
  - BMI Z score
  - Waist circumference
  - Research assistance were blinded to study assignment

- **Secondary Outcomes**
  - Physical activity
  - Cardiorespiratory fitness
  - Self-efficacy
  - Healthy living knowledge
  - Self-reported dietary intake
  - Students wore waist mounted pedometers for 7 days

- **Primary Comparisons**
  - Reduction in waist circumference
  - Intervention group had significant reduction P<0.001
  - BMI Z score: no significant differences

- **Secondary Comparisons**
  - No difference in physical activity in younger peers between groups
  - Older intervention groups showed a reduction in average daily steps than those in control groups
  - At baseline knowledge of healthy eating and behavior similar in older and younger students
  - Younger students had significant improvement in knowledge of healthy eating and behavior

- **Demographics**
  - 647 students
  - 38 classrooms in 19 schools
  - 10 schools (340 students) in intervention arm
  - 10 schools (347 students) in control arm
  - 49% students in rural schools
  - 48% girls
  - 36% overweight or obese
  - 11% achieved 13,500 steps per day

- **Strengths and Weaknesses**
  - **Strengths**
    - Primary strength was use of a cluster-randomization design. The intervention prohibited randomization at the level of the student.
    - Inclusion of schools from rural communities where there is higher rate of obesity
  - **Weaknesses**
    - Implementation limited to 2 classrooms within each school and delivered for only 1 year. Long-term effects remain unclear

- **Older class paired with younger class**
- **Older student received 45 minute healthy living lesson from teacher once a week**
- **Older student acted as peer mentors and taught a 30 minute lesson to the younger students**
- “Go Move” a 30 minute aerobic fitness session given twice a week
- “Go Fuel” lesson on healthy eating
- “Go Feel Good” students were taught to value themselves and others
The Benefit of Sleeve Gastrectomy in Obese Adolescents on Nonalcoholic Steatohepatitis and Hepatic Fibrosis


Nonalcoholic fatty liver disease (NAFLD) is the leading cause of chronic liver disease in morbidly obese adolescents and adults.

Ranges from simple steatosis to nonalcoholic steatohepatitis (NASH) which can progress to inflammation and hepatocellular injury with progression to fibrosis.

Recent evidence suggests the reversal of NASH by bariatric surgery.

Prospective pilot intervention study

Methods

- Three arms
  - Laparoscopic sleeve gastrectomy (LSG)
  - Lifestyle intervention and intra-gastric device (IGWLD)
  - Nonsurgical with lifestyle intervention only (NSWL)

- Consecutive obese patients (n=164)
  - BMI >35 kg/m^2
  - Biopsy proven NAFLD
  - Failure to lose >10% of baseline body weight over the 6 prior months

- Evaluate efficacy of LSG on liver histology
  - 93 patients entered the study

Exclusion Criteria

- Genetic obesity
- Any endocrine or systemic disease except metabolic abnormalities related to obesity
- Severe gastroesophageal reflux disease
- Esophagitis
- Large, sliding hiatal hernia
- Para-esophageal hernia Type III
- Psychiatric disorder
- Previous gastroesophageal surgery
- Use of recreational drugs or alcohol abuse

Intervention

- Nutritional counseling before and throughout follow-up period
  - A balanced diet
    - 40 kcal/kg/day
    - Carbohydrates 55%
    - Proteins 15%
    - Lipids 30%
  - Aerobic physical exercise 30 min/day

Inclusion Criteria

- Age 13 – 17 years
- BMI ≥ 35 kg/m^2
- Failure to achieve 10% weight loss using lifestyle intervention alone during previous 6 months
- Motivation to adhere to treatment recommendations
- Clear understanding of risks and benefits from medical treatment and surgery
- Lifestyle commitment to LSG
- Dedicated family relatives
The Benefit of Sleeve Gastrectomy in Obese Adolescents on Nonalcoholic Steatohepatitis and Hepatic Fibrosis

- **Follow-up**
  - Seen at baseline and 1, 3, 6 and 12 months
  - Body weight, nutritional habits and physical activity recorded during monthly meetings with dieticians and nurses
  - Clinical exams, psychosocial questionnaires, blood tests, liver ultrasound and liver biopsy, ambulatory blood pressure monitoring and polysomnography

- **Results**
  - LSG showed improved NASH and reverted fibrosis in 90% of cases
  - Lifestyle intervention alone or combined with intra-gastric balloon showed weight loss but NASH persisted in one half the patients after 1 year of treatment

- **Discussion**
  - Long term weight loss a key issue
  - In non-surgical groups, weight loss was null or minimal
  - Compliance poor and >50% lost to follow-up
  - No major perioperative complication in LSG or intra-gastric balloon
  - Longitudinal or larger cohort studies are needed to compare effectiveness of bariatric surgery with lifestyle intervention

- **Limitations**
  - Small pilot study
  - No random assignment to study
  - Patients who opted for surgery were more complicated than those in nonsurgical group
  - IGWLD group had weight loss in first 1-6 months but gained weight when balloon removed

- **Questions?**
  - ?????????
  - ?????????
  - ????????