Origins and Sequelae: The Psychology of Obesity

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Relevant Disclosure and Resolution

Under Accreditation Council for Continuing Medical Education guidelines disclosure must be made regarding relevant financial relationships with commercial interests within the last 12 months.

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I have no relevant financial relationships or affiliations with commercial interests to disclose.
Objectives

• Describe the Adverse Childhood Experiences study
  • Overview
  • Origins in obesity research
• Subsequent studies in childhood trauma and obesity
the ACE study
IMPACT OF CHILDHOOD TRAUMA

The CDC and Kaiser Permanente surveyed 17,000 of the health plan's members to ask whether they'd had adverse childhood experiences defined as:

- ABUSE: Psychological, Physical, Sexual
- NEGLECT: Emotional, Physical
- HOUSEHOLD CHALLENGES: Family member experiencing: Domestic abuse, Mental illness, Impairment

The landmark study found those with adverse childhood experiences were at higher risk for:

- HEART, LUNGS, AND LIVER DISEASE
- OBESITY
- DIABETES
- DEPRESSION
- SUBSTANCE ABUSE

THE STUDY ALSO FOUND

NEARLY TWO-THIRDS of those surveyed experienced at least one event.

The higher the score on ACE survey, the more likely they were to be in poor health:

- Liver disease
- COPD (Chronic obstructive pulmonary disease)

The ACE (Adverse Childhood Experience) Study

Conducted by the US Center for Disease Control & Kaiser Permanente

17,000 PARTICIPANTS SURVEYED

Female Participants: 13% emotional abuse, 27% physical abuse, 24.7% sexual abuse

Male Participants: 7.6% emotional abuse, 29.9% physical abuse, 16% sexual abuse

The ACE Study Findings

Suggest that certain experiences are major risk factors for the leading causes of illness and death as well as poor quality of life in the United States.

It is critical to understand how some of the worst health and social problems in our nation can arise as a consequence of adverse childhood experiences.

Realizing these connections is likely to improve efforts towards prevention and recovery.

CHILDHOOD TRAUMA’S IMPACT ON LIFE EXPECTANCY

On average, people with six or more ACEs died nearly 20 years earlier than those no ACEs.

<table>
<thead>
<tr>
<th>ACEs</th>
<th>Years</th>
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<tbody>
<tr>
<td>None</td>
<td>80</td>
</tr>
<tr>
<td>6+</td>
<td>60</td>
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</table>

TYPES OF ADVERSE CHILDHOOD EXPERIENCES (ACES)

- ABUSE
- NEGLIGENT REASONS
- DOMESTIC VIOLENCE
- SUBSTANCE ABUSE
- CHILD ABUSE
- HOMELESSNESS
- ABANDONMENT
- EMOTIONAL والإتجار

FOCUSIN.COM
Interventions

Translating Research into Practice

a beginning

1.25 million comprehensive patient evaluations since 1975
Origins of the ACE Study

51 weeks later

408 ➔ 132 lbs

What was the core problem here?
>400 lbs. in a shorter period of time than the weight was lost.
Origins of the ACE Study

51 weeks later

408 → 132 lbs

What was the core problem here?
Childhood sexual abuse, depression, and family dysfunction in adult obese patients: a case control study

• First article by Dr. Felitti on obesity

• 100 significantly overweight patients in Kaiser weight loss program interviewed to learn how the onset of obesity correlated with other life events

• By comparison with a control group of 100 always-slender adults, the obese patients were found to be different at a highly significant level in the prevalence of childhood sexual abuse, nonsexual childhood abuse, early parental loss, parental alcoholism, chronic depression, and marital family dysfunction in their own adult lives.

Felitti V. South Med J 1993
The ACE Study

- Vincent J. Felitti, MD and Robert J. Anda, MD, MS
- Asked 26,000 adults at Kaiser, San Diego’s Dept of Preventive Medicine.
- 17,421 participated in the study.
- Participants completed a questionnaire.
ACE Study Design

Survey Wave 1
71% response (9,508/13,454)
\[ n=13,000 \]
All medical evaluations abstracted

Survey Wave II
\[ n=13,000 \]
All medical evaluations abstracted

Present Health Status

17,337 adults

VS.

Mortality
National Death Index

Morbidity
Hospitalization
Doctor Office Visits
Emergency Room Visits
Pharmacy Utilization
# Prevalence of Adverse Childhood Experiences

<table>
<thead>
<tr>
<th>Abuse, by Category</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological (by parents)</td>
<td>11%</td>
</tr>
<tr>
<td>Physical (by parents)</td>
<td>28%</td>
</tr>
<tr>
<td>Sexual (anyone)</td>
<td>22%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Neglect, by Category</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional</td>
<td>15%</td>
</tr>
<tr>
<td>Physical</td>
<td>10%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Household Dysfunction, by Category</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcoholism or drug use in home</td>
<td>27%</td>
</tr>
<tr>
<td>Loss of biological parent &lt; age 18</td>
<td>23%</td>
</tr>
<tr>
<td>Depression or mental illness in home</td>
<td>17%</td>
</tr>
<tr>
<td>Mother treated violently</td>
<td>13%</td>
</tr>
<tr>
<td>Imprisoned household member</td>
<td>5%</td>
</tr>
</tbody>
</table>
Adverse Childhood Experiences

ABUSE
- Physical
- Emotional
- Sexual

NEGLECT
- Physical
- Emotional

HOUSEHOLD DYSFUNCTION
- Mental Illness
- Incarcerated Relative
- Mother treated violently
- Substance Abuse
- Divorce

http://www.cdc.gov/ace/
http://rwjf.org/aces
Landmark ACE publication

**Relationship of Childhood Abuse and Household Dysfunction to Many of the Leading Causes of Death in Adults**

The Adverse Childhood Experiences (ACE) Study

Vincent J. Felitti, MD, FACP, Robert F. Anda, MD, MS, Dale Nordenberg, MD, David F. Williamson, MS, PhD, Alison M. Spitz, MS, MPH, Valerie Edwards, BA, Mary P. Koss, PhD, James S. Marks, MD, MPH

Found a 60% increased odds of severe obesity (BMI >35) in those with 4 or more ACEs
Health Risks

Adverse Childhood Experiences vs. Smoking as an Adult

p<.001
Childhood Experiences vs. Adult Alcoholism

- 0 ACE Score: 2% Alcoholic
- 1 ACE Score: 4% Alcoholic
- 2 ACE Score: 10% Alcoholic
- 3 ACE Score: 15% Alcoholic
- 4+ ACE Score: 18% Alcoholic

Health Risks
Biomedical disease

ACEs Increase Likelihood of Heart Disease*

- Emotional abuse 1.7x
- Physical abuse 1.5x
- Sexual abuse 1.4x
- Domestic violence 1.4x
- Mental illness 1.4x
- Substance abuse 1.3x
- Household criminal 1.7x
- Emotional neglect 1.3x
- Physical neglect 1.4x

As the number of ACEs increases, so does the risk for negative health outcomes.

- 0 ACEs
- 1 ACE
- 2 ACEs
- 3 ACEs
- 4+ ACEs
ACEs increase risks for:

**Behavior**
- Lack of physical activity
- Smoking
- Alcoholism
- Drug use
- Missed work

**Physical & Mental Health**
- Severe obesity
- Diabetes
- Depression
- Suicide attempts
- STDs
- Heart disease
- Cancer
- Stroke
- COPD
- Broken bones
ACE Score & Risk for Chronic Disease

3.9 x higher risk with ACE of 4 or more

Disease risk increases with ACE scores, Felitti et al, 1998
POPULATION ATTRIBUTABLE RISK

A large portion of many health, safety and prosperity conditions is attributable to Adverse Childhood Experience.

ACE reduction reliably predicts a decrease in all of these conditions simultaneously.

Body weight and obesity in adults and self-reported abuse in childhood

- David Williamson and Robert Anda – CDC epidemiologists
- Over 13,000 Kaiser Permanente patients participated in cohort study 1995-97
- Body weight measured followed by mailed survey
- 66% reported some type of abuse
- Physical and verbal abuse most strongly associated with obesity
- Obesity risk increased with the number and severity of each type of abuse
- Population attributable fraction – 17.3% for morbid obesity

Life adverse experiences in relation with obesity and binge eating disorder: A systematic review*

- 70 studies with > 300,000 participants
  - 53 adverse experiences and obesity
  - 7 PTSD and obesity
  - 10 BED and obesity
- The vast majority of these research data (61 studies, 87%), strongly support the hypothesis of an association between adverse life experiences and the development of obesity and BED.
- In 45 out of 53 studies (i.e., 85%) a statistically significant association was found between at least one type of trauma and obesity.

*Palmisano GL, Innamorati M, Vanderlinden J. J of Behavioral Addictions 2016
### OU-SCM Patients: ACEs

<table>
<thead>
<tr>
<th>Experience</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>Verbal abuse</td>
<td>41.6%</td>
</tr>
<tr>
<td>Physical abuse</td>
<td>31.9%</td>
</tr>
<tr>
<td>Sexual abuse</td>
<td>26.6%</td>
</tr>
<tr>
<td>Unloved</td>
<td>33.8%</td>
</tr>
<tr>
<td>Needs unmet</td>
<td>19.6%</td>
</tr>
<tr>
<td>Witness IPV</td>
<td>24.7%</td>
</tr>
<tr>
<td>Sep/Divorce</td>
<td>40.9%</td>
</tr>
<tr>
<td>Alcohol/drugs</td>
<td>36.8%</td>
</tr>
<tr>
<td>Mental illness</td>
<td>26.8%</td>
</tr>
<tr>
<td>Prison</td>
<td>17.5%</td>
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#### ACE score distribution:
- **0 or 1**: 35.7%
- **2 to 4**: 34.2%
- **5+**: 30.1%
Just one of our clinic’s patient

• Female, age 34
• Morbidly obese, BMI 60
• Smoker
• Oxygen-dependent COPD
• Poorly controlled diabetes
Social history (taken directly from her chart)

- Married, 3 children ages 8, 13, 15.
- Molested at 8, raped at 13. Grew up in home with alcoholism, instability and physical abuse.
The rest of the story

• This patient was found dead at home, age 36
• Death thought to be due to heart attack or respiratory failure
Effect of Interventions

Benefits of Incorporating a Trauma Approach

<table>
<thead>
<tr>
<th>Biomedical evaluation: (Control group)</th>
<th>11% reduction in DOVs in subsequent year. (700 patient sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biopsychosocial evaluation: (Trauma-oriented approach)</td>
<td>35% reduction in DOVs in subsequent year. (125,000 patient sample)</td>
</tr>
</tbody>
</table>
Although the study ended in 1997, some states are collecting information about ACEs in their population through the Behavioral Risk Factor Surveillance System (BRFSS).
Addressing ACEs and Trauma Impacts on Obesity

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Disclosure

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• No financial support from any source for this current presentation
Objectives

- Appreciate the complex biopsychosocial factors that block movement toward healthy weight with a focus on ACEs’ influences
- Review ACEs’ effects upon obesity
- Explore trauma-sensitive approaches for intervention in primary care settings
Lifespan Impacts of ACEs

Brain Development
- Electrical
- Chemical
- Cellular Mass

Adaptation
- Hard-Wired into Biology

Critical & Sensitive Developmental Periods
- Chronic Disease
- Psychiatric Disorders
- Impaired Cognition

Adverse Childhood Experiences
- Work/School Attendance, Behavior, Performance

Genetics
- Obesity
- Alcohol, Tobacco, Drugs
- Risky Sex
- Crime
- Poverty
- Intergenerational Transmission, Disparity
ACES Risk for Adult Obesity

• Meta-analysis of 23 studies; 112,000 participants
• 34 percent higher calculated risk for obesity
• Researchers clearly link ACEs detrimental traces which manifest as disease and disability, early death
Hints about ACEs Connections

• Patients with higher BMI’s are more likely to have ACEs
  • Nearly one out of five (17.3%) persons with a BMI≥40 can be attributed to ACEs (population attributable risk)
  • Emotional abuse is the strongest predictor of obesity
  • Frequent verbal abuse increased the risk of having a BMI≥40 by 88%
  • Frequent physical abuse increased the risk of a BMI≥40 by 71%
  • Sexual abuse increased obesity risk by 42%
Pathways for Impact

• Aces-induced brain architecture problems or defects
  • **Poor impulse control and emotional dysregulation**
    • Maladaptive stress responses – poor executive control
  • **Reward center changes**
    • Dopamine dysphoria
  • **Psychological defenses**
    • Food experienced as soothing – love -- care -- remorse
    • Protective layer between body and others
It is hard to fight an enemy that resides in your head.
Brain as Control Center

• Key organ of stress reactivity, coping, and recovery processes -- determines what is threatening and stressful

• Hippocampus, amygdala, and areas of the prefrontal cortex regulate processes which can be adaptive in the short-term and maladaptive in the long-term

• Allostatic overload promotes maladaptive wear-and-tear on the body and brain under chronically stressful conditions
Emotional Dysregulation And Stress Responses
Physiology of Stress Response

- HPA (hypothalamic-pituitary-adrenal) Axis
  - Hypothalamus stimulates adrenal glands to release adrenaline (epinephrine) and glucocorticoids (cortisol) – fight - flight - freeze
    - Heart rate increases and blood pressure rises
    - More oxygen to body tissues
    - Digestion slows
    - Blood supply shunted to large muscles (hand and feet cold)
    - Muscles tense
    - Blood clots faster
    - Liver converts glycogen to glucose for quick energy
Persistent Stress Changes Brain Architecture

Normal

Typical neuron—many connections

Toxic stress

Damaged neuron—fewer connections

Prefrontal Cortex and Hippocampus
During a Stress Response

- First there is a thought or an experience as a catalyst.
- Second, the catalyst is then pre-consciously compared to other similar experiences we’ve stored in our memories. The hippocampus is actively involved in this process of memory retrieval and comparison.
- Third, once this catalyst gets categorized as "threat" according this comparison, the amygdala helps us evoke the emotional stress response to this new experience based on what our past experiences are telling us.
- Fourth, the hypothalamus activates our pituitary and adrenal glands and elevates our stress hormones such as adrenaline and cortisol.
- Finally, the body then engages in muscle contraction, elevated heart rate, shallow breath, and inhibits digestion, salivation, and nutrition absorption.
Role of the Hippocampus

• Central to memory consolidation of eating behaviors through mnemonic processes
  • Including remembering whether one ate, conditioning associations, where food is located, identifying interoceptive states of hunger and remembering how to relieve these states
Psychological Impacts
Reward Center Impacts
**BRAIN REWARD CENTER**

What do the colors mean?

**RED**
- high dopamine
- normal pleasure and interest

**YELLOW**
- medium dopamine
- difficulty feeling joy or pleasure

**GREEN**
- low dopamine
- lack of pleasure

- Normal brain
- Brain of an obese person
- Brain of a cocaine user
- Brain of an alcoholic
Reward Circuit Differences

• Substantial segment of obese individuals exhibit an enhanced sensitivity of the reward circuitry to conditioned stimuli strongly linked to energy-dense food

• Impaired function of the executive control circuitry weakens inhibitory control over eating behaviors
Dopamine Receptors and Obesity —
Role of Pleasure in Eating and Obesity
Recommending Dieting Alone

• Seldom a path to successful (i.e. sustainable) weight loss

• Premises:
  • Dieting may trigger a withdrawal syndrome through lowered leptin levels leading to hyper-activation of reward circuitry and compensatory food seeking behaviors
  • Insurance hypothesis promotes the idea that early food insecurity increases later adaptive fat storage to buffer against future times when food is scarce
Trauma-Informed Care

• Caring for the whole patient
  • Acknowledges benefit of considering a patient’s life experiences to deliver effective care (What happened to you?)
  • Improves patient engagement, treatment adherence, health outcomes, and reduces provider and staff tension and hostility
Trauma-Informed Approaches

- Trauma-informed approaches go beyond talking about healthy lifestyle choices to address aces and trauma effects over a lifespan
  - Recognize weight loss might be threatening to trauma survivors
    - Food may be used as a means of coping, self-medicating
    - Obesity might be a person’s intentional or unconscious defense
Beginning the Conversation

• If you suspect your patient has had ACEs
  • “At some point in their lives, many people have experienced distressing events we refer to as ACEs such as abuse, neglect, or family problems. Have you ever had any experiences like that?”
Conversations

• If you know your patient has had a traumatic experience
  • “I notice that you have experienced difficult events and stress during your developmental years. Do you think these experiences impact your health now?”
  • "How have ACEs affected your thoughts, memories, or feelings about your body, self-esteem, or self-efficacy?
  • Have ACEs interfered with your current relationships? Your work? Your enjoyment of activities?"
Conversations

• Describe why ACEs often lead to recommendations for an interdisciplinary team approach to evaluation and/or treatment
  • Explain the need for complex approaches
    • “Although a wish to avoid reminders of the trauma is common, avoidance may actually interfere with healthy weight attainment”
    • “Avoidance may stall processes that arise from talking through the experiences, receiving social support, or receiving specialized treatments”
Conversations

• Ensure patient understands that referrals for psychological care does not mean he or she is crazy or irreparably damaged
• Address patient worry or guilt that ACEs are just an excuse for “laziness or personal weakness”
Conversations

- Suggest an evaluation rather than treatment
- Suggest a meeting with mental health professionals to learn more about how unexamined ACEs contribute to obesity
- Provide educational materials or ideas about access to information that describe aces link to obesity
  - Use stories or metaphors to clarify possible barriers to healthy weight
Connections Between ACEs and Health

- Metaphors or stories may help explain the lifetime effects of ACEs
  - Research
  - Serve and return
  - Building a brain
  - Brain traffic control
  - Resilience scale/Fulcrum, tipping the balance
  - Overloaded pick-up truck
  - Tree of trauma
  - Toxic stress
  - Backpack
  - Volume control
Follow-Up

• Explore reactions to ACEs and obesity discussion(s)
  • Consider scheduling more frequent brief office visits or telephone follow-ups to explore ongoing struggles and keep patients involved in their own change processes

• If referrals suggested
  • If the patient followed through, were the referrals helpful?
  • If not, what were the obstacles?
Psychological Summary

• Complex biopsychosocial factors contribute to obesity
  • ACEs are associated with poor self-image, negative predictions about change, psychological distress
  • Individuals who experienced ACEs have a much harder time with impulse eating and controlling consumption
  • Trauma defenses may perpetuate obesity
    • Poor coping strategies lead to using food as a soothing mechanism
    • Stigma and guilt about obesity (and ACEs) often activates a cycle of impulsive intake, weight gain, shame, and repeated over-eating
Summary of ACEs Physiological Impacts

- ACEs increase the risk of obesity via detrimental changes in brain architecture, appetite regulation, metabolism, eating behaviors, sleep, inflammation, and cognitive/emotional functioning.

- Obesity is not just about overeating and/or a sedentary lifestyle.
  - An ACEs-informed approach increases successful weight loss and maintenance of a healthy weight.
  - Treatment partners are key to achieving lasting change.
Dr. Robert Anda

• “Stressful and traumatic childhood experiences literally become biology affecting brain structure and function leading to persistent effects………this information comes with the responsibility to use it.”
Literature Referenced


