Socioeconomic inequalities in obesity: Why do they arise, and what can we do about them?

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Outline

• Obesity is socioeconomically patterned
• Obesity-related *behaviours* socioeconomically patterned
• What determines these patterns? Intrapersonal & environmental mediators
• A direct role of psychosocial stress?
• Implications & promising approaches
Obesity is socioeconomically patterned
What is socioeconomic position?

• A person’s economic and social position in relation to others

• Typically indicated by proxies such as education level, occupation, income, neighbourhood disadvantage (SEIFA)
Obesity is socioeconomically patterned

- Seminal review: inverse relationship in women (Sobal & Stunkard, 1989)
- Updated review: confirmed, + education - men (McLaren, 2007)
- Review of longitudinal studies: disadvantage - weight gain - men & women (Ball & Crawford, 2005)
- Children: early life disadvantage – adult obesity (Parsons, Power, Logan & Summerbell, 1999)
Are obesity rates levelling off?

Proportion men and women overweight or obese, 1995 - 2011-12

Proportion children overweight or obese, 1995 - 2011-12

ABS, 2013. Australian Health Survey 2011-12
Levelling is not universal...

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Gearon et al., under review

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Projected socioeconomic inequalities in the prevalence of obesity among adults in Australia may **increase** into the future

Backholer et al., ANZJPH 2012

Gearon et al., under review

Levelling is not universal...
• Obesity rates may be slowing or levelling off in Australia and other developed countries

• However, obesity is (still) socioeconomically patterned
Why?

- Genetic explanation unlikely
- Social mobility impacts on weight change
- Classified 8756 young women by own & parents’ education
- Upward educational mobility attenuated excess weight gain associated with low education

Adjusted for key confounders including marital status, parity, smoking status

Ball & Mishra, *Int J Epi* 2006
Conceptual model

Behavioural construct

- Food choice & consumption
- Physical activity behaviours
- Sedentary behaviours

Energy balance component

- Energy intake
- Energy expenditure

Weight outcome

Weight gain/obesity

Adapted from Ball & Crawford, in Crawford et al, OUP 2010
Conceptual model

Socioeconomic disadvantage

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Adapted from Ball & Crawford, in Crawford et al, OUP 2010
Obesity-related behaviours are socioeconomically patterned
Socioeconomic disadvantage and diet

- Lower income/household disadvantage predicts less healthy diets in children, adolescents and adults (Brug, Fam Prac 2008)

- Parental education level predicts children’s/adolescents’ obesity-related dietary behaviours (fruit, veg, fat intakes) (Van der Horst, Health Ed Res 2006)

- Living in disadvantaged area predicts adults’ obesity-promoting dietary behaviours (Giskes et al., Obes Rev 2011)

Fruit/veg serves/day by education level (n=1347 women)

Ball, Crawford & Mishra, PHN 2006
Socioeconomic disadvantage and physical activity

• Socioeconomic position positively predicts leisure-time PA in adults (Gidlow et al., Health Ed J 2006)

• Less consistent among children and adolescents – emerge later in life? (Stalsberg & Pedersen, 2010)
Socioeconomic disadvantage and sedentary behaviours

- Socioeconomically disadvantaged children spend more time in sedentary screen behaviours (Pate et al, Br J Sports Med 2011; Salmon et al., AJPM 2011)

- In adults, education inversely associated with TV time; mixed findings for other sitting & for income (Rhodes et al., AJPM 2012)
Why are obesity-related behaviours socioeconomically patterned?
Conceptual model

Mediating pathways
- Individual
- Social
- Environmental/structural

Behavioural construct
- Food choice & consumption
- Physical activity behaviours
- Sedentary behaviours

Energy balance component
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Weight outcome
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Adapted from Ball & Crawford, in Crawford et al, OUP 2010
Potential mediators

Individual
• Knowledge
• Values/priorities
• Self-efficacy
• Behavioural skills & strategies

Social
• Social support
• Sabotage
• Modelling
• Social norms

Environmental
• Home environment
• Neighbourhood – access to healthy/less healthy foods
• Neighbourhood – Access to physical activity supports
Mediators of inequalities in diet

Correlates of fruit consumption

- Nutrition knowledge: Low
- Health considerations: Mid
- Family support: High
- Friend support: Mid

Environmental: Objectively assessed density of supermarkets or fruit/veg stores not correlated with fruit intake

Correlates of veg consumption

- Nutrition knowledge: Low
- Health considerations: Mid
- Family support: High
- Friend support: Mid

Density of supermarkets not correlated with veg intake; density f/v stores correlated 0.06 with veg intake

Ball, Crawford & Mishra, PHN 2006
Mediators of inequalities in diet

• Individual and social factors partly mediated, but did not completely explain, socioeconomic variations in fruit and vegetable consumption

• Environmental factors (store density) did not mediate the relationship of SES with fruit or vegetable consumption

Ball, Crawford & Mishra, PHN 2006
Mediators of inequalities in PA

Odds* of any LT walking by environmental, social & personal characteristics

Environmental Social Individual

Ref Aesthetics Safety Coast Dog Friend support Self-efficacy Enjoyment

Ball et al., JECH 2007
Mediators of inequalities in PA

• Variables from all three domains contributed to explaining socioeconomic variations in leisure-time walking
  – Self-efficacy, enjoyment and intentions
  – Friends’ social support
  – Neighbourhood walking tracks; coastal proximity

Ball et al., JECH 2007
Mediators of inequalities in obesity

Coastline proximity
Density of PA facilities
Density of supermarkets
Density of green grocers
Distance to closest supermarket

17% of the low-high education difference in BMI explained

Abbott et al., Obesity 2014
A note on cost...

• Providing women of high & low SEP with theoretically greater/reduced shopping budgets did little to reduce inequalities in the ‘healthfulness’ of selected foods (Inglis et al, Appetite 2009)

• Economic factors not key determinants of lower PA participation among low SEP women (Ball et al., Women & Health 2006)
Environmental solutions? Cautions

- Widespread push for environmental solutions to obesity epidemic
- Evidence from mediation studies suggests alone may have limited impact on reducing socioeconomic inequalities
- However methodological limitations
- Need more ‘nuanced’ conceptualisation of ‘access’: mobility potential; ‘unwritten laws’/norms; activity space Shareck et al, Health & Place 2014
- Access to foods near workplace associated with healthy food consumption Thornton et al., Health & Place 2014
Environmental solutions? Cautions

• “In the US observational evidence supports the idea that access to supermarkets and grocery stores is constrained for those who live in low-income neighbourhoods, and that consequent price and choice disincentives to healthy eating might help to explain higher rates of poor diet and of obesity. Outside the US the most recent observational studies suggest that this is not the case.”

  Cummins & Macintyre, 2006

• Aggregate measure of neighbourhood obesogenicity not associated with BMI in 80 Victorian neighbourhoods (Tseng et al., 2014)

• Place effects research is context-specific
A direct role for psychosocial stress?

Mean body weight (kg) by perceived stress score, n=6364

S3 (25-30)  S4 (28-33)  S5 (31-36)  S6 (34-39)

Stress score
- Not at all
- Somewhat
- Moderate
- Very/Extremely

Ball & Mishra, in preparation, using data from Aust Long Study Women’s Health
Some triple-choc fudge ice-cream & trashy TV will make me feel better...

Weight gain

Stress linked to socioeconomic disadvantage; may explain disadvantage-obesity link (Hemmingsson, 2014)
A direct role for psychosocial stress?

- Cortisol levels in scalp hair - novel marker for long-term cortisol exposure
- Obtained hair samples of 74 women and 42 children from disadvantaged n/hoods
- Cortisol levels correlated among mothers & children (rho=.569, p=.0001)
- No correlation with stress or BMI
- At odds with literature: more research to determine potential novel treatment target
Implications & positive examples

• Limited evidence of pathways linking socioeconomic disadvantage to obesity & determinant behaviours
• Selected individual & environmental mechanisms implicated but more research required to explain & importantly redress
• A few notes on addressing...
Implications & positive examples

- Review 11 studies: individual-focused interventions may exacerbate inequalities (Beauchamp et al, Obes Rev 2014)
- Systematic reviews (43 studies) of effectiveness of individual, community & societal interventions for reducing inequalities in obesity among adults (Hillier-Brown et al, IJO 2014) & children (Hillier-Brown et al, BMC Pub Health 2014)
- Individual: primary care tailored weight loss programs for adults; screen time reduction, mentoring interventions for children
- Community: behavioural weight loss interventions, community diet clubs (including workplace); inconclusive evidence for children
- Societal level evaluations: few, low quality and inconclusive
- No evidence any of the interventions increased inequalities
• Aims to develop & trial a novel m-health intervention addressing obesity risk for disadvantaged families
• Targets intrapersonal, social and environmental supports
• Examine how this intervention can be implemented in Primary Health Care settings (GP, Maternal and Child Health Services, & an Aboriginal Primary Health Service)

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Conclusions

• People experiencing socioeconomic disadvantage remain at increased risk of obesity and engaging in obesity-risk behaviours
• Evidence of explanatory pathways limited
• Solutions must be based on locally-relevant evidence
• Addressing structural barriers to healthy behaviours critical
• However DON’T discount individual intervention levers - mediation results & review of interventions suggest individual (& social) determinants may be important levers for reducing inequalities
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