Influence of school on whether girls develop eating disorders: a multilevel record-linkage study

Dr Helen Bould
Elizabeth Blackwell Clinical Primer
Child and Adolescent Psychiatry Registrar
Eating Disorders

Up to 6% of adolescent girls
(Smink 2014)

SMR: 5.9 (95% CI 4.2-8.3) for anorexia nervosa
(Arcelus, 2011)
The silent epidemic hitting top girls’ schools

A silent epidemic of anorexia is sweeping through the country’s top independent schools, affecting thousands of teenage girls, experts say.

Katie Gibbons
Last updated at 12:01AM, February 22 2014

Experts say many of the top private schools are in denial about the scale of the problem
Paola Colleoni/Getty Images
School Clustering

Clinical impression

Weight loss behaviours vary (Austin, 2013)

More underweight girls $\rightarrow$ More losing weight (Mueller, 2010)

School level interventions?
Variation in Rates between Schools

Composition: characteristics of the students
Parental Education

Subtypes of ED (N=574,720†)

Adjusted hazard ratio (95%CI)

- Anorexia nervosa
- Bulimia nervosa
- EDNOS

Goodman, 2014
Variation in Rates between Schools

Context:
characteristics
of the school
Stockholm Youth Cohort

- Record linkage study
- 0 – 17 year olds
- In Stockholm County 2001-2011
- N=735,096
Sources of diagnosis

• Throughout: Sweden Inpatient (SOSSLV)
• From 1993: Stockholm Inpatient (VALSLV)
• From 1995: Adult psychiatry (PVS)
• From 1997: Sweden Daytime surgery (SOSDAG)
• From 1998: Stockholm Outpatient (VALOVR)
• From 2001: CAMHS diagnosis/reason for visit (BUPDIA/BUPKO)
• From 2005: Primary care (VALKON)
• From 2007: Private (VALARV)
Inclusion Criteria

- Subset of SYC who left Gymnasium 2001-2010
- At a school with >10 pupils
- Had a final exam result
- No previous eating disorder diagnosis
- Born in Sweden
- Female
Outcome

- Eating Disorder (ED) aged 16-20

- Any diagnosis (IP/OP/any eating disorder)

- Attendance at a specialist eating disorder clinic (Ahren, 2013)
School Variables

• Built from 142,832 subjects (boys & girls)

• To calculate for each school
  - proportion of girls
  - proportion of parents with higher education
  - proportion of students/parents born abroad
  - proportion with high disposable income
Descriptive Data

- 55,059 girls attending 409 Gymnasiums
- 2.37% diagnosed with an ED aged 16-20
# School Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean (range) in schools (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Students per School</td>
<td>1513 (10-3956)</td>
</tr>
<tr>
<td>Eating Disorder in girls aged 16-20</td>
<td>2.42 (1.3-16.7)</td>
</tr>
<tr>
<td>Female</td>
<td>55.04 (1.6-100)</td>
</tr>
<tr>
<td>Final exam score in the top 20%</td>
<td>23.16 (0-94.7)</td>
</tr>
<tr>
<td>Disposable income in the top 20% for Sweden</td>
<td>32.45 (0-70.60)</td>
</tr>
<tr>
<td>One or both parents with higher education</td>
<td>57.16 (12.73-91.67)</td>
</tr>
<tr>
<td>Mother with higher education</td>
<td>37.48 (0-73.34)</td>
</tr>
<tr>
<td>One or both parents born outside Sweden</td>
<td>25.54 (0-67.37)</td>
</tr>
<tr>
<td>Child born abroad</td>
<td>6.24 (0-40)</td>
</tr>
</tbody>
</table>
## Proportion of Variance at School Level

<table>
<thead>
<tr>
<th>Unadjusted and Adjusted Models</th>
<th>% of unexplained variance at school level (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unadjusted Model</strong></td>
<td></td>
</tr>
<tr>
<td>Whole sample (N=62,990)</td>
<td>4.3 (2.7 to 6.7)</td>
</tr>
<tr>
<td>Complete Case sample (N=55,059)</td>
<td>4.4 (2.8 to 7.1)</td>
</tr>
<tr>
<td><strong>Adjusted for Multiple Individual Level Variables</strong></td>
<td></td>
</tr>
<tr>
<td>Parental level of education, psychiatric history in either parent, maternal age, disposable income, either parent born outside Sweden</td>
<td>2.9 (1.6 to 5.3)</td>
</tr>
</tbody>
</table>
10% Increase in School Level Variables

- School Level Variable only
- Adjusted for Individual Variables
- Adjusted for proportion of parents with higher education

Odds Ratio for eating disorder diagnosis for a 10% increase in school variables

- % Female
- % Born outside Sweden
- % Final exam score in top quintile
- % Disposable income in top quintile
- % One or both parents with post-school education
- % One or both parents born outside Sweden
% of parents with higher education

<table>
<thead>
<tr>
<th>Adjusted for a 10% increase in students in the school with the following characteristics</th>
<th>Odds Ratio for Eating Disorder diagnosis (95% CI, p value)* for a 10% increase in the proportion of parents with higher education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted for Individual Variables only*</td>
<td>1.14 (1.09 to 1.19), p&lt;0.0001</td>
</tr>
<tr>
<td>Female</td>
<td>1.14 (1.09 to 1.18), p&lt;0.0001</td>
</tr>
<tr>
<td>Born outside Sweden</td>
<td>1.13 (1.08 to 1.18), p&lt;0.0001</td>
</tr>
<tr>
<td>Final exam score in the top 20%</td>
<td>1.13 (1.05 to 1.21), p=0.001</td>
</tr>
<tr>
<td>Disposable income in the top 20%</td>
<td>1.12 (1.04 to 1.20), p=0.002</td>
</tr>
<tr>
<td>One or both parents born outside Sweden</td>
<td>1.14 (1.09 to 1.19), p&lt;0.0001</td>
</tr>
</tbody>
</table>

*Parental level of education, psychiatric history in either parent, maternal age, disposable income, either parent born outside Sweden
Cross Level Interaction

- Individual and school level parental education

- No evidence of cross-level interaction
Possible mechanisms

ED are contagious

Some school cultures encourage ED

Some schools are better at identifying ED
ED are contagious (cognitive/perceptual)

Rates of body dissatisfaction are higher in areas of lower average BMI (McLaren, 2003)

In schools with more underweight girls, individuals are more likely to be trying to lose weight (Mueller, 2010)

Body size perceived to be most normal can be altered with visual adaptation (Winkler, 2005; Glauert, 2009)

So can perception of own size (Bould, unpublished)
ED are contagious (behavioural)

Adolescent girls’ extreme weight loss behaviours are associated with those in their friendship groups (Paxton 1999, Hutchinson 2007)
School culture may encourage ED

A school salad bar increases the amount of fruit & veg purchased by students (Slusser, 2007)
School culture may encourage ED

Girls in single sex (vs mixed) schools associate intelligence and professional success with being thinner (Tiggemann, 2001)
Possible mechanisms

• Some schools may be better at identifying ED

Outcome: Any referral to Child and Adolescent Mental Health Services

10% increase in proportion of parents with higher education: OR 1.00 (95% CI 0.98, 1.05), p = 0.739
Implications

Higher risk in all girls’ public schools
Developing school level interventions
Increasing awareness in at risk schools

The Telegraph

The truth behind the death of Little Miss Perfect

The quest for perfectionism is damaging young women beyond repair, prompting a backlash from high-achieving schools. So just how do we explain the death of "Little Miss Perfect" to our girls - and what can we do to boost their confidence again?
Future Directions

• Eating Disorders & Body Dissatisfaction in ALSPAC

• GHQ, BMI, alcohol use, smoking, other mental illnesses in Swedish Cohorts
Acknowledgements

Cecilia Magnusson
Christina Dalman
Henrik Dal

Glyn Lewis
Nadia Micali

Bianca DeStavola

Jonathan Evans
Any questions?