**Why are children with asthma bullied? A risk factor analysis.**

**Authors:**

R. S. Charles; University Hospitals of North Midlands – Staffordshire (United Kingdom)

P. L. P. Brand; Isala Academy – Zwolle (Netherlands)

F. J. Gilchrist; Keele University – Staffordshire (United Kingdom)

J. Wildhaber; Universite de Fribourg (Switzerland)

W. D. Carroll; University Hospitals of North Midlands – Staffordshire (United Kingdom)

Corresponding Author: W. D. Carroll; will.carroll@nhs.net

**Ethics**
Prior to the conduct of the initial survey, the UK National Research Ethics Service were contacted and they advised that ethical review by a Research Ethics Committee was not required.

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**Contribution of authors**
PB, WC and JW conducted the Room to Breathe study. WC, FG and RC conceived the hypothesis driven design of this study based on a review of the literature. RC and WC jointly undertook the data analysis. All authors contributed to the preparation of the final manuscript.

**What is already known on this topic?**

Children with chronic diseases, including asthma, are at increased risk of reporting bullying.

Bullying during childhood is common and has important, long-term consequences.

Around 1 in 10 children with asthma report bullying/teasing due to their condition.

**What this study adds?**

Children with better asthma control were less likely to report asthma-related bullying or teasing.

Children, but not parents, were more likely to report worse overall asthma control if they were bullied/teased because of their asthma.

Children who report bullying/teasing are more likely to report activity restriction and have parents who report ongoing ‘worry’ about their child’s asthma.

**Abstract**

The links between bullying and asthma have not been explored in children. We wanted to determine the child/parent factors and attitudes associated with asthma-related bullying. Individual child/parent responses of children with asthma (n=943) from the Room to Breathe survey were analysed. 1 in 10 children reported asthma-related bullying/teasing (n=93). Children with well-controlled asthma were less likely to report being a victim of asthma-related bullying/teasing (OR 0.51 95% CI 0.23, 0.84, p=0.006). Being a victim of bullying/teasing was commoner in children reporting activity restriction (OR 1.74, 95% CI 1.11, 2.75, p=0.010), who described their asthma as ‘bad’ (OR 3.02, 95% CI 1.86, 4.85, p<0.0001) and those whose parents reported on-going asthma-related health worries (OR 1.64 95% CI 1.04, 2.58, p=0.024). Asthma consultations should incorporate specific questions about bullying and be child-focussed in order to gain a representative appreciation of asthma control and its impact on the child’s life.

**Introduction**

Bullying is a challenge faced by many children and adolescents, but disproportionately affects those with chronic disease [1]. In the UK, it is estimated 17% of children aged 10-15 years are bullied[3] and almost 10% of young people have asthma[4]. Despite this, there is a paucity of research into asthma-related bullying.

We recently undertook a literature review to establish the current evidence base regarding bullying and asthma [20]. The narrative findings of this review showed a consistent association between asthma and bullying victimisation. However, there was a lack of evidence to explain why this relationship exists, and a reliance on parent-reported data. . We used data from the Room to Breathe Survey [21] to explore whether child-reported and parent-perceived asthma control was associated with the risk of bullying, and how parental worries about their child’s asthma was related to the risk of bullying.

**Methods**

We analysed unpublished data from the Room to Breathe study conducted between 2008 and 2009 [21]. The questionnaire used in this study elicited parent and child behaviours and beliefs in families with an asthmatic child. A total of 943 children with asthma aged 8-15 years and their parent/caregivers were interviewed.

*Choice of questions*

To avoid multiple hypothesis testing, we pre-selected question items for analysis based on our narrative review of the literature [18]. Specifically, we tested whether asthma-related bullying risk was reduced in children with well-controlled asthma, according to perceived control and validated control score. We also tested whether activity restriction, and parental worry affected the risk of bullying. Bullying/teasing was determined according to the response to the question: ‘Have you ever been made fun of, or been bullied as a result of your asthma?’

*Defining Asthma Control*

Our primary measure of asthma symptom control was defined according to the most recent GINA guideline [22]. Raw data from the following questions were used: In the past four weeks has the patient had: daytime asthma symptoms more than twice a week?; night-time waking due to asthma?; SABA reliever for symptoms more than twice a week?; any activity limitation due to asthma?. GINA symptom control scores were grouped into well controlled (score 0), partly controlled (score 1-2) or uncontrolled (score 3-4).

Individuals were excluded (n=13) if complete data were not available for calculation of the GINA symptom control score. For statistical analysis of the association with bullying, scores were dichotomised into well controlled (score 0) versus not well controlled (score ≥1).

Control according to the Childhood-Asthma Control Test (C-ACT)was also calculated [23]. A score of ≤19 was considered uncontrolled, and ≥20 indicated controlled asthma [23]. Children with incomplete questionnaire data for C-ACT calculation were excluded from the analysis (n=229). See Appendix 1.

*Overall Assessment of Asthma by Parents and Children*

In the Room to Breathe study, children were asked to choose from four options to describe the overall assessment of their asthma: I only get it every now and then; not too bad; quite bad; very bad. Similarly, parents were asked to describe their child’s asthma choosing from the options: intermittent; mild (not too bad); moderate (quite bad); severe (very bad). We dichotomised both overall assessments into not bad (1 or 2) versus bad (3 or 4).

*Parental anxiety*

Parents had been asked to describe their level of worry about their child’s health at different times points and in different situations. For analysis, we dichotomised the answers to these questions into those who reported being worried (very worried or quite worried) versus other responses.

*Data Entry and Analysis*

Data were analysed using STATA statistical software (release 8.0; StataCorp, College Station, TX, USA). To ensure accuracy, C-ACT and GINA scores were separately calculated by two researchers and the results compared manually. For non-parametric continuous variables the two sample Wilcoxon rank-sum test was applied. For categorical variables we used the Chi-squared test and Fisher’s exact test. For small samples we used the Cornfield approximation. A p value of <0.05 was taken as statistically significant. Odds ratios were calculated using the STATA case-control odds-ratio calculator.

**Results**

943 children from six countries participated in the Room to Breathe survey. Data on demographic characteristics and bullying are presented in table 1.

*Asthma Control*

Only 358/930 (38.5%) children were well controlled according to the current GINA symptom control criteria. 312/714 (43.7%) children were controlled according to their C-ACT score.

*Bullying*

93 children (9.9%) reported being bullied / teased as a result of their asthma. Of these, 34 (36.6%) were aged 8-10 years, 27 (29.0%) 11-13 years and 32 (34.4%) 14-15 years (table 1).

The relationship between being bullied and asthma-related factors is presented in table 2.

*Bullying and Asthma Control*

Children with well controlled asthma symptoms (GINA defined) were less likely to report being a victim of asthma-related bullying or teasing (OR 0.51, 95% CI 0.30, 0.85, p=0.006) There was a highly significant association (p<0.0001) between C-ACT score and reported bullying/teasing with children who reported bullying (n=81) having lower scores (median C-ACT score 18, IQR 15-21) than those (n=633) who did not (median ACT score 20, IQR 17-23). C-ACT defined controlled asthma (score ≥20) was significantly associated with a lower risk of bullying (OR 0.46, 95% CI 0.28, 0.76, p=0.001).

*Child and Parent Overall Assessment of Asthma*

Children who reported their asthma was ‘bad’ were significantly more likely to experience asthma-related teasing/bullying (OR 3.02, 95% CI 1.86, 4.85, p<0.0001). In contrast, parental overall assessment of their child’s asthma was not significantly associated with asthma-related bullying (OR 1.5, 95% CI 0.92, 2.41, p=0.079).

*Bullying and Parental Worry*

Parental worry concerning their child’s health was significantly associated with child-reported bullying (OR 1.64 95% CI 1.04, 2.58, p=0.024). Parental worry at diagnosis (OR 1.69, 95% CI 0.94, 3.22, p=0.070) and parental worry regarding steroid use (n=612 responses) (OR 1.21 95% CI 0.67, 2.21, p=0.506) were not significantly associated with asthma-related bullying.

*Bullying and Activity Restriction*

370 families reported the child with asthma had restricted their daily activities because of asthma. Being a victim of bullying/teasing was more common in children who reported activity restriction (OR 1.75 95% CI 1.11, 2.75, p=0.010).

*Bullying and Spacer Use*

Reported use of spacers in public (for reliever medication) was not associated with asthma-related bullying (OR 1.44, 95% CI 0.89, 2.32 p=0.114).

**Discussion**

Bullying is a recognised but under-appreciated complication of asthma. Asthma-related bullying was significantly associated with poorer asthma control, activity restriction and ongoing parental worry regarding their child’s asthma. Children with poorly controlled asthma were also found to have higher levels of parental worry and activity restriction. In order to identify bullying, which is common in children with asthma, clinicians should direct specific questions about this to children themselves in order to gain a representative appreciation of the child’s asthma and its impact on their quality of life. We acknowledge sWe recommend that future research focuses on child-reported experiences and interventions that reduce the risk of bullying of children and young people with asthma.

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Table 1: Demographics of group including bullying rate, asthma control, sex, age and country.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|   |   |   | N | % |
| Have you ever been made fun or been bullied as a result of your asthma? | Yes | 848 | 90.1 |
| No | 93 | 9.9 |
| Asthma Control using GINA [22] Criteria (n=930)(≥1 not fully controlled, 0 controlled)  | Score 0 | 358 | 38.5 |
| Score 1  | 315 | 33.9% |
| Score 2  | 167 | 18.0% |
| Score 3  | 65 | 7.0% |
| Score 4 | 25 | 2.7% |
| Asthma Control using C-ACT [23] Scores (n=714)(≤19 uncontrolled, and ≥20 controlled) | Controlled | 312 | 43.7 |
| Uncontrolled  | 402 | 56.3 |
| Sex  | Female  | 380 | 40.3 |
| Male | 563 | 59.7 |
| Age  | 4-7 years | 341 | 26.6 |
| 8-10 years | 332 | 25.9 |
| 11-13 years | 332 | 25.9 |
| 14-15 years | 279 | 21.8 |
| Country | United Kingdom | 131 | 13.9 |
| South Africa | 150 | 15.9 |
| Greece | 175 | 18.6 |
| The Netherlands | 153 | 16.2 |
| Hungary | 175 | 18.6 |
| Canada | 159 | 16.8 |

Table 2: Relationship between being bullied and asthma-related factors.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Not bullied | Bullied | OR | 95% CI | p value |
|   |  |  |  |  |  |
| *Asthma control (GINA) [22]* |  |  | 0.509 | 0.297, 0.846 | 0.0064 |
| Controlled  | 335 (93.6%) | 23 (6.4%) |  |  |  |
| Uncontrolled | 504 (88.1%) | 68 (11.9%) |  |  |  |
|  |  |  |  |  |  |
| *Asthma control (C-ACT) [23]*  |  |  | 0.464 | 0.280, 0.763 | 0.0012 |
| Controlled (C-ACT *≥* 20) | 263 (84.3%) | 49 (15.7%) |  |  |  |
| Uncontrolled (C-ACT <20) | 370 (92.0%) | 32 (8.0%) |  |  |  |
|   |  |  |  |  |  |
| *Child's overall assessment*  |  |  | 3.020 | 1.858, 4.853 | <0.0001 |
| Not Bad | 703 (92.5%) | 57 (7.5%) |  |  |  |
| Bad | 147 (80.3% | 36 (19.7%) |  |  |  |
|   |  |  |  |  |  |
| *Parent's overall assessment*  |  |  | 1.500 | 0.919, 2.409 | 0.0789 |
| Not bad  | 629 (91.2%) | 61 (8.8%) |  |  |  |
| Bad | 220 (87.3%) | 32 (12.7%) |  |  |  |
|   |  |  |  |  |  |
| *Activity restriction* |  |  | 1.746 | 1.110, 2.748 | 0.0103 |
| Not restricted | 527 (92.1%) | 45 (7.9%) |  |  |  |
| Restricted | 322 (87.0%) | 48 (13.0%) |  |  |  |
|   |  |  |  |  |  |
| *Parental worry at diagnosis*  |  |  | 1.689 | 0.942, 3.219 | 0.0692 |
| Not worried | 190 (92.7%) | 15 (7.3%) |  |  |  |
| Worried | 660 (88.2%) | 88 (11.8%) |  |  |  |
|   |  |  |  |  |  |
| *Parental worry now*  |  |  | 1.638 | 1.038, 2.576 | 0.0237 |
| Not worried | 549 (91.8%) | 49 (8.2%) |  |  |  |
| Worried | 301 (87.2%) | 44 (12.8%) |  |  |  |
|   |  |  |  |  |  |
| *Parental worry about steroid use* |  |  | 1.207 | 0.672, 2.207 | 0.5061 |
| Not worried | 231 (91.3%) | 22 (8.7%) |  |  |  |
| Worried | 322 (89.7%) | 37 (10.3%) |  |  |  |
|   |  |  |  |  |  |
| *Spacer use for bronchodilator inhaler*  |  |  | 1.439 | 0.891, 2.324 | 0.1139 |
| No | 459 (92.0%) | 40 (8.0%) |  |  |  |
| Yes | 343 (88.9%) | 43 (11.1%) |  |  |  |

Appendix 1: Missing data for C-ACT Scores [23]

|  |  |  |  |
| --- | --- | --- | --- |
| Item No.  | Question | Responses  | Missing data items  |
| B0 | How is your asthma today? | 940 | 3 |
| B0i | Which of the following describes how much of a problem your asthma is when you run, exercise or play sports? | 943 | 0 |
| B0ii | Do you cough because of your asthma? | 943 | 0 |
| B0iii | Do you wake up during the night because of your asthma? | 943 | 0 |
| S10a | During the last four weeks, how many days did your child have any daytime asthma symptoms? | 884 | 59 |
| S10b | During the last four weeks, how many days did your child wheeze during the day because of asthma? | 849 | 94 |
| S10c | During the last four weeks, how many days did your child wake up during the night because of asthma? | 747 | 196 |
|  |  |  | 352\*\* |

\*\*116 individuals had 1 missing item response; 102 individuals had 2 missing item responses; 11 individuals had 3 missing item responses.