Fall 12-2-2020

Pediatric Asthma and Psychological Resilience: Examining Whether Family Functioning and Social Support Relate to Asthma Symptoms and Lung Function

Dalia Jaafar
Chapman University, jaafar@chapman.edu

Natasha H. Hikita
Chapman University, hikit101@mail.chapman.edu

Pornchai Tirakitsoontorn
Children's Hospital of Orange County, PTirakitsoontorn@choc.org

Azucena Talamantes
Children's Hospital of Orange County, atalamantes@choc.org

Anchalee Yuengsrigul
Children's Hospital of Orange County, ayuengsrigul@choc.org

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Abstract

Upwards of 6 million children in the United States are afflicted with pediatric asthma. While previous research has linked asthma to multiple contributing biological and environmental factors, recent research suggests that psychological and social factors may have an impact on physiological outcomes of asthma like lung function and lung inflammation. Therefore, we suggest the need to study the impact of positive psychological factors such as a well-functioning family environment and beneficial social support on symptoms and lung function of children diagnosed with asthma. In the present pilot study, we recruited a total of 15 children with a confirmed asthma diagnosis and their parents from the Division of Pulmonology at the Children's Hospital of Orange County. Participants were asked to complete an initial baseline assessment as well as ecological momentary assessments four times a day for seven days followed by a final follow up survey. Asthma symptoms and pulmonary function were measured using a 7-item Asthma Control Diary, and peak expiratory flow (PEF) values were gathered using data from self-administered spirometer recordings during the ecological momentary assessment portion of the study. This pilot study demonstrates the feasibility in collecting ecological momentary assessments surrounding positive psychological factors. Further, in testing the associations between family functioning and social support on children's asthma symptoms and lung function, children who received more support from teachers (b = 0.03, t = 2.34, p = 0.048) and close friends (b = 0.04, t = 3.88, p = 0.006) had worse symptoms and lung function. Family functioning was not significantly associated with asthma symptoms and lung function (b = -0.00, t = -0.03, p = 0.975). Based on the results obtained, significant associations were only found in some aspects of social support. Interestingly, it seems as though children with more social support had worse asthma symptoms and lung function. This negative association might be an issue of reverse causality in which children who need more assistance receive more support. Next steps in this work include testing these associations in a larger-scale study. In sum, as pediatric asthma's prevalence continues to rise, future studies should further examine the relationship between positive psychological factors and children's asthma resilience.

Keywords

pediatric, asthma, psychological, resilience, family functioning, social support, asthma symptoms, lung function, PEV, children, peak expiratory flow, spirometer, daily diary, resilience

Disciplines

Behavior and Behavior Mechanisms | Child Psychology | Clinical Psychology | Health Psychology | Medicine and Health Sciences | Psychology | Social and Behavioral Sciences | Social Psychology

Authors

Dalia Jaafar, Natasha H. Hikita, Pornchai Tirakitsoontorn, Azucena Talamantes, Anchalee Yuengsrigul, Eric Sternlicht, and Brooke N. Jenkins

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Dalia Jaafar, Natasha Hikita, Pornchai Tirakitsoontorn, Azucena Talamantes, Anchalee Yuengsrigul, Eric Sternlicht, Zeev Kain, & Brooke Jenkins
Chapman University
Center on Stress and Health
University of California, Irvine

IRB #181191

INTRODUCTION

- Pediatric asthma is the most pervasive chronic illness afflicting upwards of 6 million children in the United States (Bloom, Dey, & Freeman, 2009; 2007).
- Children diagnosed with asthma encompass persistent symptoms of wheezing, coughing, shortness of breath, and chest tightness triggered by intermittent constriction and inflammation of the lungs (Ou et al., 2015).
- Asthma has been linked to multiple contributing biological factors (Chen & Schreier, 2008), but emerging evidence suggests that psychological and social factors may also have an impact on the physiological aspects of asthma (Wright, Rodriguez, & Cohen, 1998).

We propose that less asthma symptoms and better lung function will be associated with increased social support and increased positive family functioning. Therefore, in the current pilot study, we have assessed the impact of these positive psychological factors on symptoms and lung function of children diagnosed with asthma.

METHOD

Participants: 15 children with a confirmed asthma diagnosis and their parents from the Division of Pulmonology at Children's Hospital of Orange County between the ages of 12 and 17 (7 male, 8 female, M_{age} = 13). 42.9% Hispanic, 35.7% White, and 7.1% other.

Procedures:

- Potential participants were electronically identified through a secure online medical record gateway to verify their eligibility.
- Participants were asked to complete an initial baseline assessment electronically following the child's initial doctor's appointment at CHOC.
- Ecological momentary assessments, sent via text message, were administered four times a day for the next seven days.
- Then, participants completed a brief follow up assessment survey which was administered either in person or by email.

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MEASURES

Social Support

Child & Adolescent Social Support Scale

60-item self report scale with five 12-item subscales (parents, close friends, classmates, teachers, and people in school) examining emotional, instrumental, informational & appraisal support
Frequency= 6-point Likert scale (1=Never, 6= Always)
Importance= 3-point Likert scale (1= Not important, 3= Very important)

Higher frequency rating= perceive greater over social support
Higher importance= value social support more
Frequency and importance were also calculated for each individual network type (e.g., social support frequency from parents, frequency from teachers).

Family Functioning

Family Problem Solving Communication Index

10-item instrument measuring patterns of family communication through two 5-item subscales (negative and positive)
Family problem-solving communication patterns on 4-point Likert scale (0= False, 1= Mostly false, 2= Mostly True, 3= True)

Higher rating of negative communications= greater negative communication patterns than those with lower ratings
Higher rating of affirming communications= greater positive communication patterns than those with lower ratings

Asthma symptoms and lung function

7-item Asthma Control Diary

6-point Likert scale assessing:

- Disruption of sleep (0= Not woken at all, 6= Awake all night)
- Severity of asthma symptoms upon waking up (0= No symptoms, 6= Very severe symptoms)
- How frequently asthma symptoms limited daily activities (0= Not limited at all, 6= Totally limited)
- How often they experienced shortness of breath (0=None, 6= A very great deal)
- How often they wheezed (0= Not all all, 6= All the time)
- Puffs of asthma medication used (0= None, 6= More than 16 puffs)
- Peak Expiratory Flow (PEF) scores (0=>95% predicted, 6=<50% predicted)

PEF percent values were collected using data from daily self-administered spirometer recordings
PEF values obtained were entered into an online medical PEF calculator that produces predicted percentages based on participant's gender, and height.
Higher scores= worse asthma symptoms and lung function

RESULTS

In models controlling for age, gender and ethnicity:

Social Support Frequency

- Children with greater frequency of social support overall from their network (i.e., parents, teachers, classmates, close friends, and people in school) experienced marginally worse asthma symptoms and lung function (b= 0.01, t= 2.21, p= 0.069).
- In a multiple regression model, frequency of social support from close friends was the only significant social support predictor of asthma symptoms and lung function (b= 0.07, t= 4.83, p= 0.040).

Social Support Importance

- Child ratings of social support importance from close friends was marginally associated with asthma function and social support (b= 0.06, t= 2.25, p= 0.054).

Family Functioning

- Overall family functioning score was not significantly associated with asthma symptoms and lung function (b= -0.00, t= -0.03, p= 0.975).
- Neither of the family functioning subscales were significantly associated with asthma symptoms and lung function (affirming communication: b = -0.01, t = -0.14, p = 0.898; negative communication: b = -0.00, t = -0.07, p = 0.949).

CONCLUSION

- Only some aspects of social support revealed significant associations with children's asthma symptoms and lung function.
- Social support from close friends and classmates were associated with worse asthma symptoms and lung function in children.
- This may be due to reverse causality in which children who have worse asthma symptoms and lung function receive more support because they need more help from others.
- Counterintuitively, children who indicated social support from close friends experienced worse asthma symptoms and lung function.
- Children with worse symptoms and lung function may be experiencing greater social limitations, reducing their opportunity to form peer relationships.
- As a reflection of reverse causality, worse asthma symptoms and lung function lead children to value peer relationships they may lack.
- Next steps in this work include testing these associations in a large-scale ecological momentary assessment.