



## Review

# Psychological characteristics associated with the onset and course of asthma in children and adolescents: A systematic review of longitudinal effects

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## ABSTRACT

**Objective:** To systematically review all available studies that investigated the longitudinal relationships between the psychological characteristics of children and adolescents suffering from asthma and those of their caregivers, and the onset and course of the asthma.

**Methods:** Relevant studies were identified using Medline, PubMed, and PsychINFO between 1970 and September 2009.

**Results:** Twenty studies matching inclusion criteria were reviewed. Six studies focused on child-specific psychological characteristics in relation to the onset and course of asthma. No compelling evidence was found for an association with asthma onset, but there was some evidence that the child's psychological characteristics can contribute to the subsequent course of asthma. Fourteen studies considered the effects of the psychological characteristics of the caregivers. Eleven studies found significant relationships between the psychological problems of caregivers and the subsequent onset and unfavorable course of the asthma in the child.

**Conclusion:** In pediatric asthma both the psychological characteristics of the affected children and their caregivers appear to contribute to the course and possibly also to the onset of the condition.

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## 1. Introduction

With approximately 300 million persons currently suffering from asthma worldwide, this condition is one of the most common chronic diseases, especially in childhood [1]. Mean worldwide 'current wheeze' prevalence rates in the last 12 months range from 11.6% in 6–7-year age children to 13.7% in 13–14-year olds,

according to phase III of the International Study of Asthma and Allergies in Children [2].

Recent epidemiological studies assessed the effects of psychosocial characteristics on the expression of atopic disorders. Besides studies on childhood asthma, Chida and colleagues reviewed the research on various other atopic disorders (e.g. allergic rhinitis, atopic dermatitis and food allergies) in both children and adults. They found robust, positive, and bidirectional associations between psychosocial factors and both the onset and prognosis of the conditions studied [3]. They, however, did not explicitly address the possible differential role that the characteristics of the children and parents or caregivers may play in the onset and course of asthma episodes in childhood and adolescence.

It is important to differentiate between the child's and caregiver's psychological characteristics, because it is still not known how these factors are related which each other in the case of childhood asthma. Moreover, children and caregivers tend to have different perceptions of to what constitutes severe asthma [4]. In addition, differences between their personal characteristics may yield valuable information about the direction interventions should take, i.e., whether the treatment should focus more on the child or on the caregiver(s). It is also important to differentiate between different aspects of mental health. Depression, anxiety or stressful events require other interventions.

**Abbreviations:** AE, allergen exposure; AL, caregiver alcohol use; BF, breast feeding; BM, baseline morbidity; BSI, Brief Symptom Inventory; BSQ, Behavior Screening Questionnaire; BW, birth weight; CBCL, Child Behavior Checklist; CCEI, Crown-Crisp Experiential Index; CES-D, Center for Epidemiological Studies Depression Scale; CI, confidence interval; ECBI, Eyberg Child Behavior Inventory; ED, Emergency department; FHA, family history of asthma; GHQ, General Health Questionnaire; HAD, Hospital Anxiety and Depression Scale; HRI, history of respiratory infections; ICD, International Classification of Diseases; IgE, immunoglobulin E; IL, interleukin; INF, interferon; MH, mental health; OR, odds ratio; PACE, Psychosocial Assessment of Childhood Experiences; PP, parenting practices; PRS, Parenting Risk Scale; PSS, Perceived Stress Scale; RR, relative risk; SC, Spearman correlation; SES, socioeconomic status; SS, social support; TNF- $\alpha$ , tumor necrosis factor- $\alpha$ ; UCLALSI-CV, University of California Los Angeles Life Stress Interview—Child Version.

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In their meta-analysis of the data of nearly 5000 children suffering from asthma, McQuaid et al. found that these children had more psychological problems, especially internalizing problems, than their healthy peers [5]. The majority of the analyzed studies were cross-sectional, which therefore does not allow any conclusions to be drawn about causality. Several theories have been proposed to explain the mechanisms that relate psychological characteristics to asthma onset. As a result genetic, immunological, neural, endocrine, and behavioral pathways have been suggested as linking psychological characteristics to asthma onset, severity, and course. These pathways continue to be investigated [6–8]. Behavioral pathways include problems with treatment adherence and the effects of psychological problems on the perceptions and management of asthma by different informants.

It is important to ensure that psychological problems are detected early in asthmatic children, because there is evidence to suggest that such problems negatively affect the children's treatment adherence, which is already notoriously low in this population [9,10]. This may result in reduced physical and psychosocial health, and increased health care utilization and costs.

Moreover, besides the children's own psychological characteristics, psychological problems of their caregivers also tend to increase the risk of asthma onset or have a negative effect on the course of asthma [11–13]. If we are to improve psychosocial interventions that help enhance the children's overall health status and reduce the burden of asthma on the patients and their families as well as on society, knowledge of the interrelationship between these personal characteristics of children and their caretakers and asthma outcome is crucial. In order to compile an overview of the insights to date, we conducted a systematic review of the available empirical research on the longitudinal relationship between specific psychological characteristics of healthy and asthmatic children or teenagers and their caregiver(s), and the onset and course of asthma. In our report we consider the psychological characteristics of both parties in terms of anxiety, depression or exposure to stressful events, which also includes parenting stress.

## 2. Method

### 2.1. Selection of relevant studies

In this systematic review we evaluate reports published in peer-reviewed journals in English, German, French, and Dutch. The electronic databases of Medline, PubMed, and PsychINFO (between 1970 until the end of September 2009) were used to identify relevant publications. In order to identify publications on the subject of psychological characteristics and asthma in children and adolescents, we used the search terms: (asthma) AND (psych\* OR emotion\* OR distress\* OR depress\* OR mental\* OR adjustment\* OR anxiety OR behavior\* OR quality of life). We limited our review to studies that included participants  $\leq 18$  years old. Since we were interested in longitudinal relationships between the psychological characteristics and the onset and course of asthma, we merely considered prospective (longitudinal) studies. We searched the reference lists of the studies in order to identify additional relevant studies, which we had not found with initial search strategies (snowball method).

### 2.2. Assessment of study quality

Study quality was determined based on the protocols of the Cochrane Database of Systematic Reviews [14]. The inclusion criteria were adjusted to fit the research questions of our review:

- i. Database: English, German, French or Dutch language full-length publication in a peer-reviewed journal and abstract available in an electronic database.
- ii. Selection of subjects: the participants in the study should be  $\leq 18$  years old and selected randomly or consecutively.
- iii. Psychological characteristics (in children, adolescents or caregivers) such as anxiety, depression, behavior adjustment or general distress should be addressed through questionnaires or clinical interviews with proven reliability and validity, and should be compared with reference populations.
- iv. Outcome measures associated with asthma should concern asthma onset or asthma course and assessed by well-expressed child or parental reports, physical parameters or physician's diagnosis.
- v. Study design: Studies should have a prospective design investigating a longitudinal association between psychological characteristics of children or caregivers and the subsequent onset and/or course of asthma.
- vi. All studies were required to have reported statistics (e.g., means and standard deviations, *t*, *F*).

Study inclusion and data extraction were conducted by the first author (MT) and verified by the second (CV).

### 2.3. Presentation of the results

We divided the relevant literature into prospective studies that investigated the child's asthma manifestations in relation to the child's psychological characteristics and those that examined them in relation to the caregiver's characteristics. If one publication addressed both research questions, it was considered as two separate studies.

## 3. Results

Our search strategy yielded 711 publications that addressed a wide range of topics related to psychology and asthma. The first author (M.T.) initially screened the titles and abstracts against the content and methodological criteria for review, which resulted in the exclusion of 643 articles. Table 1 shows the reasons for exclusion in this first round.

The remaining 68 publications (10%) subsequently underwent a more detailed, second evaluation of their content and methodologies, after which 53 publications were excluded. The reasons for this exclusion are detailed in Table 2. The flowchart in Fig. 1 provides an overview of the inclusion and exclusion process.

**Table 1**

Overview of the grounds on which studies were excluded based on abstract content.

Reason for exclusion	Total	%
Main focus on medical aspects	230	32
Main focus on other diseases than asthma	128	18
Main focus on interventions	77	11
Main focus on sociodemographic, lifestyle or economic/epidemiological aspects	41	6
Psychometric properties of questionnaires insufficient	38	5
Participants older than 18 years	26	4
Main focus on smoking behavior/exposure	27	4
Main focus on association asthma and body weight	18	3
Non-prospective (non-longitudinal) design	12	2
Review	6	1
No abstract available or not published in one of the target languages in a peer-reviewed journal	6	1
Other (no focus on association between psychological characteristics and asthma)	34	5
Potentially relevant articles <sup>a</sup>	68	10
Total	711	100

<sup>a</sup> Publications meeting the criteria for review as based on abstract content.

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