Anxiety and depression in adolescents with asthma and in their parents: a study in clinical practice

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Abstract

Emotional disorders, namely anxiety and depression, frequently affect adolescents with asthma. In addition, their parents also may present emotional problems. The objective of this study was to investigate anxiety and depression in asthmatic adolescents and in their parents in a real-life setting. A series of adolescents with allergic asthma were consecutively enrolled. Asthma was diagnosed according to the GINA document and consistently the symptom control grade was assessed. We used the HADS questionnaire for the adolescents, and HADS, STAY, and BDI questionnaires for their parents. Globally, 121 adolescents (71 males, 50 females, mean age 13.4±0.8 years, age ranging between 12 and 15 years) with allergic asthma and their parents were evaluated. Only 29% of adolescents had controlled asthma. Adolescents with controlled asthma had lower HADS-A and HADS-D scores than other patients, whereas there was no difference among parents. Severe maternal anxiety was more frequent in poorly controlled subjects than in partially controlled ones; absence of maternal anxiety was more common in controlled subjects. The preliminary results of the current study suggest that anxiety and depression are common in adolescents suffering from asthma as well as in their parents, mainly in mothers. Emotional disorders might affect also the asthma control. Thus, in clinical practice, the psychological assessment could be included in the asthma work-up.

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Introduction

It is well known that the emotional disorders, namely anxiety and depression, frequently affect adolescents suffering from asthma [1]. In addition, there is convinced awareness that anxiety and depression may be common also in their parents [2]. A recent systematic review and meta-analysis evaluated 25 studies, reporting outcomes on 4300 caregivers of children with asthma and 25,064 caregivers of healthy children. This review concluded that caregivers of children with asthma have greater anxious and depressive symptoms than caregivers of healthy children [3]. Consequently, emotional disorders of the parents and anxiety and/or depression in their asthmatic children may affect asthma outcomes as recently reported in a cross-sectional study [4]. Indeed, parental anxiety and depression, mainly maternal, may negatively impact on the filial asthma, mainly concerning the asthma severity, the asthma control, and the use of medications [4-6]. In addition, the adolescents represent a subset of asthmatic patients with evident emotional disturbance that should be adequately recognized and carefully managed [7,8]. Actually, the adolescence is a critical age from an emotional point of view, i.e. the subject is defining his/her identity and personality maturing a personal experience full of new emotions [9,10]. Asthmatic adolescents present peculiar issues concerning the acceptance of the asthma diagnosis, the perception of symptoms, the compliance and the adherence to prescribed treatment, and the self-management of asthma, mainly concerning the decision of taking reliever drugs [11]. On the other hand, the asthma control is considered currently the goal of asthma treatment as stated by the 2018 Global Initiative for Asthma Report, concerning the global strategy for asthma management and Prevention [12]. However, a few asthmatics are successful in obtaining the complete control of asthma [13]. In this regard, many factors are involved in unsatisfactory asthma control, including lack of adherence [13] and emotional disorders [14]. A real-life study demonstrated that anxiety and depression were a common and relevant comorbidity in adult asthmatic outpatients and were associated with uncontrolled asthma and lower Asthma Control Test scores [15]. On the basis of this background, we tested the hypothesis that emotional problems may be clinically relevant also in adolescents suffering from asthma and in their parents. The current study aimed to investigate anxiety and depression in adolescent asthmatics and their parents, considering also the asthma control grade. The novelty of this study was the simultaneous evaluation of this issue in adolescents and parents in a real-life setting, such as a tertiary level asthma clinic.

Patients and Methods

Study design

This cross-sectional real-life study enrolled consecutive adolescents, attending the secondary school, and visited for the first time at the third-level paediatric clinic of the Policlinico San Matteo of Pavia (Italy) to confirm a preliminary clinical diagnosis of asthma.

Inclusion criteria were: age between 12 and 15 years, both genders, asthma diagnosis. Exclusion criteria were: use of medications able to interfere with the interpretation of the results, current respiratory infections, severe chronic disorders able to interfere with the interpretations of the results.

The procedure was approved by the Ethics Committee of the Istituto Giannina Gaslini of Genoa (code number: 22253/2017; in the context of the Italian Project "ControL'Asma" promoted by the Italian Society of Paediatric Allergy and Immunology). Both the parents signed an informed consent.

Asthma diagnosis was confirmed according to the 2018 GINA document [12]. The asthma symptom control was measured according to the GINA guidelines and considered three grades: controlled, partially controlled, and poorly controlled [12]. Briefly, the assessment of symptom control considered 4 questions, asked by a physician, concerning the past 4 weeks: daytime symptoms more than twice/week, any night waking due to asthma, reliever needed more than twice/week, and any activity limitation due to asthma [12].

Allergy was defined by positive skin prick test and consistent history.

Anxiety and depression aspects were evaluated in adolescents with asthma and in their parents.

Instruments

The adolescents completed Hospital Anxiety Depression Scale (HADS) questionnaire alone during the visit. The parents completed the 3 psychometric questionnaires: HADS, BDI, and STAI immediately after the visit.

The Hospital Anxiety Depression Scale (HADS) gives clinically meaningful results as a psychological screening in clinical group comparisons [16]. In the interpretation of the questionnaire, a score >7 (in the two subscales) has been found to define anxious or depressive symptoms [17].

The Beck Depression Inventory II (BDI-II) is a validated 21 item self-administered questionnaire to measure depression [18]. Each question has 4 choices, ranging in point value from 0 to 3. Total scores of 0 to 13 represent no depression, 14 to 19 mild depression, 20 to 28 moderate depression, and 29 to 63 severe depression.

The State-Trait Anxiety Inventory (STAI) questionnaire measures both the present (state: STAI-Y1) and the trait (trait: STAI-Y2) feelings of some characteristics of anxiety, including apprehension, tension, nervousness, and worry [19]. The 40-item STAI-Y scores range from 20 to 80. Weighted scores for 20 items on each scale are added together to give total anxiety scores ranging from 20 to 80 (most anxious), scores higher than 65 indicate a clinically relevant anxiety.

Statistical analysis

Data were reported as median with inter-quartile range or as absolute and relative (percentages) numbers. The non-parametric Wilcoxon signed rank test was used. Statistica software 9.0 (StatSoft Corp., Tulsa, OK, USA) was used.

Results

This cross-sectional real-life study included 121 consecutive adolescents (71 males, 50 females, mean age 13.4±0.8 years, age ranging between 12 and 15 years). All adolescents completed the HADS questionnaire; 121 mothers and 119 fathers completed the 3 questionnaires.

Thirty-five patients (29%) had controlled asthma, 57 (47%) had partially controlled one, and 29 (24%) poorly controlled one. The adolescents and their parents were stratified on the basis of asthma control grade as reported in Table 1. Asthmatic adolescents with controlled asthma had lower HADS-A and HADS-D scores than other patients (p=0.014 and 0.03, respectively). There was no difference among parents. Further, the adolescents and their parents were categorized on the basis of anxiety/depression level, as reported in Table 2.

Adolescents

Globally, 52 (43%) adolescents had anxious symptoms, such as positive HADS-A test, but there was no significant association with asthma control (p=ns); 22 (18%) adolescents had depressive symptoms and there was a significant association with the asthma control grade (p=0.011).

Mothers

Globally, 86 (71%) mothers had depression using BDI-II questionnaire: 64 mild, 18 moderate, and 4 severe, there was a significant association with the asthma control level of their children (p=0.02). Consistently, 74 (61%) mothers had depressive symptoms using HADS, there was also a significant association with the asthma control level of their children (p=0.023). About anxiety, using STAI-Y1, 86 (71%) mothers had anxiety (13 mild, 47 moderate, and 26 severe), there was a significant association with asthma control (p=0.047). Using STAI-Y2, there was no significant

Table 1. Comparison of the HADS-A and HADS-D scores in the 3 groups of asthma control.

	Controlled (n=35)	Partially controlled (n=57)	Poorly controlled (n=29)	p value
Patients HADS-A	6 (4-9)	9 (4-12)	10 (5-12)*	**0.014**
Patients HADS-D	4 (2-6)	5 (3-7)	5 (4-9.5)*	**0.030**
Mothers HADS-A	8 (5.5-10)	9 (8-10)	9 (8-11)	0.10
Mothers HADS-D	7 (5-8)	8 (5-8)	8 (7.5-8.0)	0.18
Fathers HADS-A	5 (3.5-8)	5 (4-8)	7 (4-8)	0.66
Fathers HADS-D	4 (3-7)	4 (3-8)	6 (3-8)	0.58

*p<0.05, *vs* controlled asthma.

association with asthma control (p=ns). Consistently, using HADS, 93 (77%) had anxious symptoms, and there was also a significant association with asthma control (p=0.036).

Fathers

Globally, 44 (37%) fathers had depression using BDI-II questionnaire: 39 mild and 5 moderate, but there was no significant association with the asthma control level of their children (p=ns). In addition, 31 fathers had depressive symptoms using HADS, there no significant association with the asthma control level of their children (p=ns). About anxiety, using STAI-Y1, 48 had anxiety (7 mild, 31 moderate, and 10 severe), there was no significant association with asthma control (p=0.047). Using STAI-Y2, there was a significant association with asthma control (p=0.044). Consistently, using HADS, 47 had anxious symptoms, but there was no significant association with asthma control (p=ns). Analysing globally the sample, patients with poorly controlled asthma had more frequently depression, a mother with anxiety and depression, and a father with anxiety than patients with controlled one; and more frequently a mother with moderate-severe anxiety than patients with partially controlled one.

From another point of view, severe maternal anxiety is more frequent in poorly controlled subjects than in partially controlled ones; absence of maternal anxiety is more common in controlled subjects.

Discussion

The present study underlined the clinical relevance of emotional disorders in adolescents with asthma and in their parents, and showed their impact on asthma control. Emotional impairment, mainly anxiety, was common in adolescents with asthma and there was an association between the emotional scores and the asthma symptom control. Consistently, emotional impairment was common in their parents, mainly in mothers, with a significantly association with the asthma control of their children. It is noteworthy the very high percentage of mothers with depressive symptoms ranging between 60 and 70%. It might depend on the awareness of the chronic illness of their children and the need of adequate and long-term care.

Table 2. Number of subjects stratified on the basis of the level of emotional problems in the 3 groups of asthma control.

		Controlled	Partially controlled	Poorly controlled	P value
Mothers BDI-II	No depression	11 (31.43%)	20 (35.09%)	4 (13.79%)§	**0.020**
	Mild	21 (60%)	29 (50.88%)	14 (48.28%)	
	Moderate	2 (5.71%)	8 (14.04%)	8 (27.59%)	
	Severe	1 (2.86%)	0 (0%)	3 (10.34%)	
Fathers BDI-II	No depression	21 (61.76%)	38 (67.86%)	16 (55.17%)	0.70
	Mild	12 (35.29%)	15 (26.79%)	12 (41.38%)	
	Moderate	1 (2.94%)	3 (5.36%)	1 (3.45%)	
Mothers STAI-Y1	No anxiety	12 (34.29%)	19 (33.33%)	4 (13.79%)*	**0.047**
	Mild	0 (0%)	7 (12.28%)	6 (20.69%)	
	Moderate	12 (34.29%)	21 (36.84%)	14 (48.28%)	
	Severe	11 (31.43%)	10 (17.54%)	5 (17.24%)	
Mothers STAI-Y2	No anxiety	13 (37.14%)	22 (38.6%)	6 (20.69%)	0.55
	Mild	3 (8.57%)	9 (15.79%)	6 (20.69%)	
	Moderate	15 (42.86%)	21 (36.84%)	15 (51.72%)	
	Severe	4 (11.43%)	5 (8.77%)	2 (6.9%)	
Fathers STAI-Y1	No anxiety	20 (58.82%)	36 (64.29%)	15 (51.72%)	0.07
	Mild	1 (2.94%)	1 (1.79%)	5 (17.24%)	
	Moderate	11 (32.35%)	15 (26.79%)	5 (17.24%)	
	Severe	2 (5.88%)	4 (7.14%)	4 (13.79%)	
Fathers STAI-Y2	No anxiety	21 (61.76%)	37 (66.07%)	17 (58.62%)*	**0.044**
	Mild	3 (8.82%)	0 (0%)	5 (17.24%)	
	Moderate	10 (29.41%)	14 (25%)	6 (20.69%)	
	Severe	0 (0%)	5 (8.93%)	1 (3.45%)	
Adolescents HADS-A	No symptoms	21 (60%)	27 (47.37%)	11 (37.93%)	0.20
	Symptoms	14 (40%)	30 (52.63%)	18 (62.07%)	
Adolescents HADS-D	No symptoms	34 (97.14%)	45 (78.95%)*	20 (68.97%)*	**0.011**
	Symptoms	1 (2.86%)	12 (21.05%)	9 (31.03%)	
Mothers HADS-A	No symptoms	13 (37.14%)	12 (21.05%)	3 (10.34%)*	**0.036**
	Symptoms	22 (62.86%)	45 (78.95%)	26 (89.66%)	
Mothers HADS-D	No symptoms	19 (54.29%)	22 (38.6%)	6 (20.69%)*	**0.023**
	Symptoms	16 (45.71%)	35 (61.4%)	23 (79.31%)	
Fathers HADS-A	No symptoms	20 (58.82%)	36 (63.16%)	17 (58.62%)	0.88
	Symptoms	14 (41.18%)	21 (36.84%)	12 (41.38%)	
Fathers HADS-D	No symptoms	26 (76.47%)	41 (71.93%)	22 (75.86%)	0.87
	Symptoms	8 (23.53%)	16 (28.07%)	7 (24.14%)	

*p<0.05 *vs* controlled; §p<0.05 *vs* partially controlled.

These outcomes are consistent with the literature evidence about the frequent association between asthma and anxiety-depression [1-3], and confirm the important association with asthma control [4,9]. In particular, Delmas evaluated 700 asthmatic teenagers and found that asthma was associated with a higher prevalence of major depressive episodes that were in turn associated with poorer asthma control [20]. This finding was consistent with the current study that reported a high frequency of depressive symptoms in adolescents. Depressive symptoms in caregivers were also associated with a higher number of primary care visits, emergency department visits, and hospital admissions in their asthmatic children [21,22]. A very recent cross-sectional study confirmed that the mothers' depression negatively affected the lives in their asthmatic children and was correlated with increased number of emergency department visits [23]. These studies were consistent with the current study that showed a relevant percentage of parents with depressive symptoms, mainly mothers. On the hand, it has been reported that the psychological health of the parents is strongly affected by their child's chronic disease [24,25].

Moreover, this topic has been deeply investigated in the last years. Wamboldt and colleagues evaluated the parents, usually the mother, of 62 adolescents admitted to a tertiary care asthma center for severe asthma and showed a link between severe asthma and familial affective disorders [26]. Akcakaya *et al.* investigated the relationship between the severity and duration of asthma and psychological problems in 57 asthmatic children, as well as the probability of maternal anxiety [27]. Emotional factors and family dynamics were found to be triggering factors for asthma attacks and were positively correlated with asthma severity. Both asthmatic children and their mothers were negatively affected by the disease. Ortega *et al.* studied the associations between parental mental health problems and asthma attacks in a group of Puerto Rican youths [28]. Parents with mental health problems were more likely to report histories of asthma attacks in their children compared with parents without mental health problems. Kean and co-workers demonstrated that 49 adolescents who had experienced a life-threatening asthma episode and their parents had high levels of post-traumatic stress symptoms that were linked to asthma morbidity [29]. Yuksel *et al.* reported that anxiety and depression symptoms of the mothers of 75 asthmatic youths were significantly more severe than in mothers of healthy subjects [30]. Rockhill and colleagues demonstrated that asthmatic adolescents without behavioral problems and with less severe anxiety and depression were recognized significantly less often by their parents [31]. Szabo *et al.* showed that caregivers of asthmatic youths have more depressive and consequently anxious symptoms than the average Hungarian population [32]. Guxen and colleagues reported that maternal psychological distress during pregnancy was associated with increased odds of wheezing in their children during the first 6 years of life independent of paternal psychological distress during pregnancy and maternal and paternal psychological distress after delivery [33]. Lau *et al.* reported that poorly controlled asthma in adolescents was associated with maternal anxiety [34]. Interestingly, maternal anxiety may induce negative behavioral: Dantas *et al.* reported that a high proportion of the mothers of asthmatic adolescents restrained their children from engaging in physical activity [35]. These studies are consisting with our findings and support the convincing evidence that emotional disorders exert important effects on both asthmatic adolescents and their parents.

However, the present study has some limitations, including the cross-sectional design, the lack of a control group, and the use of psychological questionnaires without a formal and complete psychological work-up. In particular, the cross-sectional nature of the study did not allow to establish the direction of causality between clinical outcomes and psychological variables.

On the contrary, 3 questionnaires were together evaluated, adolescents and parents were also considered simultaneously, and the data were collected in a real-life setting, so the findings may mirror what occurs in the daily practice. Actually, these outcomes suggest that a psychological assessment should be recommendable in all adolescents suffering from asthma and in their parents.

Conclusions

The preliminary results of the current study suggest that anxiety and depression are common in adolescents suffering from asthma as well as in their parents, mainly in the mothers. Emotional disorders might significantly affect also the asthma control. Thus, in clinical practice, the psychological assessment could be included in the asthma work-up.

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