Adherence to Treatment: Assessment of an Unmet Need in Asthma

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Abstract. *Background*: In asthma, as in other chronic conditions, poor adherence to treatment and to medical advice is common and contributes to substantial worsening of the disease and increased health care costs.

Objective: The aim of the present study was to evaluate patients' self-reported adherence to asthma medication regimens and to identify possible correlations between treatment adherence and depression, anxiety, and coping strategies.

Methods: Sixty-three asthmatic outpatients (27 men and 36 women; mean age $\pm$ SD, 38.5 ± 14.1) were consecutively enrolled during their routine control visit. Patients were asked to complete 3 different questionnaires: the Adherence Schedule in Asthma, the Hospital Anxiety and Depression Scale, and the Coping Orientations to Problem Experienced questionnaires.

Results: Depression was detected in 32.3% of patients and anxiety in 34.9%. A negative correlation was found between older age and perception of family support ($\rho = -0.33$). The presence of anxiety displayed a positive correlation with difficulty in accepting the illness ($\rho = 0.33$) and a negative correlation with acceptance of illness limitations ($\rho = -0.30$); it was also positively correlated with fear of the side effects of medication ($\rho = 0.37$). The presence of depression was negatively correlated with acceptance of illness limitations ($\rho = -0.32$), knowledge of the illness ($\rho = -0.29$), and with ability to identify worsening signs ($\rho = -0.31$).

Conclusion: This study shows how different factors may modulate adherence to asthma treatment. The opportunity to identify reasons for nonadherence through a simple assessment will allow a tailored intervention to be planned for each patient.

Key words: Asthma. Adherence. Coping. Depression. Anxiety.

Resumen. *Antecedentes*: En el asma, al igual que con otros trastornos crónicos, un cumplimiento terapéutico deficiente, así como no seguir las instrucciones médicas, contribuye a un empeoramiento de la enfermedad y al aumento de los costes sanitarios.

Objetivo: El propósito de este estudio fue valorar el cumplimiento terapéutico (según lo expresado por el propio paciente) de los tratamientos farmacológicos contra el asma e identificar posibles correlaciones entre dicho cumplimiento y la depresión, la ansiedad y las estrategias de adaptación a la enfermedad.

Métodos: Durante las visitas de control periódicas se inscribieron consecutivamente al estudio 63 pacientes asmáticos de consulta externa (27 hombres y 36 mujeres; edad media $\pm$ DE, $38,5 \pm 14,1$). Se pidió a los pacientes que respondieran a 3 cuestionarios distintos: programa de cumplimiento terapéutico en el asma, escala de depresión y ansiedad hospitalarias y orientaciones de adaptación a problemas experimentados.

Resultados: La depresión se detectó en un 32,3% de los pacientes y la ansiedad en un 34,9%. Se encontró una correlación negativa entre una edad más avanzada y la percepción del apoyo familiar ($\rho = -0,33$). La presencia de ansiedad reveló una correlación positiva con la dificultad en aceptar la enfermedad ($\rho = 0,33$) y una correlación negativa con la aceptación de las limitaciones de la misma ($\rho = -0,30$). También se correlacionó positivamente con el miedo a los efectos secundarios de la medicación ($\rho = 0,37$). La presencia de depresión se correlacionó negativamente con la aceptación de las limitaciones de la enfermedad ($\rho = -0,32$), el conocimiento de la misma ($\rho = -0,29$) y con la capacidad de identificar los signos de empeoramiento ($\rho = -0,31$).

Conclusión: El estudio muestra que distintos factores pueden condicionar el cumplimiento del tratamiento contra el asma. La oportunidad de identificar los motivos de la falta de observancia mediante una simple evaluación permitirá el establecimiento de una intervención personalizada para cada paciente.

Palabras clave: Asma. Cumplimiento terapéutico. Adaptación. Depresión. Ansiedad.

Introduction

Poor adherence to treatment and medical advice is well-known to clinicians and has been widely reported. In a recent document, the World Health Organization recognized lack of adherence as a major problem in management of chronic disease and concluded that improving adherence would have a more beneficial impact on health outcome than improving specific treatments [1]. In asthma, as in other chronic conditions, only about 50% of patients comply with care recommendations over the long-term [1-3]. It is recognized that treatment regimens are often complex and require active and tailored management, making optimal self-care arduous both to achieve and to maintain. In fact, in addition to the requirement for patients to take medications as prescribed, they are also asked to adopt a range of behavior patterns in order to manage and achieve good control (ie, regular visits to healthcare providers, monitoring of symptoms, avoidance of aggravating factors, exercising, and lifestyle modifications). Effective self-management of asthma requires an "active, collaborative involvement of the patient in a mutually acceptable course of behavior to produce a desired preventive or therapeutic result" [3].

Troublesome consequences of nonadherence include uncontrolled symptoms, limitations of daily life activities, an increase in the number of missed days at school and work, unnecessary urgent healthcare visits, and progression of disease with increased risk of fatal or near fatal asthma. The overall effects of poor adherence are clear and have been well documented in terms of morbidity [4, 5], direct and indirect costs [6], and quality of life [7].

Various determinants of adherence in asthma have been described: age [8, 9], low socioeconomic status [10], complexity of the treatment regimen [11], asthma severity, side effects of pharmacological therapy, negative attitudes toward medication [12], poor doctor–patient communication [2], psychological factors [13], coping style [14], social support [15], and limited knowledge of illness [16]. If all these factors contribute to poor asthma management, adherence to the treatment regimen may be more accurately explained by considering an association between different determinants and their synergic effect on disease management.

The aim of the present study was to assess self-reported adherence to asthma therapy and to evaluate correlations between treatment adherence and depression, anxiety, and coping strategies.

Methods

Procedure and Sample Selection

From January 2004 to August 2004, 63 outpatients were consecutively enrolled during routine control visits to the Allergy & Respiratory Diseases Institute at the University of Genoa. The inclusion criteria were diagnosis of asthma and an age of at least 18 years. Exclusion criteria included first visit for asthma, other medical or psychiatric comorbidities, and unreliable psychological assessment (due to cognitive or sensory impairment or refusal to be psychologically assessed). Subjects were enrolled by a trained psychologist and were requested to complete the questionnaires alone; help was given only if necessary and explicitly requested. All patients signed an informed consent form.

Clinical Evaluation

Diagnosis of asthma was based on clinical history, physical examination, and lung function test (spirometry with bronchodilator test and bronchial provocation with methacholine). The etiology of asthma was investigated using clinical history and by performing a skin prick test. The classification of severity was performed according to Global Initiative on Asthma (GINA) guidelines [17] on the basis of daily and nocturnal symptoms, pulmonary function, and in treated patients, the amount of medication necessary for disease control.

Questionnaires

Adherence Schedule in Asthma

The Adherence Schedule in Asthma (ASiA) questionnaire is a tool specifically aimed at evaluating adherence to treatment in asthmatic patients [18]. It was conceived and tested before this study by the Allergy & Respiratory Diseases Institute of Genoa in collaboration with the Psychology Unit of the Scientific Institute of Montescano (Fondazione S. Maugeri). It contains 3 sections: *a)* cognition area, 6 items referring to what the patient thinks about his or her illness, the prescribed treatment, and family/social support; *b)* behavioral area, 5 items referring to the patient's opinions on his or her behavioral disease management; *c)* therapy satisfaction area, 3 items on satisfaction with treatment. Answers can be provided on a 5-point Likert scale. During preliminary testing, no difficulties were revealed in comprehension of items and/or in the assessment modalities.

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS) is a widely used self-rating scale originally designed for detecting depression and anxiety in medical conditions [19]. It consists of 7 items related to depression (HADS-D) and 7 concerning anxiety (HADS-A). Each item has a 4-point ordinal scale to describe the severity of symptoms. Both raw subscale scores, which range from 0 to 21, can be converted into a 4-point scale (0-7, no anxiety or depression; 8-10, mild; 11-14, moderate; 15-21, severe). The HADS was designed to exclude symptoms that might

arise from the somatic aspects of illness such as insomnia, energy, and fatigue. Thus, the questionnaire was purposely designed for use within the clinical context of general medicine. The HADS has been used for screening purposes in a diverse range of clinical groups, including asthmatic patients [20, 21]. The HADS has also been widely adopted in Italy, providing valid and reliable results. [22, 23]

Coping Orientations to Problem Experienced

The Coping Orientations to Problem Experienced (COPE) questionnaire is a self-report instrument containing 60 items, each of which describes a coping behavior [24]. The questionnaire was developed within the theoretical constructs of stress and behavioral self-regulation [25]. Patients are required to rate their answer on a 4-point scale, ranging from 1 (generally do not use) to 4 (generally use to a large extent). Carver et al [24] identified 15 coping strategies (primary factors), which were subsequently grouped into 4 secondary factors. The COPE questionnaire has been used in clinical studies and its reliability and validity confirmed [26, 27]. A validated Italian version is available and has shown good psychometric properties that confirm the primary and secondary factors extracted from the English version [28, 29].

Statistical Analysis

The descriptive analysis included the following variables: sex, years of education, employment status, smoking habit, classification of severity performed according to GINA guidelines [17], and scheduled treatments. Descriptive statistics were also performed on ASiA, HADS, and COPE scores. Raw HADS scores were regrouped in a 4-point classification. Subsequently, Spearman correlation coefficients were calculated between ASiA scores and sociodemographic and clinical data, and between ASiA scores and HADS and COPE scores. A *P* value of less than .01 was considered statistically significant. All analyses were performed with SPSS system 11.1 (Statistical Package for the Social Sciences, 2004).

Results

Table 1 shows the sociodemographic and clinical characteristics of the study population. The mean age$\pm$ SD was 38.5 ± 14.1 years, length of time since diagnosis was 7.9 ± 7.9 years, and time on medical treatment was 4.2 ± 5.1 years.

The response frequencies and percentages for ASiA items are shown in Table 2. In order to simplify data interpretation, the 5-point Likert responses were grouped in 3 sub-classifications: not at all/a little, enough, much/very much.

The results of the HADS questionnaire revealed that 42 (66.7%) patients were not depressed and 41 (65.1%)

Table 1. Sociodemographic characteristics and clinical data*

Sex	Men	27 (42.9%)
	Women	36 (57.1%)
Education, y	0-5	4 (6.3%)
	6-8	17 (27.0%)
	9-13	26 (41.3%)
	> 14	16 (25.4%)
Employment status	Employed	42 (66.7%)
	Retired	4 (6.3%)
	Housewife	7 (11.1%)
	Unemployed	2 (3.2%)
	Student	8 (12.7%)
Disease severity classification (GINA)		
	1	22 (34.9%)
	2	32 (50.8%)
	3	9 (14.3%)
	4	0
Smoking habit	Nonsmoker	41 (65.1%)
	Smoker†	14 (22.2%)
	Ex-smoker	8 (12.7%)
Scheduled treatments	LABA	32 (50.8%)
	Inhaled Steroids	37 (58.7%)
	Antileukotrienes	36 (57.1%)

* Data are shown as number of patients (%). GINA indicates Global Initiative on Asthma; LABA, long-acting ß $_2$-agonists. † Cigarettes smoked per day: 4.7 ± 3.0

patients were not anxious. Fifteen patients (23.8%) presented mild depression, 5 (7.9%) had moderate depression, and 1 (1.6%) was severely depressed; 15 (23.8%) presented mild anxiety, 6 (9.5%) moderate anxiety, and 1 (1.6%) severe anxiety.

Table 3 shows the scores for the COPE primary and secondary factors. There was a significant negative correlation between the ASiA scores for "how much family/friends helped in your illness management" and age ($\rho = -0.33$). This indicates that older age is associated with a greater patient perception of a low degree of support from family and friends.

Analysis of correlations between HADS and ASiA scores revealed that anxiety showed significant positive correlations with difficulties in accepting illness ($\rho = 0.33$) and fear of the side effects of medication ($\rho = 0.37$), and a significant negative correlation with acceptance of illness limitations ($\rho = -0.30$). Moreover, depression displayed significant negative correlations with acceptance of illness limitations ($\rho = -0.32$), knowledge of illness ($\rho = -0.29$), and ability to identify worsening signs ($\rho = -0.31$).

Table 2. ASIA Item Response Frequencies Grouped in 3 Subcategories*

	Not at All/A Little	Enough	Much/Very Much
Cognitions area			
1. Difficulties in accepting your illness	41 (65.1%)	15 (23.8%)	7 (11.1%)
2. Accept your illness limitations	31 (49.2%)	22 (34.9%)	10 (15.9%)
3. Think you know your illness	16 (25.4%)	30 (47.6%)	17 (27.0%)
4. Think treatment has helped your illness management	6 (9.5%)	22 (34.9%)	35 (55.6%)
5. Think treatment has improved your QoL	7 (11.1%)	27 (42.9%)	29 (46.0%)
6. How much family/friends have helped in your illness management	22 (34.9%)	22 (34.9%)	19 (30.2%)
Behavioral area			
7a. Been able to take the medicines correctly	16 (25.4%)	22 (34.9%)	25 (39.7%)
7b. Been able to attend follow-up visits on time	11 (17.5%)	24 (38.1%)	28 (44.4%)
7c. Been able not to smoke (only for smokers)	12 (85.8%)	1 (7.1%)	1 (7.1%)
7d. Been able to identify worsening signs	12 (19.0%)	26 (41.3%)	25 (39.7%)
7e. Been able to monitor clinical parameters (PEF, clinical diary)	36 (57.1%)	15 (23.8%)	12 (19.1%)
Therapy satisfaction area			
8a. Think your medicines were necessary	5 (7.9%)	21 (33.3%)	37 (58.7%)
8b. Been worried about side effects of medicines	45 (71.6%)	9 (14.2%)	9 (14.2%)
8c. Think treatment benefits were greater than possible disadvantages	10 (15.9%)	19 (30.1%)	34 (54.0%)

* Data are shown as number of patients (%). QoL indicates quality of life; PEF, peak expiratory flow.

Assessment of correlations between primary COPE factors and ASiA scores showed that humor exhibited significant negative correlations with taking medicines correctly ($\rho = -0.42$) and with attending follow-up visits on time ($\rho = -0.38$); positive reframing displayed a significant positive correlation with ability to identify worsening signs ($\rho = 0.34$); and use of alcohol displayed a significant negative correlation with taking medicines correctly ($\rho = -0.30$).

Finally, only 1 relevant correlation emerged between secondary COPE factors and ASiA scores: avoidance strategies showed a significant negative correlation with taking medicines correctly ($\rho = -0.40$).

Discussion

Recent trials suggest that the available treatments for asthma permit long-term, global control of symptoms [30, 31]. Nevertheless, poor adherence constitutes a considerable obstacle to controlling asthma. Nonadherence results in poor self-management of therapy

Table 3. COPE Primary and Secondary Factor Scores

	Mean	SD	Range
Primary Factors			
Active coping	10.75	2.03	6-15
Planning	10.56	2.45	5-16
Suppression of competing activities	8.84	2.29	4-14
Restraint	9.35	2.30	5-21
Search for information	9.83	2.72	4-14
Search for comprehension	8.68	2.87	4-15
Venting emotions	9.33	2.66	4-16
Positive reframing	11.02	2.71	4-16
Acceptance	9.92	2.38	4-14
Religion	7.62	3.67	4-16
Humor	7.71	2.78	4-13
Denial	6.52	2.15	4-12
Behavioral disengagement	6.51	1.91	4-11
Mental disengagement	9.02	1.97	5-12
Use of alcohol	4.68	1.48	4-10
Secondary Factors			
Social support	9.28	2.35	4.3-13.7
Avoidance strategies	6.89	1.40	4.4-10.4
Positive attitude	10.10	1.91	5.7-15.3
Problem focusing	10.05	1.79	5.0-13.3

and that may exacerbate the burden of asthma, with significant consequences in terms of quality of life and increased direct and indirect costs. It is now recognized that adherence is a complex, multidimensional, dynamic phenomenon that is influenced by many factors related to patients, doctors, disease, and therapy. Identifying factors that contribute to nonadherence to prescribed treatment constitutes the basis for planning individualized therapeutic programs.

In this study, we examined emotional, cognitive, and behavioral problems and resources that influence management of asthma by using 3 different questionnaires. Among them, ASiA is a simple form that permits the detection of difficulties in adherence to asthma treatment. The results of ASiA show that living with asthma involves variables that may influence adherence: patients have difficulties in accepting both their illness (34.9%) and related limitations (49.2%), they do not have adequate knowledge of the disease (25.4%), and they report receiving poor support from family and friends (34.9%).

The self-management of asthma in daily life presents some critical aspects: patients report being unable to take medicines correctly (25.4%) and an inability to identify worsening signs (19%) and monitor clinical parameters (57.1%). Concerning the prescribed medicines, 41.8% of our sample was not certain that asthma therapy was necessary and 28.2% reported fear of side effects. The treatment benefits were not considered greater than the disadvantages in 15.9% of patients. Depression and anxiety, as measured by HADS, were present in a small percentage of patients (9.5% and 11.1%, respectively).

In our study, age correlated with the perception of support, with elderly patients reporting a poor involvement of family and friends in asthma management. Furthermore, patients with a long history of asthma were less responsive to adopting health-promoting behaviors (eg, giving up smoking), considering that it would be of no benefit. The presence of depression correlated with difficulties in accepting both asthma and its limitations in daily life, while high levels of anxiety were associated with fear of side effects. The recourse to avoidant coping strategies was significantly correlated with poor diligence in taking medicines and in meeting follow-up appointments. On the other hand, the ability to reframe the experience as positive was associated with a more accurate attention to worsening symptoms.

The results of this study provide some insights into the factors that modulate adherence to asthma treatment. General difficulties, fears, perspectives, and resources, if neglected, may result in a barrier that diminishes optimal asthma control. The findings reported here suggest that a simple questionnaire may help to identify motivations behind nonadherence in order to plan a more appropriate intervention for each patient.

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