





Patient perspectives on living with severe asthma in Denmark and Sweden

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ABSTRACT

Background: Severe asthma has an acknowledged impact on health-related quality of life (HRQOL) and is associated with substantial health care costs. This study aimed to investigate the patients' own experiences of the disease, perceptions of HRQOL, and awareness of disease management.

Methods: This study included severe asthma patients in Sweden and Denmark. A quantitative Web-based survey and qualitative in-depth interviews (IDIs) were conducted. The survey included St. George's Respiratory Questionnaire (SGRQ), Asthma Control Test (ACT), Work Productivity and Activity Impairment (WPAI), and a study-specific questionnaire on quality of care and disease awareness. Telephone-based IDIs were conducted by medical interviewers following a semi-structured interview guide.

Results: A total of 93 patients participated in the Web survey, and 33 participated in the IDIs. In the survey, the vast majority (77%; 72/93) had uncontrolled asthma (ACT<20). Mean total SGRQ score was 47.4 (59.7 symptom, 53.7 activity, 39.9 impact scores). Nearly 60% were treated in primary care. The IDIs revealed a long path to diagnosis, substantial and constant need for adaptations because of disease limitations, high burden on family members, social restrictions, and sick leaves and income losses. Patient awareness about guidelines, treatment goals, and available therapies was poor, and a low level of satisfaction by primary health care was seen.

Conclusions: The vast majority of this severe asthma population had uncontrolled asthma and poor access to lung expert physicians. Impaired HRQOL despite patients' adaptations was indicated. These findings highlight the need for structured patient education and greater access to units with disease-specific knowledge.

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Introduction

Asthma is a common chronic disease affecting approximately 339 million of people worldwide [1]. The majority have mild or moderate disease, but severe disease affects approximately up to 10% of individuals with asthma [2–4]. In Sweden and Denmark, the prevalence of severe asthma has been reported to be 4–8% of the total asthma population [5,6]. Severe asthma impairs patient's health related quality of life (HRQOL) and is associated with substantial health care costs [7,8]. A common goal for patients and health care is that patients get empowered to live a life free of disease symptoms, and to reduce the number of hospital and emergency care visits, the loss of school and work days, and the constraints placed on the patients' daily lives [9].

Patients with severe asthma who do not achieve asthma control with inhaled treatments, such as inhaled

corticosteroids and long-acting bronchodilators, are often prescribed oral corticosteroids (OCS), both as short-term treatment for exacerbations and as long-term medication to maintain asthma control [6]. Regular OCS use is well-known to be associated with side effects such as osteoporosis, fractures, ischaemic heart disease, hypertension and changes in glucose metabolism [10–15]. Guidelines recommend that patients with severe asthma should be referred to a specialist for evaluation and management of their disease [1]. However, studies have reported that many patients with severe asthma are not seen by specialists [6], and that patients can suffer from frequent asthma exacerbations and still wait for several years before they are referred to specialist care [8]. In addition, reports have indicated that patients are neither aware of the severity of their disease, the opportunity to see a specialist, nor the option to reduce OCS use by therapy with new biologic treatment regimens. There is, however, a need for more in-

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depth understanding around the patients' experience of living with severe asthma.

The aim of this study was to investigate how severe asthma patients in Sweden and Denmark experience their disease, their HRQOL and how they perceive control visits, referrals to specialist care, and management of their disease.

Methods

Description of patients and study designs

This was a cross-sectional, patient-reported outcomes (PRO) study conducted in Sweden and Denmark, consisting of two parts: a quantitative web survey and a qualitative In-Depth Interview (IDI). Adult patients with severe asthma, defined as treatment per GINA step 5 or having uncontrolled disease despite treatment in GINA step 4, were included. Uncontrolled asthma was defined as ≥ 1 of the following: use of rescue inhaler to control asthma symptoms > 2 days/week during the past 4 weeks; night-time awakenings due to asthma symptoms ≥ 1 times/week during the past 4 weeks; need for ≥ 2 bursts of systemic corticosteroids (> 3 days each) for asthma exacerbations during the past 12 months; or having experienced asthma attacks requiring emergency care and/or hospitalization during the past 12 months. Patients were excluded if participating in a clinical trial, receiving treatment with biologics, not confirming treatment as per GINA step, or not being able to read the local language. Study participants were identified among those asthma patients in Denmark and Sweden, that contacted the participating sites for health-related issues, either during a visit or a phone call, or by advertisement via the Swedish Asthma- and Allergy patient association. Severe asthma, as defined above, and thus eligibility for study participation, was confirmed by health care professionals. Eligible patients were afterwards provided with the link to the web-survey. The screening period and recruitment of eligible participants started on the 9th of April and was completed on the 27th of December 2019. The study protocol was approved by the Swedish Ethics Authority (registration number 2018/1110). For Denmark, the study was reviewed and assessed as out of scope for ethics approval by the Region South Ethics Committee (project ID: S-20190029).

Measured outcomes of this analysis

Web survey

Quantitative data were collected through a web-based survey. Responses to Asthma Control Test (ACT) [16], St. George's Respiratory Questionnaire (SGRQ) [17],

Work Productivity and Activity Impairment (WPAI: Asthma V2.0) (assessing employment status and absence from work during the past 7 days) and a study-specific questionnaire (assessing patients' perceptions of quality of care, awareness of disease, right to see a specialist and knowledge of treatment options) were collected.

In-Depth Interviews (IDIs)

All participants in the web survey were able to indicate their interest in taking part also in the IDIs. For those patients that expressed their interest in participating, qualitative data were collected through in-depth telephone interviews. The IDIs were conducted by trained moderators employed at an independent Life Science research company with previous experience from this field. Each interview had an approximate duration of one hour, following a semi-structured interview guide with focus on domains/questions regarding patients' experiences of living with severe asthma (Supplement, Table S1) and free-flowing responses. The interview guide was developed by input of clinicians with experience in the field. Interviews were recorded and transcribed by a transcription agency, using Express Scribe Transcription software. If patients' responses indicated need for psychological support, the moderators followed a predefined procedure.

Statistical analyses

Descriptive statistics were reported for all variables. The maximum sample available for each variable was used. There was no replacement of subjects if they did not respond to the survey.

Results

A total of 93 patients, 73 in Sweden, and 20 in Denmark (mean age 48 years, 80% females) were included in the study and responded to the Web survey (Table 1). Asthma duration showed a mean of 25 years, and for severe asthma the mean duration was 15 years. More than half of the patients were primarily treated in general practice. The majority of the patients (76%) used fixed ICS/LABA combinations, whereas 34% used ICS as monotherapy with or without LABA. Use of OCS as part of the asthma treatment were reported by 44 patients, among whom 20% used OCS daily as maintenance treatment. Among the OCS users, 96% received two or more courses of OCS annually because of exacerbations (defined as need for an increased dosage above maintenance for at least 2-3 consecutive days, during an exacerbation, for those treated with daily OCS).

Table 1. Patient characteristics[†].

	Web-survey (n = 93)	In-Depth Interviews (n = 33)
Age, mean years	48.4	49.8
Female, n (%)	74 (80)	28 (85)
Age at asthma diagnosis, mean	23.1	23.9
Age at severe asthma diagnosis, mean	33.1	37.7
Asthma duration, mean (y)	25.3	25.8
Asthma duration, median (y)	23	23
Severe asthma duration, mean (y)	15.3	12.1
Severe asthma duration, median (y)	11	10
Treatments, n (%)		
• Fixed ICS + LABA combinations	71 (76)	30 (90)
• ICS + LABA monotherapies	18 (19)	2 (6)
• ICS alone	14 (15)	3 (9)
• Oral corticosteroids	44 (47)	19 (57)
Maintenance treatment	9 (20)	
As needed treatment	33 (75)	
Other	2 (5)	
Responsible physician, n (%)		
• General practitioner	55 (59)	18 (54)
• Allergist	8 (9)	4 (12)
• Pulmonologist	23 (25)	11 (33)
• Other*	7 (8)	0 (0)

[†]Characteristics as reported by the patients

*Most common open text answer: asthma/allergy nurse

Web survey

Asthma control test, St. George's respiratory questionnaire

The vast majority (77%) had uncontrolled asthma (ACT<20) and SGRQ indicated a total score of 47.4 (Table 2). Perception of current health varied. The average response was 'Fair' (38%) while 24% described it as 'Poor.' Shortness of breath on ground level was reported by 50%, increasing to 82% when walking up a flight of stairs, while one third experienced it by just bending over. Exercise was considered as 'not safe' by half of the patients. For a majority, severe attacks

Table 2. Asthma control, HRQOL and W-PAI.

ACT, n (%)	
• Controlled	5 (5)
• Partly controlled	16 (17)
• Uncontrolled	72 (77)
SGRQ total score	47.4
• Symptoms	59.7
• Activity	53.7
• Impacts	39.9
W-PAI	
• Employed, n (%)	51 (55)
• Hours missed due to health problems, mean h (%)	8 (20)
• Hours worked, mean h	30.8

occurred at least 2 times over the last 3 months, and 37% reported that the worst attack lasted for at least 3 days. In between the worsening periods, six out of ten had less than 3-4 good days/week. More than half of the patients were not expecting their condition to improve. Half of the participants that ever held a job (n = 90), stated that their respiratory problems affected their work (Figure 1).

Work productivity and activity impairment questionnaire

One third of employed patients (n = 51), reported missing work in the past week due to health problems, accounting for 8 hours (20%) of their working time (Table 2).

Study specific questionnaire

For one-third of patients, asthma was reported as having had an impact both on choice of career and longer sick leaves of at least 1-2 days for $\geq 2-3$ times/year. Shorter sick leaves, for less than 1-2 days, were equally common, occurring at least 2-3 times per year.

In depth interviews

Thirty-three patients, 25 from Sweden and 8 from Denmark, participated in the IDIs. The patients in the IDIs were slightly older compared to the total population (mean age 49.8 vs 48.4), more often females (85% vs 80%), and more commonly treated with fixed ICS/LABA combinations (90% vs 76%). The IDIs showed in detail the actual level of impact of severe asthma on patients' HRQOL, despite individual adaptations to avoid disease worsening (Supplemental Table 1). Several patients reported delay in receiving their asthma diagnosis, with two patients reporting a lateness exceeding 10 years. Difficulties in access to specialist care were stated, as was the lack of continuity regarding health care contacts. Approximately 61% also reported not being content with the current level of support.

All patients (100%; 33/33) reported restrictions on daily life, such as travelling, involvement in social life and household chores, and need of planning to avoid anything that could lead to disease deterioration. In addition, 70% (23/33) reported impact on family and relations, 30% (10/33) on choice of housing, and 45% (15/33) stated that their asthma had impacted and restricted their choice of professional career. Longer sick leaves due to asthma, >1-2 days for $\geq 2-3$ times/year, were reported by 30% (10/33). Shorter sick leaves, < 1-2 days, were equally common, occurring at least 2-3 times per year. Also, feelings of fear, frustration,

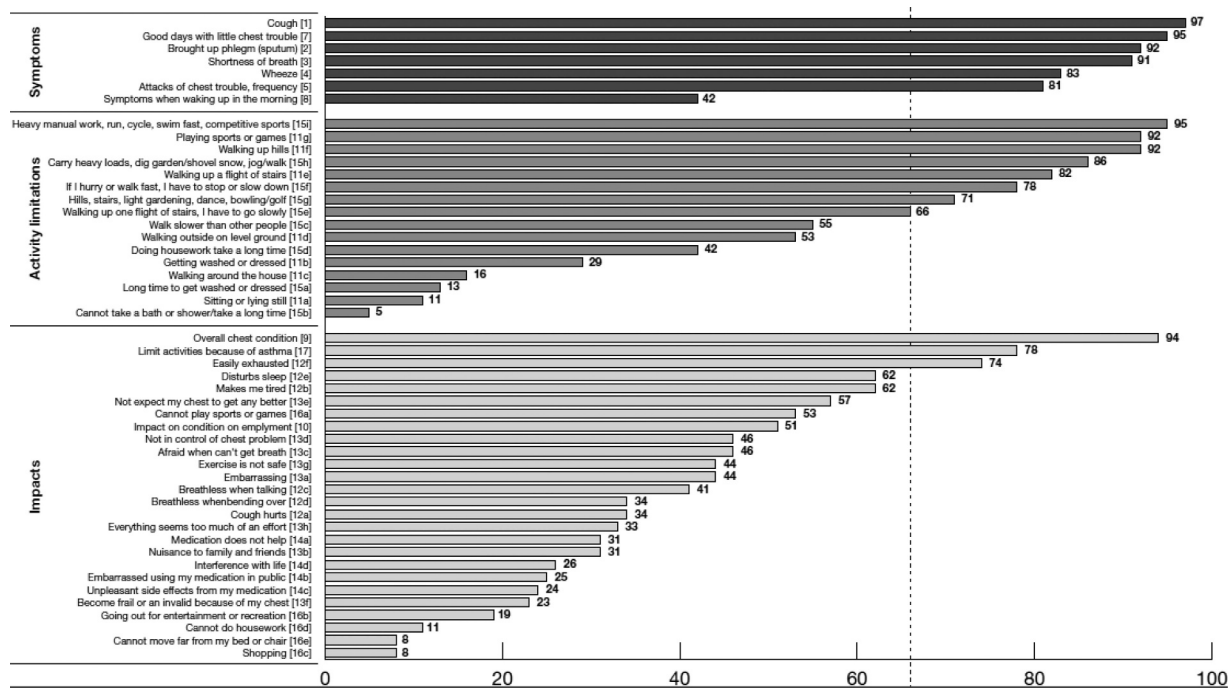


Figure 1. Proportion of patients endorsing each SGRQ question.

hopelessness, and anxiety were reported by many, as was, for isolated cases, also suicidal thinking. Many stated having appreciated professional psychological help, but only one patient had been offered this support.

Attachment to rescue medication was commonly reported, with 70% (23/33) of the patients reporting a feeling of panic if they did not have access to their short-acting bronchodilator. Frequent asthma attacks, with fear of suffocating or dying were described by

most patients (79%; 26/33) (Figure 2), often accompanied by ER visits (Figure 3).

More than half of the patients did not expect their respiratory problems to get any better, and 31% (10/33) reported that their treatment did not have any major effect on their asthma. The overall level of patient awareness on guidelines, treatment goals, the right to specialist care, and available therapies was low. More than half (18/33) of the patients did not have any knowledge of currently available biologic therapies for severe asthma.

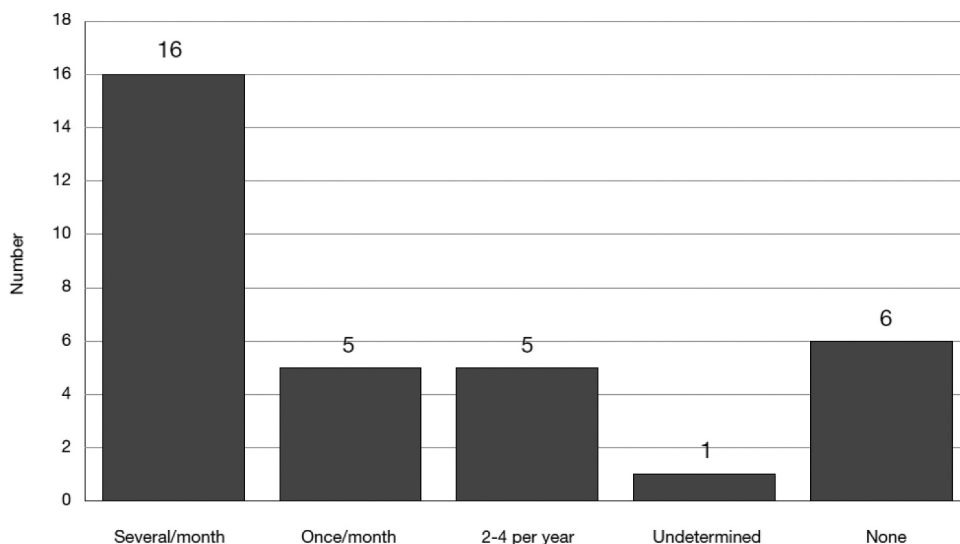


Figure 2. Frequency of asthma attacks.

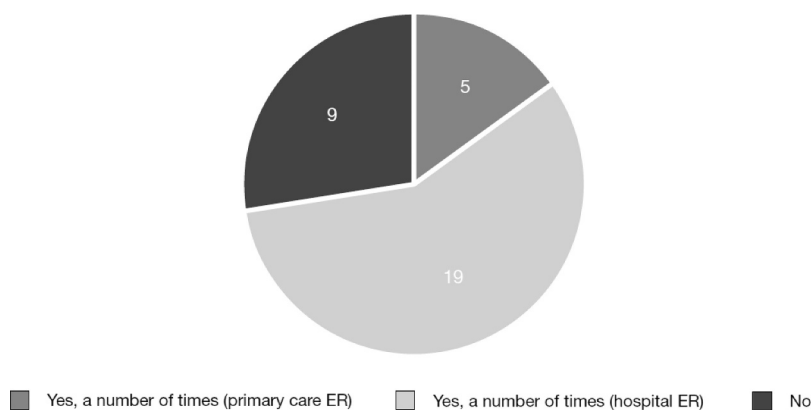


Figure 3. Patient contacts with emergency care.

The majority of the respondents experienced asthma attacks at least once monthly, and 2/3 of these severe asthma patients had at some point contacted the ER, either at the hospital or at the health care center.

Discussion

This patient reported study in Sweden and Denmark investigated severe asthma patients' own experiences of their disease, their perceptions of HRQOL, and awareness of possibilities of improved disease management using both quantitative and qualitative methodology. The quantitative data from the web-survey questionnaires showed that severe asthma patients in this study have both poor disease control and impaired HRQOL. The actual degree of impairment, restrictions, need for adaptations and disease awareness, from a patient perspective, was covered in the subsequently conducted IDIs where this relatively young study population, having had asthma for approximately 11 years, showed a high degree of acceptance of limitations [10,18,19]. A constant need for adaptations in order to avoid triggers leading to disease deterioration was identified, in fact having become the reference baseline for daily activities. That this outcome was not captured by the initial web survey, may lead to a risk of overestimations of asthma control, which also has been evaluated in previous studies [18,19]. A reason may be that surveys do not always offer predefined response options that matches the patients' opinion.

Experienced restrictions, affecting the patient as an individual, were not always identified by participants answering to the web survey as having a negative impact on daily life. However, restrictions became more apparent when discussing in the IDI's about family and friends (Supplemental Table 1). Lack of energy, resulting in restricted involvement in family

activities and transfer of household burdens to the healthy partner was reported. Report of an excessive attachment to rescue inhalators was in concordance with the recently published work by Nwaru et al, indicating overuse of SABA in 30% of Swedish asthma patients across disease severity [20]. Frequent exacerbations were described by many as dramatic episodes and fear of suffocating or dying, often accompanied by ER visits. Feelings of frustration, anxiety, embarrassment, fear for the future, hopelessness and, in isolated cases, suicidal thoughts were described in the IDIs. Many patients would have appreciated professional psychological support, but only one participant was offered this help. Almost half of the patients reported that OCS were part of their treatment, whereof 75% used OCS periodically. This is higher than what was recently reported in a Swedish asthma population by Ekström et al, where 34% in the age group 40–65 years used OCS during a 12-month baseline period, a difference that may be explained by the different methods for data collection [21].

In the SGRQ, half of all employed patients stated that their respiratory problems did have a general negative affect on their work life, and the IDIs further revealed an impact even in non-physically demanding occupations. Cost of productivity losses among individuals with severe asthma was recently reported to be significantly higher than the direct asthma costs [8]. Further, work disability has been shown to be common among adults with severe asthma and having frequent asthma symptoms has been reported to be associated with increased risk of unemployment [22,23].

A long path to diagnosis with difficulties to relate the symptoms to asthma, by both patients and physicians, was followed by relief when getting the correct diagnosis. Most of the interviewed patients reported high satisfaction with health care during attacks

requiring emergency care. However, despite GINA guidelines, a surprisingly high proportion of the patients were primarily treated in general practice. Previous studies have shown that it takes long to be referred to a specialist [9] and although patients in this study expressed high interest in being referred, they were not offered this option. Poor satisfaction was reported for the current level of health care support, with common issues mentioned such as lack of continuity and yearly renewal of prescription without a doctor/nurse appointment. Further, insufficient control of treatment effect, and lack of scheduled appointments despite frequent exacerbations or visits at the ER was reported. Also, being left with the responsibility for self-management of a chronic disease in combination with poor awareness of treatment goals, right to see a specialist and available biologic treatments according to guidelines, it is questionable whether the self-evaluation was reliable. This has also been the focus of recent reports to improve patient care [9,24].

Management of co-morbidities and the need for a multidisciplinary team [25] was indirectly captured by the IDIs. Anxiety, fear of dying and other phobias, social isolation and depression became apparent, raising questions about undiagnosed conditions secondary to severe asthma burden on psychological well-being. Previous studies enhance this observation among severe asthmatics [26–28]. Further, in a multi-ethnic study of atherosclerosis, persistent asthmatics had a greater risk for cardiovascular disease events than non-asthmatics [27]. Half of the patients in the present study stated that exercise was not safe for them. Co-morbidities due to frequent use of OCS including osteoporosis and obesity (reported in IDIs), diabetes and hypertension, are not routinely investigated through standard questionnaires [26,29].

This study comes with several limitations. Asthma severity was based on treatment as per GINA step 4 or 5, and no clinical measurements or information on differential diagnoses were collected. Another limitation is the female dominance among the included patients, which is likely not entirely representative for a population with severe asthma, although severe asthma is more common in females [30]. It has also previously been shown that females are more prone to respond to surveys. Another weakness is the potential recall bias when responding, both to the survey questions and the IDIs, which may over- or under-estimate some of the results. There may also be a recruitment bias that could impact the representativeness of our sample, with more severely ill patients being more prone to respond to surveys. However, disease characteristics in our study are similar to that of other severe

asthma studies. The strengths of this study are that a web study is optimal when striving for a larger sample and when questions are more ‘closed ended’ with different response options. It allows a good geographical spread and allows respondents to complete the survey whenever suitable for them. IDIs are excellent when wishing to prompt and dig deeper into the patients’ experience of asthma. By conducting the interview on telephone this alternative also allowed a good geographical spread.

Conclusion

In the severe asthma patients in this study in Sweden and Denmark, the vast majority had uncontrolled asthma with frequent exacerbations and poor access to lung expert physicians. In-depth interviews revealed a pattern of a severely impaired HRQOL, despite patients’ adaptations to the disease. These findings highlight the need for structured patient education, raised awareness of the disease, and greater access to units with disease-specific knowledge.

Authors’ contributions

Analysis, interpretation and drafting of the manuscript was conducted by GP in cooperation with the other authors. All authors have had access to the raw data.

Data-sharing statement

Data underlying the findings described in this manuscript may be obtained in accordance with AstraZeneca’s data sharing policy described at

[https://astrazenecagrouptrials.pharmacm.com/ST/ Submission/Disclosure](https://astrazenecagrouptrials.pharmacm.com/ST/Submission/Disclosure).

Disclosure statement

GP has received Principal Investigator fees by AstraZeneca. She has also participated in advisory boards for AstraZeneca and Novartis. AT has participated in advisory boards and provided medical expertise against remuneration for medical staff in the fields of allergy, asthma and COPD, sponsored by AstraZeneca, GSK, Boehringer Ingelheim, MSD, ALK, Novartis, Mundipharma, Nycomed, Sanofi, Teva, Almirall Nordic, and AGA. JB has participated in studies sponsored by AstraZeneca and Viscogel. He has been Scientific consultant for AstraZeneca. GT are employed by AstraZeneca. KR has collaborated with AstraZeneca, GSK, Chiesi, Boehringer-Ingelheim, Mundipharma and Teva, supporting education and projects in respiratory medicine. He has also participated in advisory boards for the same companies.

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