



The effect of the COVID-19 pandemic on severe asthma care in Europe: will care change for good?

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Changes in severe asthma care caused by the #COVID19 pandemic include the transition to video/phone consultations and home administration of biologics. Patients are satisfied with the changes and show no evidence of poor asthma control. <https://bit.ly/3MV6ywy>

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Abstract

Background The coronavirus disease 2019 (COVID-19) pandemic has put pressure on healthcare services, forcing the reorganisation of traditional care pathways. We investigated how physicians taking care of severe asthma patients in Europe reorganised care, and how these changes affected patient satisfaction, asthma control and future care.

Methods In this European-wide cross-sectional study, patient surveys were sent to patients with a physician-diagnosis of severe asthma, and physician surveys to severe asthma specialists between November 2020 and May 2021.

Results 1101 patients and 268 physicians from 16 European countries contributed to the study. Common physician-reported changes in severe asthma care included use of video/phone consultations (46%), reduced availability of physicians (43%) and change to home-administered biologics (38%). Change to phone/video consultations was reported in 45% of patients, of whom 79% were satisfied or very satisfied with this change. Of 709 patients on biologics, 24% experienced changes in biologic care, of whom 92% were changed to home-administered biologics and of these 62% were satisfied or very satisfied with this change. Only 2% reported worsening asthma symptoms associated with changes in biologic care. Many physicians expect continued implementation of video/phone consultations (41%) and home administration of biologics (52%).

Conclusions Change to video/phone consultations and home administration of biologics was common in severe asthma care during the COVID-19 pandemic and was associated with high satisfaction levels in most but not all cases. Many physicians expect these changes to continue in future severe asthma care, though satisfaction levels may change after the pandemic.

Introduction

Severe asthma, affecting around 3.7% of adults with asthma in Europe, is a heterogeneous chronic respiratory disease characterised by persistent symptoms, impaired lung function and frequent exacerbations most commonly triggered by viral infections, resulting in disease worsening and increased vulnerability [1, 2]. Treatment depends on complex regimes of high-dose maintenance medications, including biologics [3]. Traditional models of care for patients with severe asthma require frequent attendance to specialist centres and review by a multidisciplinary team to assess asthma control, monitor lung function and inflammation parameters, evaluate response and adherence to medication, check for adverse effects, and dispense or administer medication such as oral corticosteroids (OCS) and biologics [4, 5].

The coronavirus disease 2019 (COVID-19) pandemic has placed major challenges on healthcare services, forcing reorganisation of traditional care pathways and reducing the capacity for face-to-face consultations globally [6]. The crisis created considerable challenges to maintain access to and delivery of effective severe asthma care for many vulnerable patients. Several expert-opinion papers have provided recommendations for reorganisation of severe asthma care during the pandemic, though large-scale real-world data on how physicians managed in practice and the resultant impact on severe asthma patients are lacking [7–11].

The “Severe Heterogeneous Asthma Research collaboration, Patient-centred” (SHARP) is a Clinical Research Collaboration of the European Respiratory Society (ERS) that forms a network of severe asthma experts and patients from different European centres to promote patient-centred severe asthma research on a pan-European scale [12]. The aims of this European-wide survey-based study by SHARP are to investigate the effect of the pandemic on the organisation of severe asthma care: 1) from the physician perspective; 2) from the patient perspective, including the impact of changes in care and treatments on satisfaction with care and asthma control; and 3) to evaluate which aspects of reorganised care physicians expect to be continued in future care.

Methods

Design

This was a cross-sectional study in which a patient survey was sent to patients with severe asthma, and a physician survey was sent to severe asthma specialists. The survey was launched on 30 November 2020 and closed on 9 May 2021. Members of the European Lung Foundation’s asthma Patient Advisory Group (PAG) and representatives of national respiratory patient organisations were actively involved in the conception and design of the study (details in supplementary file 1) [13].

Survey development and setting

The surveys were developed in an iterative manner by the authors, involving physicians (severe asthma experts), psychologists and patients. The patient surveys were translated by professional translators into the

native languages of the 16 countries. The translations were reviewed by the SHARP National Leads. Physicians were asked to recruit severe asthma patients from their outpatient clinics for the patient survey and to complete the physician survey. Both online and paper versions of the patient survey were available, while only an online version was used for the physician survey. SurveyMonkey (SurveyMonkey, Momentive Inc, San Mateo, CA, USA) was used for the online survey. Paper versions of the patient survey were used if online versions were not available, and results from these paper version surveys were transferred into the SurveyMonkey system by the local research team. Data collection was anonymous.

Patient and physician selection

Patients were eligible for inclusion if they had physician-diagnosed severe asthma and had been followed up in a severe asthma clinic for at least 6 months from the beginning of the COVID-19 pandemic. Participating physicians included national leads from SHARP member countries and physicians in their Respiratory Societies, who were identified by the national leads to have significant experience treating severe asthma patients. All participating physicians were instructed not to exclude any severe asthma patient on their consultation hour when recruiting patients for the study.

Survey content

The patient survey consisted of multiple-choice questions including demographics, medication use, changes in care and (biologic) treatments, patient satisfaction with any changes in care or treatments, and patient perceptions of any change in asthma control induced by changes in care or treatments. Full patient and physician surveys are included in supplementary file 2 and 3, respectively. A scale ranging from 1 to 5 was used for answering questions about satisfaction, with a higher score meaning a higher level of satisfaction. "Satisfaction with care" was then calculated as a mean of the scores of seven questions (question 16A–G, in which 16C–G were reverse coded), "satisfaction with changes in care" as a mean of the scores of two questions (16H–I) and "satisfaction with changes to biologic treatments" consisted of the score of a single question (16J). A scale ranging from 1 to 5 was used for answering questions about patients' perceived change in asthma control, with a higher score meaning a worsening in asthma. Change in asthma control due to "changes in care" was then calculated as a mean of the scores of three questions (question 17A–C), and change in asthma control due to "changes in biologic treatment" consisted of the score of a single question (17D). Questions 17A–D comprised statements indicating that asthma symptoms had got worse, with responses 1=strongly disagree, 2=disagree, 3=neither agree nor disagree, 4=agree, 5=strongly agree. The physician survey contained multiple-choice questions about the reorganisation of severe asthma care and treatments, the challenges they faced in reorganisation of care and physicians' perspectives on which of these changes may be implemented in future care. The physician survey was conducted in English.

Ethics

Approval for the study was obtained from the medical ethical board of the Amsterdam University Medical Center (W20_463 # 20.512) and the ethical boards of every individual country where there was a requirement for ethics approval for survey-based studies. All patients and physicians provided digital or written informed consent for participation in this study.

Statistical analysis

Descriptive statistics and t-tests were used for comparisons between groups. p-values ≤ 0.05 were regarded as a statistically significant difference. Statistical analyses were performed using IBM SPSS v.25 software (IBM Corp., Armonk, NY, USA).

Results

Patient and physician participation

The physician survey was completed by 268 severe asthma specialists from 16 countries in Europe. Of 1119 returned patient surveys, 1101 were complete and included for analysis. Numbers of participating physicians and patients per country and baseline patient characteristics of included patients are shown in table 1.

Physician-reported changes in care during the COVID-19 pandemic

90% (242 of 268) of participating physicians reported at least one change in severe asthma care in their centre during the COVID-19 pandemic, and the nature of the changes are shown in table 2. Changes were either the result of "voluntary" physician-induced changes in reorganisations of severe asthma care or due to "involuntary" pandemic-induced changes, mainly concerning reduced staff or resource capacity.

TABLE 1 Country breakdown of physician and patient respondents to questionnaires

Country	Physicians n		Patients		
		n	Female n (%)	Use of biologics n (%)	Daily OCS n (%)
Belgium	13	102	57 (56)	86 (84)	9 (9)
Estonia	8	14	13 (93)	6 (43)	5 (36)
France	28	15	10 (67)	13 (87)	5 (33)
Greece	18	122	82 (67)	74 (60)	35 (29)
Hungary	40	110	71 (65)	71 (65)	22 (20)
Italy	31	52	38 (73)	28 (54)	13 (25)
Latvia	4	54	33 (61)	24 (44)	19 (35)
Lithuania	15	53	35 (66)	41 (77)	8 (15)
The Netherlands	2	114	69 (61)	79 (69)	27 (24)
Romania	31	12	5 (42)	9 (75)	3 (25)
Russian Federation	13	55	34 (62)	11 (20)	9 (16)
Serbia	15	74	50 (68)	45 (60)	30 (41)
Slovenia	2	70	51 (73)	64 (91)	12 (17)
Sweden	9	122	60 (49)	67 (55)	34 (28)
Switzerland	19	57	25 (44)	46 (81)	19 (33)
UK	20	75	43 (57)	45 (60)	31 (41)
Total	268	1101	676 (61)	709 (64)	281 (26)

Number of returned physician surveys per country, and number and characteristics of participating patients per country. OCS: oral corticosteroids.

Patient-reported changes in care during the COVID-19 pandemic and impact on satisfaction with care and asthma control

Of 1101 included patients, 494 (45%) experienced a change in severe asthma care. Table 3 shows the nature of these changes in care and the associated levels of satisfaction with care as well as changes in care. Patients for whom care had changed were significantly less likely to be satisfied with care compared to patients who experienced no changes in care ($p < 0.001$). In a further analysis of only those patients who were changed to video/phone consultations from face-to-face the majority was satisfied, see figure 1.

Table 3 also shows change in perceived asthma control. For those patients who reported a change, the mean score was 1.9 indicating that, on average, they disagreed with the three statements indicating poorer control. Reports of different types of change also showed mean levels indicating disagreement with the assertion that asthma symptoms had got worse.

TABLE 2 Physician-reported changes in delivery of care

Change in care	n (%)
Reorganisation of care by physicians (i.e. voluntary)	
Change to video/phone consultations	122 (46)
Outpatient clinic continued with social distancing	142 (53)
Urgent consultations only	44 (16)
New patients postponed	32 (12)
Switch to home-administered biologics	102 (38)
Changes induced by the pandemic (i.e. involuntary)	
Reduced capacity outpatient clinic	109 (41)
Reduced capacity lung function lab	159 (59)
Fewer physicians available	115 (43)
Fewer nurses available	76 (28)

Changes in severe asthma care during the coronavirus disease 2019 (COVID-19) pandemic as reported by the participating severe asthma specialists (n=268).

TABLE 3 Satisfaction scores with types of change in care and asthma control

	n (%)	Satisfaction with care	Satisfaction with changes in care	Effect on asthma control attributed to changes in care
All patients (n=1101)				
No change	607 (55)	4.42±0.61 [#]		
Change	494 (45)	3.85±0.72 [#]	3.68±0.93	1.90±0.84
Type of change reported (n=467)				
Phone/video consultations	212 (45)	3.96±0.67	3.81±0.87	1.80±0.78
Monitored my asthma at home	24 (5)	3.55±0.76	3.65±0.86	2.24±0.70
The location of my appointments was changed	43 (9)	3.90±0.68	3.78±0.91	1.86±0.87
Attended alternative unit (e.g. ED)	10 (2)	3.66±0.92	3.55±1.28	2.50±1.25
I chose to cancel appointments	61 (13)	3.60±0.74	3.30±1.00	2.07±0.96
Cancelled or postponed by clinic	117 (25)	3.79±0.74	3.55±0.97	1.91±0.85

Data presented as mean±SD, unless otherwise stated. Patient-reported changes in severe asthma care during the coronavirus disease 2019 (COVID-19) pandemic and associated levels of satisfaction with care and changes in care, and patient-perceived effect on asthma control. Higher satisfaction scores indicate better satisfaction (range 1–5, 1=very low satisfaction and 5=very high satisfaction); higher asthma control scores indicate greater agreement with statements that changes in care induced worsening of asthma control (range 1–5, 1=strongly disagree and 5=strongly agree). ED: emergency department. [#]: t (1068)=15.82, p<0.001, d=0.96.

Patient-reported changes in biologic care during the COVID-19 pandemic and impact on satisfaction with care and asthma control

Of 709 patients using asthma biologics at the start of the pandemic, 167 (24%) reported a change in their biologic treatment. The different types of changes in biologic care, and associated satisfaction ratings and impact on asthma control are presented in table 4. Patients on biologics reporting a change in provision of biologic care were significantly less satisfied with care than those who reported no change in provision of biologic care (p<0.001). In a further analysis of patients who experienced a change in biologic care during

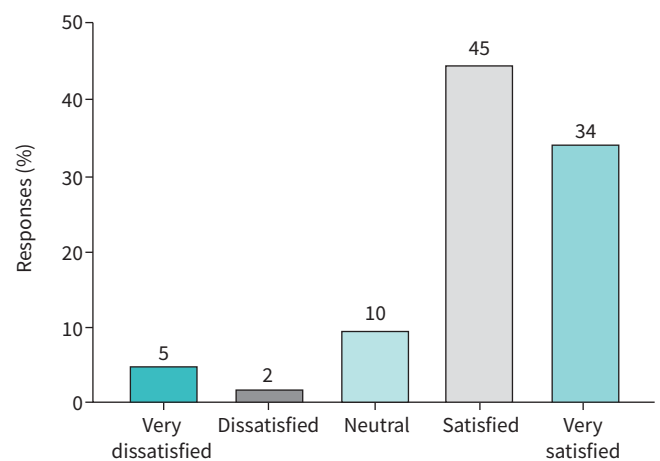


FIGURE 1 Satisfaction with change to video/phone consultations. A change to video/phone consultations was reported by 212 patients, of whom 207 indicated their satisfaction level with this change.

TABLE 4 Satisfaction scores with types of change in biologic care and asthma control

	n (%)	Satisfaction with care	Satisfaction with changes in care	Effect on asthma control attributed to changes in biologic treatment
All patients on biologics (n=709)				
No change	542 (76)	4.40±0.59 [#]		
Change	167 (24)	3.93±0.68 [#]	3.72±1.08	1.90±0.88
Type of change reported (n=167)				
Switch to home administration	153 (92)	3.96±0.67	3.90±0.87	1.76±0.74
Treatment less frequent	4 (2)	4.05±0.46	3.83±0.53	2.22±1.57
Treatment postponed	7 (4)	3.63±0.84	3.92±1.02	2.05±0.83
Treatment stopped	3 (2)	3.04±0.33	3.17±0.29	3.22±0.69

Data presented as mean±SD, unless otherwise stated. Patient-reported changes in biologic care during the coronavirus disease 2019 (COVID-19) pandemic and associated levels of satisfaction with care and changes in care, and patient-perceived effect on asthma control. Higher satisfaction scores indicate better satisfaction (range 1–5, 1=very low satisfaction and 5=very high satisfaction); higher asthma control scores indicate greater agreement with a statement that changes in biologic care induced worsening of asthma control (range 1–5, 1=strongly disagree and 5=strongly agree). Data of 709 patients on biologics; 26 did not complete the questions concerning satisfaction with care. [#]: t (674)=8.47, p<0.001, d=0.72.

the pandemic, the large majority of patients reported a switch to home-administered biologics. Figure 2 shows that a small percentage of patients were not satisfied with this change. Only 3 out of 153 patients (2%) who switched to home administration of their biologic agreed or agreed strongly that their symptoms had worsened because of this change.

Table 4 also shows the mean score of responses to a single statement indicating that change in biologic care produced a worsening of asthma control. On a scale ranging from 1 to 5 (in which 1=strongly disagree and 5=strongly agree), a mean score of 1.9 shows that on average patients who were on biologics disagreed with this statement. 92% of those patients reporting a change in biologic treatment reported that the change was due to home administration, and for these patients the mean was 1.76 indicating a slightly greater trend towards strong disagreement with the statement that asthma symptoms had worsened.

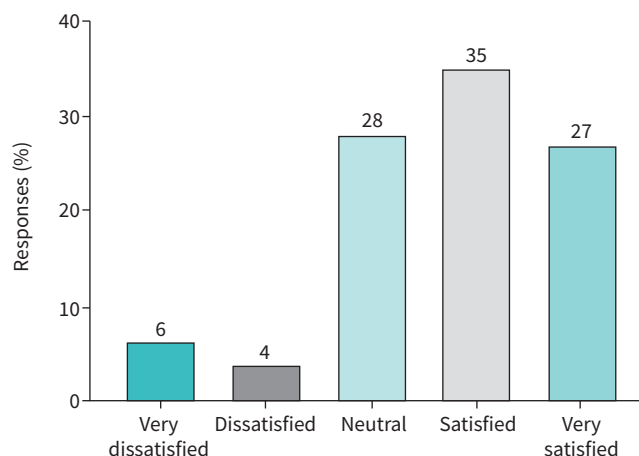


FIGURE 2 Satisfaction with change to home-administered biologics. Satisfaction with change to home-administered biologics in patients reporting this change in their biologic care (n=153).

Physicians' expected changes to future severe asthma care

The majority of participating physicians (78%) expect that certain aspects of reorganised care will be continued in the future. Figure 3 presents physicians' beliefs about how severe asthma care will change as a result of the COVID-19 pandemic.

Discussion

The results of this European-wide survey showed that both physicians and patients reported changes in severe asthma care during the COVID-19 pandemic. Physicians expected these changes to outlast the pandemic, and the majority of patients were satisfied by the changes that were made, the most common changes being the use of video/telephone consultations and home administration of biologics. There was no evidence that changes led to poorer perceived asthma control.

Although this study is the first that has investigated the effect of the pandemic on severe asthma care, our results can be compared to other disease areas. A global survey from the World Health Organisation showed that >50% of 163 participating countries reported disrupted outpatient services for non-communicable diseases with limited access, reduced staff capacity, alternate locations or different modes of care [6]. Consistent with the results of our study, replacement of face-to-face consultations into telemedicine deployments were reported in ~60% of countries. Several other studies investigated patient satisfaction with video/phone consultations during the COVID-19 pandemic, both in allergy/immunology and other services (e.g. rheumatology, inflammatory bowel disease, oral/maxillofacial surgery, urology), and all confirmed high satisfaction levels in the majority of patients [14–20]. In addition, some other studies, mainly involving allergy/immunology clinics, reported increased prescriptions of home-administered biologics [21–23]. Apparently, even patients requiring complex care, including those with severe asthma, are willing to switch to a different type of care if circumstances demand it.

In our study changes in asthma care resulted from decisions made either by the hospital, the doctor or by the patients themselves, and changes took various forms. Some of the changes were due to reduced staffing, and low staffing will impact care irrespective of whether there is a pandemic. There was evidence of reduced satisfaction in care in those patients experiencing a change compared to those not experiencing a change, but it does not follow that change caused reduced satisfaction as other unknown factors also contribute to satisfaction levels. We found no evidence that any one type of change was associated with lower satisfaction than any other.

Slightly more than half of physicians in our study reported that the change to home administration of biologics would be more frequent in future care. In our study we found no evidence that home administration was associated with better or worse asthma control for the group as a whole. Although the majority were satisfied with that change, a small minority were not satisfied indicating the need to personalise this aspect of patient care post-pandemic.

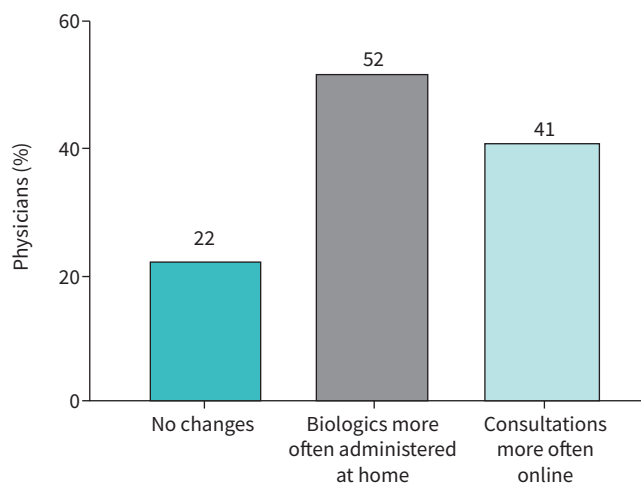


FIGURE 3 Physicians' expected changes to future severe asthma care. Physicians' beliefs about how asthma care will change following the pandemic (n=268).

Telemedicine in the field of asthma is not new, and several studies including meta-analyses suggested positive effects of telemedicine on asthma control and quality of life in asthma patients, though numerous human-related, technical and reimbursement barriers hampered widespread implementation [24–27]. The emergence of the COVID-19 pandemic seems to have accelerated the transition towards telemedicine modalities, although its precise role in future severe asthma care needs further exploration. In our study, satisfaction levels with video/phone consultations were high. 79% of patients were satisfied or very satisfied with this change, while only 7% of patients were not satisfied. Preferences in the mode of consultations may vary between patients or may vary over time in individual patients. In addition, previous reports suggested benefits to telemedicine modalities in asthma patients living in rural/remote areas, while other studies suggested decreased benefits in vulnerable patient populations, including those with lower socioeconomic status, with language barriers or poor internet access [28–30]. Better understanding of patient characteristics associated with dissatisfaction or poorer clinical outcome would allow for accurate patient selection and a personalised approach to telemedicine deployments in severe asthma patients. It is conceivable that a hybrid form of care delivery will emerge in future severe asthma care, in which virtual and face-to-face consultations are alternated, tailored to individual patient preferences and needs.

Limitations of this study include a possible underestimation of the proportion of patients with changes in care and the inability to calculate survey response rates, since numbers of provided surveys were incomplete. Further, we made no distinction between phone or video consultations, which are quite different modalities regarding logistics and patient–physician interaction, but a recent study in an allergy/immunology service evaluating patient satisfaction with in-person, video or phone consultations during the pandemic did not find a significant difference in satisfaction levels between these encounter modalities [19]. Lastly, we did not make comparisons between countries, because multiple factors could influence the results.

Conclusions and implications for clinical practice

Although severe asthma specialists across Europe reported numerous challenges in reorganisation of severe asthma care, this reorganisation was achieved with high levels of patient satisfaction and just limited effects on asthma control. Video/phone consultations and home-administered biologics were shown to work well for both physicians and most patients. For the small minority of patients who were dissatisfied, either face-to-face consultations are needed or assistance to improve their satisfaction with this mode of communication, consistent with previous research [29–31]. It remains to be seen whether the level of satisfaction with video/phone consultations will remain high after the pandemic. A personalised approach may be the way forward for a sustainable implementation of telemedicine modalities and home administration of injectable biologics in severe asthma care.

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