



Impact of COVID-19 on COPD and asthma admissions, and the pandemic from a patient's perspective

To the Editor:

The coronavirus disease 2019 (COVID-19) pandemic has led to an overall reduction in hospital admissions in the United Kingdom (UK) with national data showing a decline in emergency admissions for respiratory illness [1, 2].

Patients with asthma and COPD are considered at increased risk of dying from COVID-19 and were therefore subject to UK Government shielding advice. While this may have protected against respiratory viruses; adverse effects, including reduced physical activity, social isolation, and increasing anxiety have been recognised consequences [3]. Airways disease management is multidisciplinary and there may also be pervasive deleterious effects due to suspension of clinical services including outpatient clinics, smoking cessation support, and pulmonary rehabilitation (PR) [4]. A recent national survey found that up to 23% of patients with lung conditions have experienced worsening symptoms during the pandemic [5].

We examine admissions with exacerbations of asthma and COPD to Hull University Teaching Hospitals NHS Trust (HUTH) during the first wave of the COVID-19 pandemic and compare them to previous years. We then explore the patients' perspective of the pandemic and how it affected their physical and mental health.

All admissions to HUTH (an NHS Trust with two large hospital sites) with a diagnosis of asthma or COPD between March 23 and June 1, 2020 were identified from hospital electronic records. Data were collected using identical search criteria for aligned dates in 2018 and 2019. Electronic health records were reviewed for all identified admissions to ascertain those with a primary diagnosis of asthma or COPD exacerbation. Data collected included, demographics, diagnosis, level of care received, length of stay and acute treatment.

Patients with COPD under active clinical follow-up by the local integrated COPD service were contacted and provided verbal consent to undertake a structured interview consisting of 20 questions relating to their experience of their COPD and its treatment during the COVID-19 pandemic. Interview questions were related to subjective disease control, mental health impacts, patient physical activity and medication use. Local data from the UK Severe Asthma Registry (UKSAR) study, examining the experience of severe asthma patients during the pandemic, were also collated [6].

All data were analysed using IBM SPSS Statistics 26 (IBM Corp., Armonk, NY, USA), differences in proportions were analysed using Chi-squared testing, comparisons of means were analysed using ANOVA, and all results are presented descriptively.

Data are presented in table 1.

We identified 4665 all-cause admissions for patients with a diagnosis of asthma or COPD during the studied period, of which 883 were for exacerbations. The mean number of all-cause admissions per week in our study period fell significantly from 173 and 179.7 in 2018 and 2019 respectively to 113.8 per week



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There has been a significant reduction in all-cause and exacerbation-related #asthma and #COPD admissions during the #COVID19 pandemic. Patients also report a subjective decline in disease control and describe a negative impact on their mental health. <https://bit.ly/2Kv000H>

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TABLE 1 The number of admissions and admission-related information from March 23–June 1 in 2018, 2019, and 2020

	2018	2019	2020	p-value
Age years	69.6±14.8	68.9±15.1	66.8±15.2	0.136
Female %	62.2	61.5	60.5	
Total admissions n	1730	1797	1138	
COPD diagnosis	1072 [62.0]	1095 [60.9]	666 [58.5]	
Asthma diagnosis	665 [38.4]	715 [39.8]	477 [41.9]	
Mean admissions per week	173.0±13.2	179.7±12.9	113.8±13.0	<0.001
COPD admissions per week	107.2±8.7	109.5±6.2	66.1±9.0	<0.001
Asthma admissions per week	66.5±8.7	70.0±9.6	47.7±9.4	<0.001
Total exacerbation admissions (% of total admissions)	360 [20.8]	366 [20.3]	157 [13.7]	<0.001
COPD exacerbation	292 [81.1]	288 [78.7]	126 [80.8]	
Asthma exacerbation	68 [18.9]	78 [21.3]	31 [19.2]	
Mean exacerbations per week	36±6.8	36.6±7.9	15.7±2.9	<0.001
COPD exacerbations per week	29.2±6.3	29.4±6.4	12.6±3.2	<0.001
Asthma exacerbations per week	6.8±3.0	7.8±2.2	3.0±1.5	<0.001
Level of care				
Ward admission	321 [82.7]	331 [83.8]	150 [87.7]	0.326
COPD n	254	258	122	
Asthma n	67	73	28	
HDU admission	56 [14.5]	52 [13.2]	13 [7.6]	0.028
COPD n	54	48	13	
Asthma n	2	4	0	
ICU admission	11 [2.8]	12 [3.0]	8 [4.7]	0.245
COPD n	10	10	5	
Asthma n	1	2	3	
Admission and treatment				
Steroid prescription	343 [88.4]	348 [88.1]	137 [80.1]	0.004
Median (range) length of stay	3.0 [1–73]	3.0 [1–120]	3.0 [1–32]	0.540
Deaths	22 [5.7]	26 [6.6]	9 [5.3]	0.788

Data are presented as mean±SD or n (%), unless otherwise stated. HDU: high-dependency unit; ICU: intensive care unit.

in 2020 ($p<0.001$). Mean number of airways disease exacerbations per week also reduced from 36 and 36.6 per week in 2018 and 2019 respectively to 15.7 per week in 2020 ($p<0.001$).

No difference was observed in the proportion of patients hospitalised with exacerbations requiring admission to critical care. However, there was a significant reduction in the proportion of patients admitted to the respiratory high-dependency unit (HDU) in 2020 ($p=0.03$).

Oral corticosteroids were prescribed in a lower proportion of patients hospitalised with an exacerbation in 2020 compared with earlier years (80.1% in 2020 *versus* 88.1% in 2019 and 88.4% in 2018, $p=0.004$). No difference was observed in inpatient mortality.

Fifty patients with COPD were interviewed. One patient had recovered from COVID-19. Eight (16%) had been hospitalised with exacerbations during the study period. Overall, 48% ($n=24$) reported that the pandemic had a negative impact on their mental health.

Of the patients interviewed, 32% ($n=16$) reported worsening of their COPD control. Reduction in daily exercise was reported in 46% ($n=23$), and 57% ($n=13$) of these patients reported their COPD control as worse. Increased use of 'reliever' inhalers was reported in 48% ($n=24$), and 22% ($n=11$) of patients disclosed that at least on one occasion over the pandemic they felt as though they were exacerbating and did not seek medical help.

Eighty-two patients with severe asthma were interviewed with the UKSAR COVID questionnaire, of which 34.1% ($n=28$) reported their disease control to be worse. Overall, 18.3% ($n=15$) of patients reported the pandemic as having a negative effect on their mental health. Only one patient interviewed had a hospital admission for an asthma exacerbation in 2020.

We confirm a significant reduction in all-cause and exacerbation-related hospitalisations for patients with asthma and COPD during the first wave of the COVID-19 pandemic. This is in keeping with national emergency admission data [2] and similar data from other countries [7, 8].

There are several possible explanations for the observed reduction in hospitalisation with airways disease exacerbations. Patient's response to respiratory symptoms may have been altered by the COVID-19 pandemic, making them less likely to seek care. Indeed, a national survey conducted by the British Lung Foundation reported that 70% of patients did not feel safe seeking treatment due to fear of COVID-19 [5]. This may have impacted all-cause admissions, but we feel it is unlikely that this adequately explains the reduction in exacerbations given that no change was observed in the acuity of the admitted patients. Conversely, we observed a reduction in the proportion of hospitalised patients with asthma and COPD requiring HDU-level care and there was no change in intensive care unit admission or inpatient mortality. This suggests that those being hospitalised with exacerbations were not more unwell than during previous years.

We demonstrated a significant reduction in inpatient steroid prescriptions for patients presenting with asthma and COPD exacerbations in 2020 when compared to 2019 and 2018 combined (80.1% *versus* 88.3%, $p=0.004$). There are many possible explanations for this. The studied period predates the preliminary reports of dexamethasone utility in COVID-19 from the RECOVERY trial [9] and concern about potential adverse effects of steroids in COVID-19 were prevalent, potentially influencing prescribing practice. Our data do not allow us to draw firm conclusions about the reason for the observed reduction in steroid prescribing and therefore should be considered hypothesis-generating.

In our study, 32% of patients with COPD and 34.1% of patients with asthma reported a subjective decline in their condition. Many reported exercising less and using their reliever inhaler more often. Deconditioning is a common cause of increased symptom burden in COPD and is likely a contributing factor in our cohort. Similar results were observed in a recent study by McAULEY *et al.* [3] with an overall reduction in physical activity in patients with COPD leading to general deconditioning. A sedentary lifestyle is associated with worse outcomes including mortality in patients with COPD and it is therefore essential that this trend is reversed as we recover from the COVID-19 pandemic. PR is known to improve quality of life and exercise capacity in COPD and should be a key priority for health systems [10, 11]. Our data do not identify the reason for the apparent discordance between perceived disease control and reduction in exacerbations requiring hospital admission among patients with severe asthma. This relationship is worthy of further study.

The impact of the COVID-19 pandemic and its sequelae (*i.e.* social distancing, shielding, and national "lockdowns") on mental health was evident in our study [12]. This was particularly apparent in our COPD cohort with almost half (48%) patients reporting a negative impact of the pandemic on their mental health. This contrasts with 18.3% of interviewed patients with severe asthma. The link between depression, anxiety and COPD is well reported, with evidence to suggest that more severe COPD increases the likelihood of psychological morbidity [13].

The limitations of our study include it being single-centre and the relatively small sample of patients interviewed. The perspectives of patients with asthma were obtained from a cohort participating in the UKSAR study and therefore only patients with severe asthma were included, limiting generalisability to a broader asthma population. We were unable to account for confounding factors in the management strategies for patients with airways disease, so cannot draw definitive conclusions regarding the observed reduction in steroid prescribing. However, we report robust, in-depth analysis, of admission data during the pandemic compared with date-matched periods in previous years and provide insights into patients' experiences.

We report a significant reduction in all-cause and exacerbation-related asthma and COPD admissions during the first wave of the COVID-19 pandemic in the UK. Despite a reduction in exacerbation-related admissions, patients report a subjective decline in their disease control and describe a negative impact on their mental health, which is most profound among patients with COPD.

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