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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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Asthma control, self-management, and healthcare access during the COVID-19 epidemic in Beijing

To the Editor,

The pandemic of COVID-19, caused by the pathogen SARS-CoV-2, has now spread around the globe. Social distancing and restriction measures during COVID-19 pandemic may have impacts on asthma control and management in terms of medication availability and healthcare access. International societies responded quickly by releasing guidance on the management of asthma during the COVID-19 pandemic.[1-4] However, these temporary guidelines were based largely on previous asthma guidelines and expert consensus, because evidence from related studies was lacking. Therefore, we investigated the status of asthma control, self-management, medications, and healthcare utilization of asthma patients during the COVID-19 epidemic in Beijing, aiming to provide data for guideline recommendations on asthma managements during the emergency.

Patients with physician-confirmed asthma, selected randomly from our hospital database, were interviewed by phone call. We used a design based on a list of random digit numbers provided by Excel to select a representative sample. The study protocol was approved by the Independent Ethics Committee of the Peking University Third Hospital (IRB00006761-M2020189).

We contacted 286 patients from April 26 to April 29, 2020. A hundred and eight patients refused to accept or did not complete the survey and therefore were excluded. For the 178 patients who completed the survey, demographic data, asthma control status, exacerbation, and self-management, as well as health utilization were analyzed. Asthma exacerbation was defined as episodes characterized by a worsening of symptoms of shortness of breath, cough, or wheezing, requiring a change in treatment.[1] Both mild exacerbations self-managed by patients and those requiring medical visits were included for analysis.

The mean age of the 178 patients was 49.74 ± 17.06 (ranging from 20 to 92) years, with a median duration of disease of 4.00 (ranging from 0.5 to 62) years. There were 100 women (56.2%) and 78 men (43.8%). Detailed description of items in the questionnaire is available in this article's Appendix S1. Other sociodemographic data

TABLE 1 Asthma control and management during the COVID-19 epidemic in Beijing

	N	n (%)
Perception of overall control of asthma		
No change	178	132(74.2)
Improved		32(18.0)
Aggravated		14(7.9)
ACT score		
20-25	178	159(89.3)
16-19		11(6.2)
5-15		8(4.5)
Number of medical visits due to asthma		
0	178	134(75.3)
1		27(15.2)
2		11(6.2)
≥3		6(3.4)

Note: Scores of 20-25 are classified as controlled, 16-19 as partly controlled, and 5-15 as uncontrolled asthma. N, total number of subjects for evaluation; n (%), frequency (percentage of frequency).

TABLE 2 Current maintenance therapy during the COVID-19 pandemic

	N	n (%)
Maintenance medications	105	
ICS/LABA		96(91.4)
ICS/LABA plus oral leukotriene modifiers		23(21.9)
Oral theophylline		4(3.8)
ICS		3(2.9)
Oral leukotriene modifiers		2(1.9)
Inhaled anticholinergics		2(1.9)

Note: N, total number of subjects for evaluation; n (%), frequency (percentage of frequency).

Abbreviations: ICS, inhaled corticosteroid; LABA, inhaled long-acting beta2-agonist.

and clinical characteristics of the patients before the COVID-19 epidemic are provided as Appendix S1.

During the COVID-19 epidemic in Beijing (January 25, 2020, to April 25, 2020), the majority (74.2%) of our patients felt that their symptoms had not changed as compared with usual times, while 18.0% felt better, and 7.9% felt worse. The mean ACT score of the 178 patients was 22.76 ± 3.06 (ranging from 8 to 25) in the last 4 weeks before the survey. According to the criteria of ACT scoring from GINA, asthma was classified as controlled in 89.3%, partly controlled in 6.2%, and uncontrolled in 4.5% of the patients. During this period, 24.7% of the patients visited a hospital or clinic for asthma, with a total of 74 visits; 14.9% (11/74) of which were due to exacerbation of asthma, while the remaining (63/74, 85.1%) were for regular prescription of asthma medications. Only 6 patients (3.4%) sought consultation online (Table 1).

Notably, 25.6% (45/176) of the patients experienced exacerbation of asthma symptoms during the COVID-19 epidemic, but 75.6% (34/45) of them did not see a doctor, because 67.6% (23/34) of the patients felt that they did not need to go to the hospital and took more medications by themselves, and the remaining 32.4% (11/34) worried about cross-infection of COVID-19 in the hospital. No patient reported that he/she did not see a doctor because he/she could not arrange an appointment. Eleven patients went to the hospital due to exacerbation, 81.8% (9/11) to the outpatient, while 18.2% (2/11) to the emergency department (ED).

Of note, during the COVID-19 epidemic, 13.5% (24/178) of the patients had worried about insufficient maintenance medications, among whom 45.8% (11/24, 6.2% of the total sample) reduced medication dosing for this reason. After reducing medication dosing, 27.3% (3/11, 1.7% of the total sample) of them experienced asthma aggravation. Among patients who had their prescriptions refilled during the COVID-19 epidemic, 60.6% (40/66) chose to go to a hospital, 36.4% (24/66) to a nearby pharmacy, and 3.0% (2/66) chose to purchase online.

A hundred and five patients were receiving maintenance therapy, which was illustrated in Table 2. ICS plus LABA was the most commonly used combination therapy, followed by ICS/LABA plus oral leukotriene modifiers.

Our survey found that, during the COVID-19 epidemic in Beijing, the majority of our asthma patients had their disease controlled as defined by GINA, and the percentage of controlled asthma was higher than that reported before the pandemic. A multicenter, retrospective, cross-sectional study in China indicated that less than one-third (28.7%) of the patients had controlled asthma, and the control rate in Beijing was 31.4%.[5] We speculate that the higher control rate of our patients might be due to social distancing and mandatory closure of places where exposure to asthma triggers may occur, stepped-up public hygiene measures, and the wearing of masks during the COVID-19 epidemic, thereby reducing contact with allergens and viruses. However, it needs to be noted that ACT is used to assess asthma control in the past 4 weeks and therefore could not reflect the status of disease control in the 3 months of the COVID-19 epidemic.

However, during the study period, a quarter of our patients experienced an exacerbation of asthma, and the percentage was higher than that reported in an earlier study which showed that the proportion of patients experiencing an asthma exacerbation in the previous year was 15.5%.[5] The lower prevalence of maintenance therapy, reduction of maintenance therapy, the pollen season, and worries on epidemic may explain the increased number of reported asthma exacerbations in our survey. The patients enrolled in our study had a higher rate of asthma exacerbation but lower rates of ED visit and hospitalization. It is not surprising to see that one-third of them worried about the risk of exposure to SARS-CoV-2 in the hospital, although most patients believed that their symptoms were not severe and could be relieved by self-management with medications.

In our survey, most of the patients took their prescribed asthma medications as usual, which was consistent with

guideline recommendations.[1,2,4] Indeed, there is no evidence regarding whether currently available asthma treatments, including corticosteroids and bronchodilators, increase the susceptibility to or severity of COVID-19.[1] On the contrary, it may be more likely that a patient with asthma would have an exacerbation from other causes, including seasonal pollen exposure or a virus other than SARS-CoV-2 if they stopped regular use of indicated controller therapy.[6] An exacerbation may drive asthmatic patients to seek medical treatment, which would put them at increased risk of being exposed to SARS-CoV-2 during the current pandemic.[4]

The use of telehealth in asthma treatment is recommended within a risk-stratified context of the SARS-CoV-2 pandemic.[4] However, in our interview, only a few patients used online consultation during the epidemic in Beijing. Patients with mild-to-moderate or well-controlled asthma were encouraged to use digital medical services.[7] Outpatient service should be prioritized for patients who have poorly controlled asthma, worsening asthma symptoms, or who have required dose escalations of asthma medications in the past several months' time.[4]

Since our survey was cross-sectional, no definite conclusion can be drawn about the causal relationship between risk factors and uncontrolled asthma. The enrollment of study participants was largely dependent on patients' willingness to be surveyed. These participants might be more compliant to therapy and have well-controlled asthma, which could result in selection bias, and therefore, the proportion of patients with poorly controlled disease might be underestimated. However, since the participants were enrolled from a tertiary hospital, it was also likely that the symptoms of these patients were more severe. Moreover, the study was carried out in winter and spring (from January 25 to April 25) when seasonal aeroallergens and other respiratory viruses were also prevalent,[8] which might be associated with higher asthma exacerbation.

In conclusion, our survey revealed the status of asthma control, exacerbations, self-management, and healthcare utilization in patients with asthma during the COVID-19 epidemic in Beijing. The results support the recommendation that patients continue taking their prescribed asthma medications as usual and maintain good asthma control during the ongoing pandemic. For containment of viral transmission, social distancing is being encouraged, but measures should be taken to mitigate the negative impact on asthma.

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CONFLICTS OF INTEREST

The authors declare that they have no relevant conflicts of interest.

ETHICAL APPROVAL

The study protocol was approved by the Independent Ethics Committee of the Peking University Third Hospital (IRB00006761-M2020189).

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