Practice Pattern Survey for Paediatric Asthma in Nepal (SPAN)

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ABSTRACT

Background: In Nepal, asthma is one of the most prevalent diseases affecting children and is a leading contributor to childhood morbidity.

Objectives: We evaluated the current perceptions and experiences of pediatricians in Nepal regarding the diagnosis and management of pediatric asthma.

Methods: A questionnaire-supported, observation-based, cross-sectional survey was conducted digitally among paediatricians from Nepal who routinely manage patients ≤12 years of age with asthma. A total of 121 paediatricians from different practice settings participated in the survey.

Results: Of patients who visit paediatricians, 31.6% were under 5 years and 26.6% were between 5 and 12 years of age. 90.08% of paediatricians found an increasing trend in asthma cases in the last 5 years in Nepal. 64.46% of paediatricians agreed that dust and dust mites were the most common triggers. Diagnosis based solely on history and physical examination was used by 54.54% of paediatricians. 49.59% of paediatricians prioritized getting back to the normal routine as the criterion for achieving asthma control. 43% of paediatricians prescribed oral bronchodilators, 31.4% oral steroids, 54.5% only short-acting beta2-agonist (SABA), 66.1% combination of inhaled corticosteroids and long-acting beta2-agonist (ICS/LABA), 96.7% ICS/SABA, 46% only ICS, and 66.1% nebulization therapy to their patients with asthma. Nine out of 10 paediatricians agreed that an average of 34.01% of their patients were on add-on montelukast with inhalation therapy. Pressurized metered dose inhaler (pMDI) + spacer + facemask with bronchodilators was suggested by 63.63% of paediatricians to manage asthma attacks at home. The average adherence to inhalation therapy was 47.02%. During the first interaction, most paediatricians spent at least 15 minutes educating patients/parents about the disease and its treatment. 67.77% of paediatricians or their paramedics checked patients' inhalation techniques on every visit. Most paediatricians considered tear-off pads about asthma (46.3%) and videos on asthma for patients (31.4%) as the best tools that can increase patient awareness of asthma and inhalation therapy.

Conclusion: Only half of the participating paediatricians in Nepal follow the Global Initiative for Asthma (GINA) strategy reports to diagnose and manage their patients with asthma. pMDI + spacer with or without a face mask was the most preferred device. Patient education and awareness were critical, and most paediatricians educated their patients regularly.

Keywords: Paediatric asthma, inhalation therapy, morbidity

INTRODUCTION

Asthma is one of the most prevalent diseases affecting children in Nepal[1], contributing significantly to childhood morbidity and mortality, as evidenced by increased emergency department visits, hospitalizations, and school absenteeism[2,3]. Despite the high incidence, studies on paediatric asthma in Nepal are largely limited to hospital-based research[4]. The rising prevalence of asthma among children underscores the complexity of its management[1]. Paediatricians face ongoing challenges in treating asthma, as their approaches have evolved to incorporate new evidence and guidelines. However, barriers such as access to care, adherence to treatment, and environmental factors continue to complicate effective management[6].

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Asthma is a chronic inflammatory disorder of the airways. In susceptible individuals, this inflammation causes recurrent episodes of wheezing, breathlessness, and chest tightness. These episodes are associated with airway narrowing, resulting in airflow obstruction that can be reversed either spontaneously or with medication[5]. The global prevalence and severity of asthma have been on the rise[2], but data from Nepal, particularly regarding paediatric asthma, remains limited. Studies from neighboring India show a wide variation in asthma prevalence among schoolchildren, ranging from 4% to 19% across different geographic regions[3]. Various risk factors, including passive smoking, exposure to domestic animal allergens, poor ventilation, family history of asthma, the use of biomass fuel, and food allergies, have been investigated in relation to asthma development. A lack of appropriate treatment and follow-up, along with a knowledge gap between paediatricians and caregivers, may contribute to the underdiagnosis and undertreatment of asthma in many children in Nepal[7]. The growing industrialization in Nepal, particularly in rural areas, has introduced new socioeconomic factors, yet there is limited information on how these factors influence asthma prevalence. This study aimed to evaluate the current perceptions and experiences of the paediatricians in Nepal on the diagnosis and management of paediatric asthma.

METHODS

Study design and participants

This was a questionnaire-based, cross-sectional survey of pediatricians. The pediatricians from different geographies across Nepal were identified from various areas of practice, such as cities, towns, or rural areas. We employed purposive sampling to select pediatricians who specialize in respiratory care and routinely manage children aged 12 years or younger with asthma.

The survey protocol ensured the safety and confidentiality of the collected data, informed consent from participating pediatricians, and full transparency regarding the survey's design and its initiator. Participants were also given the freedom to withdraw from the study at any time. Consent for data sharing was obtained from the pediatricians prior to their participation, and additional consent was secured from the principal investigator. Figure 1 presents a detailed plan outlining the execution of the survey.

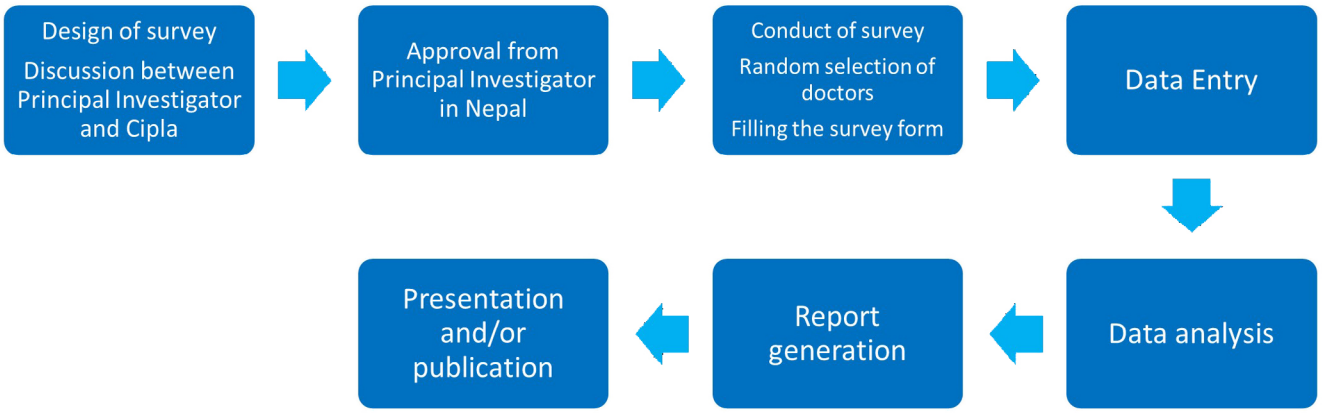

Figure 1: Plan depicting the execution of the survey

Questionnaire

The questionnaire (Appendix 1, Supplementary material) comprised 18 items organized into sections covering demographics, general information, diagnosis, and treatment practices. The format included multiple-choice questions, with some allowing respondents to select multiple options or provide answers using a 3-point Likert scale ranging from "always" to "never."

Survey administration

The survey was conducted in English and completed digitally by participating pediatricians. It was created using Microsoft Forms and distributed via a shared link. The survey period lasted one month, from January to February 2022. A total of 128 doctors responded, of which 7 submissions were excluded for not meeting the educational criteria required to be classified as a pediatrician. Data analysis was performed on the remaining 121 valid responses. Descriptive analysis was carried out using Microsoft Excel, including calculations, frequency distributions, and graphical representations. No statistical tests were conducted, and therefore no additional software was used. The survey was not sponsored, either financially or in any other form.

RESULTS

Out of the 121 participating paediatricians, 79.33% were from cities, and the remaining were practising in towns or rural areas. They were of an average age of 39 years and had a clinical practice experience of an average of 8 years.

Concerning the patients who visited paediatricians with asthma symptoms, an average of 31.6% were under 5 years of

age and 26.6% were between 5 and 12 years of age. According to 90.08% of the participating paediatricians, there had been an increasing trend in asthma cases in the last 5 years in Nepal.

Up to 64.46% of paediatricians agreed that dust and dust mites were the most common triggers. The rest of the paediatricians agreed that smoke and other factors (E.g. cold climate) were the trigger factors for asthma (Fig. 2).

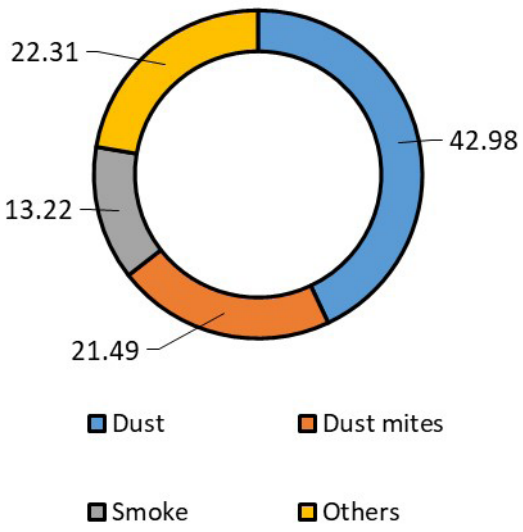

Figure 2: Most common trigger factor identifiers among children with asthma

Diagnosis based solely on history and physical examination was frequently used by 54.54% of paediatricians. A screening questionnaire (44.63%) and chest X-ray (25.62%) were also used as diagnostic plans for patients with asthma. Skin prick tests were never used by 62.81% of paediatricians (Fig. 3).

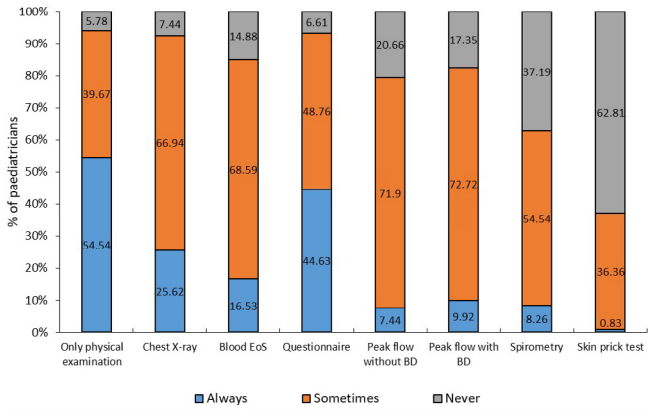

Figure 3: Frequency of utilising diagnostic plans for patients ≤12 years of age with asthma

Up to 49.59% of paediatricians prioritized getting back to the normal routine as the criterion for achieving 'control of asthma' in their patients. Minimizing symptoms, normalising the air flow rate, and enabling patients to cope with their symptoms were the lesser priorities (Fig. 4).

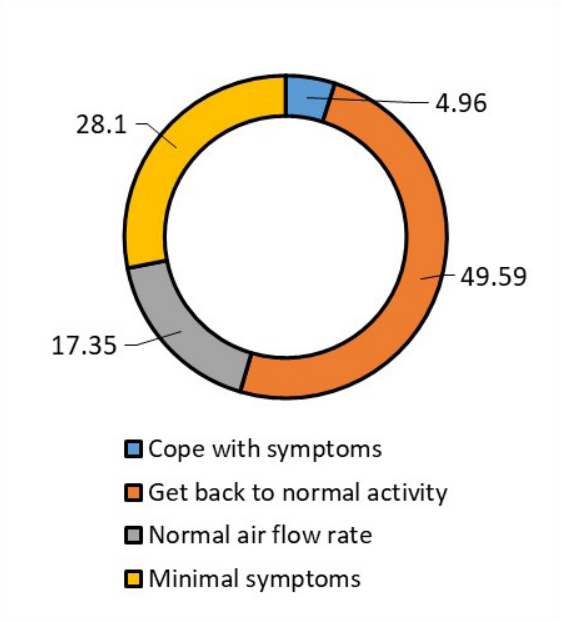

Figure 4: Criteria to prioritize that are most advised to patients for achieving 'control of asthma'

In their clinical practice, 43% of paediatricians prescribed oral bronchodilators, 31.4% oral steroids, 54.5% only inhaled short-acting beta2-agonist (SABA), 66.1% a combination of inhaled corticosteroids and long-acting beta2-agonist (ICS/LABA), 96.7% ICS+SABA, 46% only ICS, and 66.1% nebulization therapy to their patients with asthma (Fig. 5). As add-on therapy, 9 out of 10 paediatricians agree that an average of 34.01% of their patients were on montelukast along with inhalation therapy.

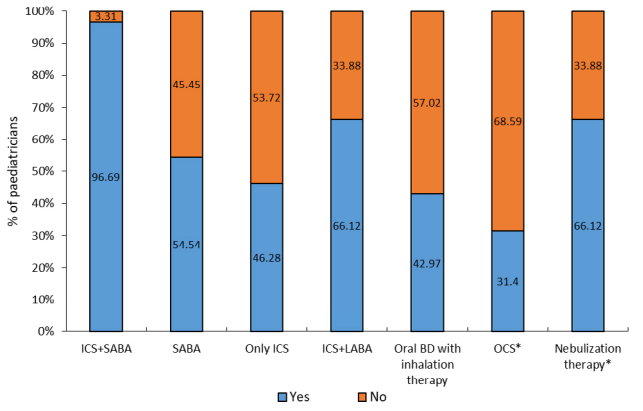

Figure 5: Frequency of utilizing pharmacotherapy for patients ≤12 years of age with asthma

A pMDI + spacer + face mask was advised the most by paediatricians (53.72%) to administer inhaled drugs in their patients ≤12 years with controlled asthma (Fig. 6). A pMDI + spacer + face mask with inhaled bronchodilator was suggested the most by paediatricians (63.63%) to their patients to preliminarily manage an asthma attack at home (Fig. 7).

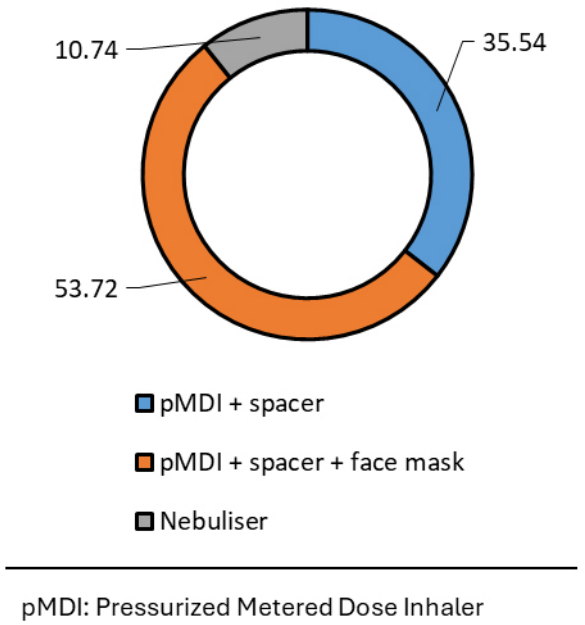

Figure 6: Most advised devices to administer inhaled drugs in children with controlled asthma

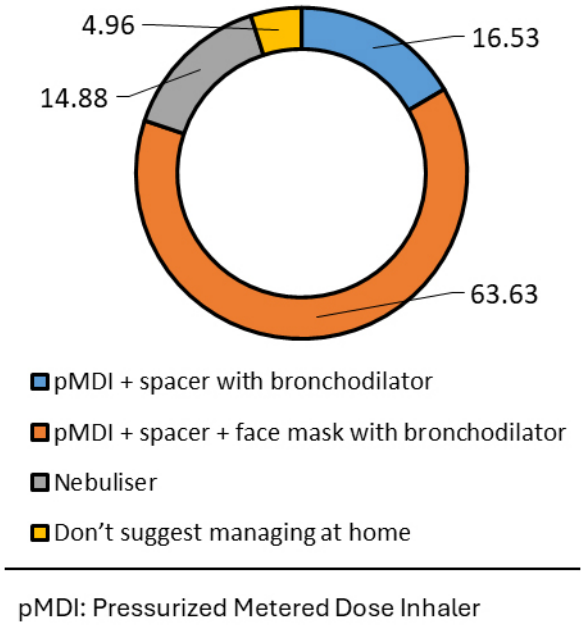

Figure 7: Most advised preliminary device to administer inhaled drugs to children at home with an asthma attack

Up to 55.37% of paediatricians advised their patients to keep a check on any increase in their asthma symptoms to recognise a life-threatening asthma attack at home. Other advice given was to check the weak response to inhaled bronchodilators (28.92%) and any decrease in the peak expiratory flow (PEF) meter reading at home (18.18%) (Fig. 8).

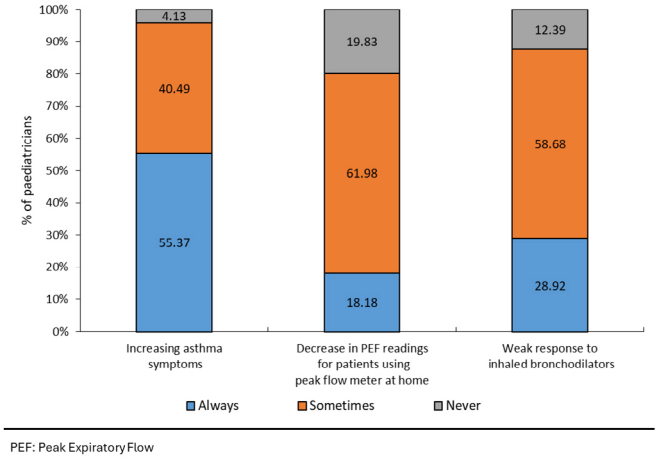

Figure 8: Frequency of advising patients on recognizing a life-threatening asthma attack at home

Adherence to prescribed inhalation therapy was seen, on average, among 47.02% of patients. During the first interaction, paediatricians spent an average of 15 minutes educating patients or their family members about the disease and its treatment.

Up to 67.77% of paediatricians or their paramedics checked the inhalation techniques of patients at every visit to ensure that they were using the inhalation devices correctly. On the other hand, 29.75% of them liked to check only when their patients came back with asthma symptoms (Fig. 9).

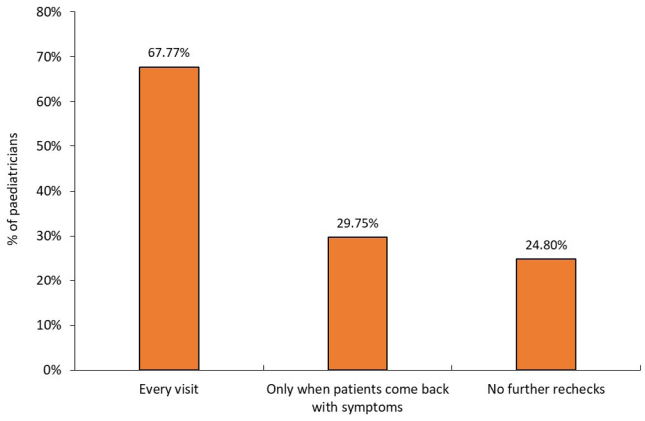

Figure 9: Frequency of checking (self or by paramedics) to ensure that patients are using inhalation devices correctly

Most paediatricians considered printed inputs (46.3%) and videos for patients (31.4%) as the best tools that could increase patient awareness of asthma and inhalation therapy.

DISCUSSION

Over the past forty years, childhood asthma has seen a significant rise in prevalence, morbidity, and mortality[3]. It is crucial to monitor asthma's frequency and severity globally and to implement new initiatives to reduce its burden[8]. Notably, 90.08% of paediatricians reported an increase in asthma cases over the last five years, underscoring a growing concern. This study describes the current perspectives and experiences of Nepalese paediatricians regarding asthma diagnosis and treatment.

The Air Quality Index (AQI) shows that Nepal's PM2.5 concentrations are now four times higher than the WHO's 24-hour air quality standard[9]. Kathmandu, where about 79% of the surveyed paediatricians are based, recorded the highest air pollution levels in Nepal. Paudel et al.'s analysis highlighted that western Nepal has a higher asthma prevalence, linked to factors like severely cold winters, polluted air, and contaminated river water[10]. In this study, paediatricians identified dust as the most common asthma trigger among their patients, with colder climates also contributing to symptoms. Dust mites were a common trigger for 64.46% of asthma patients aged 12 and below. Clinical studies indicated that the primary cause of childhood asthma is allergic disorders due to exposure to household dust mites and indoor allergens[11,12].

Diagnosing asthma in children remains challenging. The 2024 Global Initiative for Asthma (GINA) strategy recommends starting with a physical examination and detailed medical history, followed by diagnostic tools like peak flow meters or spirometers with reversibility testing[13]. Paediatricians in this study followed similar procedures, often using questionnaires. While spirometry was considered more reliable, peak flow meters were more commonly used. Chest X-rays were not routinely used in asthma diagnosis, though 25% of participants reported using them, possibly to explore alternative diagnoses[13,14].

Managing paediatric asthma is complex due to its variability in severity and control. The GINA 2024 strategy provides a detailed treatment plan based on asthma severity for children aged 6 to 11 years and those below 5 years. The preferred controller therapy was a combination of inhaled corticosteroids (ICS) and long-acting beta-agonists (LABA) or ICS with short-acting beta-agonists (SABA), with SABA used as a reliever[13,15]. Most paediatricians (96.7%) prescribed a combination of ICS and SABA. Moreover, although GINA discourages the use of oral bronchodilators, 43% of pediatricians in this study still prescribed them, possibly due to the lower cost of oral salbutamol compared to inhalers[6]. GINA also recommends using SABA only as a reliever and, if used as a controller in step 1 and 2 of asthma management for children aged 6 to 11, it should be combined with low-dose ICS[15]. Interestingly, almost 55% of paediatricians in this study preferred using only SABA for their asthma patients. A future strategy might involve replacing SABA monotherapy at GINA step 1 or 2 with a combination of ICS and a fast-acting beta-agonist to ensure patients receive an ICS dose whenever they need symptomatic relief. Low-dose oral corticosteroids are reserved as a last resort at step 5 for children aged 6 to 11, and only 31% of paediatricians in this study reported using those in some of their patients. In other words, about a third of paediatricians consulted at least some of very severe patients, this could be the reason of the high use of only SABA or oral bronchodilators for the management of asthma. The add-on montelukast, recommended by GINA for various asthma severity steps, was similarly preferred by 34% of participating paediatricians.

In this study, 53.72% of paediatricians recommended using a pressurized metered-dose inhaler (pMDI) combined with a spacer and face mask for patients under 12 years of age. Additionally, during acute asthma attacks managed at home, 63.63% of paediatricians recommended using a pMDI with a spacer and face mask along with an inhaled bronchodilator as the primary treatment method. This combination helps ensure effective medication delivery to the child's airways, especially for young children who have difficulty using an inhaler directly. Furthermore, 18.18% of paediatricians advised their patients to monitor their peak expiratory flow (PEF) at home to recognize potential life-threatening asthma attacks. Using a peak flow meter helps patients track changes in their lung function and identify early signs of worsening asthma.

The findings on patient education were also significant. Paediatricians spent an average of 15 minutes educating patients and their families during the first interaction, which is crucial for increasing adherence to the treatment plan[16]. Adherence to prescribed inhalation therapy remained inadequate, with only 47.02% of patients consistently following their treatment. This might be due to improper use of inhalation devices, highlighting the need for more frequent checks of inhalation techniqueswhich 67.77% of pediatricians already perform at every visit. The use of printed materials (46.3%) and videos (31.4%) by paediatricians to increase patient awareness is a promising step towards improving asthma management. Educational tools, along with other interactive methods, could further enhance patient adherence to the treatment protocol.

LIMITATIONS OF THE STUDY

This study included paediatricians from only a few cities in Nepal, limiting the generalizability of the results to the entire country. Additionally, the study design does not differentiate between the diagnosis and management of asthma in children aged 6 to 11 years and those aged 5 years and below. The findings are based on the perceptions and experiences of the

paediatricians regarding their patients. Including patients, caregivers or parents in the survey would have provided their perspective as well.

CONCLUSION

Only half of the participating paediatricians in Nepal adhered to the Global Initiative for Asthma (GINA) guidelines for diagnosing and managing asthma in their patients. Achieving 'control of asthma' and helping patients return to their normal routine life were concerns for half of the participants. The most preferred device was the pressurized metered-dose inhaler (pMDI) with a spacer, with or without a face mask. Patient education and awareness are critical, and most paediatricians regularly educate their patients. By investing significant time during the first encounter, paediatricians could improve the likelihood of adherence to inhalation therapy.

AUTHOR'S CONTRIBUTION

None

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AUTHORSHIP

The listed authors have all granted their consent for this version of the work to be published, accept responsibility for the integrity of the work, and satisfy the requirements set out by the International Committee of Medical Journal Editors (ICMJE) for authorship.

DISCLOSURES

Mr. Aniruddha Mukhopadhyay, Dr. Vaibhav Gaur, and Dr. Jaideep Gogtay are permanent employees of Cipla Ltd. Regarding this survey, Dr. Amrit Ghimire has nothing to reveal. None of the authors or participants received payment of any kind for carrying out or taking part in this study. The paper's writing and content are solely the authors' responsibility. The results of this study were first presented as posters at the ERS International Congress, Barcelona, Spain, from 4–6 September 2022.

ETHICS GUIDELINES

During the survey, no information about a specific patient was gathered, and no interventions were made. Ethics clearance is not needed for this project.

DATA AVAILABILITY STATEMENT

The corresponding author can provide the data sets created and/or analyzed during the current work upon reasonable request.

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