ORIGINAL RESEARCH REPORT

Profile of Bronchial Asthma Patients at a Pulmonary Outpatient Clinic of a Tertiary Hospital in Indonesia

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Article Info
Article history:
Received 24-11-2023
Revised 19-12-2023
Accepted 21-12-2023
Published 10-01-2024

Keywords:
Bronchial asthma
Quality of life
Therapy

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ABSTRACT

Background: Bronchial asthma is a common disease affecting the patient's quality of life and impacting daily life. The incidence of asthma is increasing in many countries around the world, although hospitalization and death rates due to asthma have decreased. **Objective**: This study aimed to explain the sociodemographic (age, sex, body mass index, smoking status) and clinical (comorbidities, subjective complaints, asthma control status, pharmacological therapy, and pharmaceutical step therapy) characteristics of bronchial asthma patients at the Pulmonary Outpatient Clinic of the Rumah Sakit Universitas Airlangga Hospital, Surabaya, Indonesia. **Material and Method**: An analytic observational study with retrospective cross-sectional research was conducted from December 2021 to January 2023 using secondary data in medical records with total sampling as the sampling technique. **Result**: From 70 cases, 35 patients made the three-times visits. The majority of these patients who met the inclusion criteria were female (78.6%), 50 to 59 years old (27.1%), had class 1 obese (38.6%), non-smokers (77.1%), and had no comorbidities (28.6%). On the first, second, and third visits, the patients had no subjective complaints, had well-maintained asthma status control, used controllers and relievers in the form of Budesonide-Formoterol, and did not receive additional therapy, had step therapy in the category of preferred controllers and relievers, steps 1–2. **Conclusion**: At Rumah Sakit Universitas Airlangga Hospital in Surabaya, Indonesia, most of the bronchial asthma patients were females aged 50-59 years. They were non-smokers, classified as obese class 1 without any subjective complaints, having well-controlled asthma by using controller and reliever steps 1-2, receiving Budesonide-Formoterol as the controller and reliever therapy without any additional treatment.

How to cite:
Hirmadiani, N.A., Rosyid, A.N., Utomo, B. 2024 Profile of Bronchial Asthma Patients at a Pulmonary Outpatient Clinic of a Tertiary Hospital in Indonesia. Majalah Biomorfologi-Biomorphology Journal, 34(1): 36-44.

Majalah Biomorfologi (Biomorphology Journal) p.ISSN:0215-8833, e.ISSN: 2716-0920
doi: 10.20473/mbiom.v34i1.2024.36-44

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Highlights

1. Budesonide-Formoterol was the most commonly prescribed medication for controlling and relieving symptoms in most individuals with bronchial asthma.
2. Most patients reported good control of their asthma, and most also reported no subjective problems.

BACKGROUND

Asthma is a common chronic respiratory disease affecting 1-18% of the population in different regions (Global Initiative for Asthma, 2019). Asthma causes persistent inflammation, leading to bronchial hyperactivity and constriction of the airways. Recurrent, episodic attacks define the symptoms of asthma. The symptoms encompass dyspnea, wheezing (an audible high-pitched sound during respiration), and thoracic constriction. Coughing predominantly manifests during the nocturnal or early morning hours (Minister of Health of The Republic of Indonesia, 2019; Sawitri, et al., 2023). Asthma incidence accounted for 20.8% of all chronic respiratory diseases. In 2019, there were 262 million cases of prevalence and 37 million cases of incidence; asthma-related fatalities amounted to 461 thousand cases (Global Health Metrics, 2020). In 2018, the asthma prevalence in Indonesia was 2.4%. Among males, it was 2.3%, while among females, it was 2.5%. Additionally, the prevalence of asthma tends to rise with age (Riskesdas, 2019).

Asthma has an impact on the quality of an individual's life. According to a case study, out of 134 individuals with bronchial asthma, 96 (71.4%) had a poor quality of life because of a variety of circumstances, including advanced age (≥40 years), obesity, having pets, female sex, and the severity of their asthma (Ali, et al., 2020).

Inappropriate and undiagnosed asthma treatment often occurs in developed countries, even though treatment facilities are easily accessible (The Indonesian Society of Respirology, 2006). Diagnosing bronchial asthma is quite complicated and requires a comprehensive study to determine trends in the profile of bronchial asthma patients, which prompted us to conduct this research.

OBJECTIVE

The general purpose of this research was to describe the profile of bronchial asthma patients at the Rumah Sakit Universitas Airlangga Hospital, Surabaya, Indonesia, pulmonary outpatient clinic from December 2021 to January 2023. The analysis focused on various factors, including age, gender, body mass index, smoking status, comorbidities, subjective complaints, asthma control status, pharmaceutical step therapy, and pharmacological therapy.

MATERIAL AND METHOD

This research was an analytical observational type with a retrospective cross-sectional design using internal secondary and medical record data. Patients with asthma who met the inclusion criteria and received treatment and control at the pulmonary outpatient clinic of Rumah Sakit Universitas Airlangga Hospital, Surabaya, Indonesia, between December 2021 and January 2023 comprised the population for this study. The inclusion criteria for this study were patients aged ≥20 years with bronchial asthma who met twice and three times visits, regardless of whether they had comorbidities or not. The exclusion criteria in this study were patients diagnosed with congestive heart failure, pulmonary tuberculosis, pneumonia, chronic obstructive pulmonary disease (COPD), and foreign bodies in the airways. The sample in this study was 70 patients who made two visits and 35 patients who made visits up to the third visit. In this research, a total sampling technique was used. Then, the collected data was processed into a table and graphic using the IBM SPSS Statistics for Windows, version 26.0 (IBM Corp., Armonk, N.Y., USA). Program and Microsoft Corporation (2016) Microsoft Excel. This study obtained ethical clearance from the Research Ethics Committee of The Rumah Sakit Universitas Airlangga Hospital, with the number UA-02-22138.

RESULT

According to the gender variable, 55 cases (78.6%) were female, whereas 15 cases (21.4%) were male. With 19 cases (27.1%), the majority of patients were between the ages of 50 and 59. In this study, 54 patients (77.1%) out of 70 patients with bronchial asthma were non-smokers, followed by passive smokers and ex-smokers, each with a percentage of 11.4%. Most bronchial asthma patients have a body mass index of obesity class 1 with a BMI value of 25-29.9, and the least were in the overweight category with a BMI value of 23-24.9. In this study, the patient's body mass index was classified following the World Health Organization classification of body mass index for adults of Asian race, namely underweight (BMI value < 18.5), normal range (BMI value 18.5-22.9), overweight with risk (BMI value 23 - 24.9), obesity 1 (BMI value 25 – 29.9) and obesity 2 (BMI value ≥ 30) (World Health Organization, 2000).

Table 1. Comorbidities distribution of bronchial asthma patients.

Comorbidities	Frequency (%)
Diabetes mellitus (DM)	3 (4.3%)
Obesity	17 (24.3%)
Anxiety/depression	2 (2.9%)
GERD	3 (4.3%)
Dyspepsia	2 (2.9%)
Hypertension	5 (7.1%)
DM dan obesity	5 (7.1%)
Obesity dan hypertension	9 (12.9%)
DM, hypertension, and obesity	1 (1.4%)
Obesity dan dyspepsia	2 (2.9%)
Obesity, dyspepsia dan hypertension	1 (1.4%)
No comorbidities	20 (28.6%)

From the data shown in Table 1, the majority of patients have no comorbidities, comprising 20 cases (28.6%), followed by obesity in 17 cases (24.3%) and obesity and hypertension in 9 cases (12.9%).

Table 2. Patients' distribution of subjective complaints on their first, second, and third visits for bronchial asthma.

Subjective complaints	Frequency (%)		
	1st visit	2nd visit	3rd visit
Dyspnea	5 (7.1%)	8 (11.4%)	-
Cough	11 (15.7%)	13 (18.6%)	2 (5.7%)
Dyspnea and cough	13 (18.6%)	7 (10%)	5 (14.3%)
Cough and chest tightness	-	1 (1.4%)	1 (2.9%)
Dyspnea and other complaint	3 (4.3%)	1 (1.4%)	-
Cough and other complaint	4 (5.7%)	2 (2.9%)	2 (5.7%)
Dyspnea, cough, and other complaint	4 (5.7%)	3 (4.3%)	2 (5.7%)
Another complaint	2 (2.9%)	5 (7.1%)	2 (5.7%)
No complaint	28 (40%)	30 (42.9%)	21 (60%)

The research data shown in Table 2 reveals that a significant proportion of patients, precisely 40% on the first visit, 42.9% on the second visit, and 60% on the third visit, did not report any subjective problems. The second and third most common subjective complaints at the first visit were shortness of breath and cough in 13 cases (18.6%) and cough only in 11 cases (15.7%). The second and third most common subjective complaints at the second visit were coughing in 13 cases (18.6%) and dyspnea in 8 cases (11.4%). The second highest prevalence at the third visit was dyspnea and cough in 5 cases (14.3%). Other complaints found in the patients were fever, sore throat, runny nose, heavy breathing, and headaches.

Table 3. Asthma control status distribution of bronchial asthma patients.

Asthma control status	Frequency (%)		
	1st visit	2nd visit	3rd visit
Scores of 5-15 (Uncontrolled)	10 (14.3%)	7 (10%)	2 (5.7%)
Scores of 16-19 (Partly-controlled)	12 (17.1%)	7 (10%)	6 (17.1%)
Scores of 20-25 (Well-controlled)	48 (68.6%)	56 (80%)	27 (77.1%)

Based on Table 3, data obtained from the first, second, and third visits showed that the highest asthma control status was well-controlled asthma, with respective percentages of 68.6%, 80%, and 77.1%. Asthma control status rarely found in patients was uncontrolled asthma, with 10 cases at the first visit, 7 cases at the second visit, and 2 cases at the third visit.

Table 4. Pharmaceutical step therapy on first, second, and third visit distribution of bronchial asthma patients.

Pharmaceutical step therapy	Frequency (%)		
	1st Visit	2nd Visit	3rd Visit
Preferred controller and reliever steps 1-2	21 (30%)	20 (28.6%)	16 (45.7%)
Preferred controller and reliever step 3	5 (7.1%)	7 (10%)	2 (5.7%)
Preferred controller and reliever step 4	7 (10%)	7 (10%)	3 (8.6%)
Preferred controller and reliever step 5	1 (1.4%)	2 (2.9%)	3 (8.6%)
Alternative controller and reliever step 3	19 (27.1%)	17 (24.3%)	8 (22.9%)
Alternative controller and reliever step 4	15 (21.4%)	13 (18.6%)	2 (5.7%)
Alternative controller and reliever step 5	-	1 (1.4%)	-
It cannot be categorized	2 (2.9%)	3 (4.3%)	1 (2.9%)

It was found that the highest distribution of pharmaceutical step therapy at the first visit was in the preferred controller and reliever steps 1-2 in 21 cases, at the second visit, the highest distribution of pharmaceutical step therapy was in the preferred controller and reliever step 1-2 in 20 cases and at the third visit the highest distribution of pharmaceutical step therapy was also in the preferred controller and reliever step 1-2 in 16 cases.

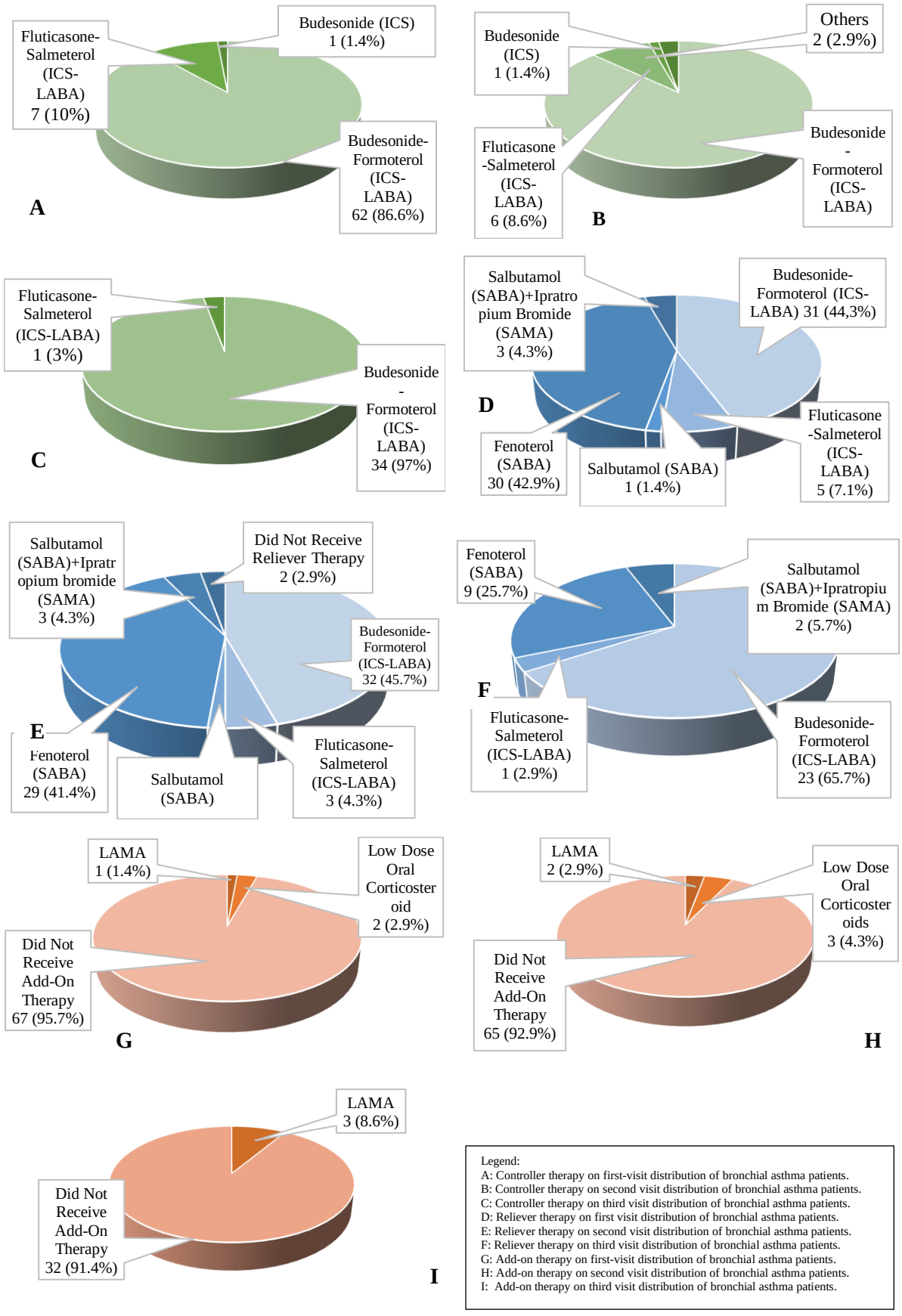

Figure 1. Pharmacological therapy distribution of bronchial asthma patients.

Figures 1 A, B, and C indicate that Budesonide-Formoterol was the predominant controller therapy throughout the first, second, and third visits, with respective percentages of 88.6%, 87.1%, and 97.1%. According to Figures 1 D, E, and F, the predominant treatment used by patients during their first, second, and third visits was Budesonide-Formoterol, with respective percentages of 44.3%, 45.7%, and 65.7%. Consequently, in Figures 1 G, H, and I, it can be seen that the majority of the patients did not obtain supplementary treatment during their first, second, and third visits, with 67, 65, and 32 cases, respectively.

DISCUSSION

This study revealed that the age group with the greatest number of cases (27.1%) was 50-59, with 19 cases. Furthermore, the prevalence of bronchial asthma increased with age until the age of 59. Differences in findings were observed between the pulmonary outpatient clinics affiliated with Rumah Sakit Universitas Airlangga Hospital and RSU Haji Surabaya. The age group comprising the most significant proportion of participants, 46.2% and 79.5%, respectively, was 46-60 years (Nur, et al., 2019). In a study conducted in Poland, it was discovered that most bronchial asthma patients belonged to the 56-65 age group. Furthermore, the data from this study revealed that the number of individuals suffering from bronchial asthma grew with age up to 65 years (Banasiak & Pawliczak, 2020).

According to our data, most patients were females, found in 55 cases (78.6%). This is comparable to studies done in the pulmonary outpatient clinics at RSU Haji Surabaya and Rumah Sakit Universitas Airlangga Hospital, where females made up the majority of the patient population (74.4% and 69.2%, respectively) (Nur, et al., 2019). This was also supported by a study using a cohort method conducted in Paris which found that among adults aged >35 years, 20% higher asthma cases occurred in females compared to males, and that female gender constituted an independent risk factor for non-allergic asthma (Colombo, et al., 2019). In the category of adult-onset asthma or late-onset asthma, sex hormones in women is a risk factor apart from exposure to irritants in the workplace, pollutants, active and passive exposure to cigarettes, stress, and others (Yudhawati & Krisdanti, 2019).

Based on smoking status distribution data, it was found that the majority of patients were non-smokers, with 54 cases (77.1%). This was similar to a cross-sectional study conducted in ten primary healthcare centers located in Surabaya, which also obtained data showing that the majority of respondents in 33 cases (63.5%) did not smoke (Sari, 2018). Several studies also indicated that excessive irritant levels, primarily from tobacco smoke, which is linked to inflammatory processes, may be the cause of inadequate asthma control (Ndarukwa,et al., 2020).

The category with the highest frequency, as determined by body mass index distribution data, was level 1 obesity, which accounted for 27 cases (or 38.6%). This was comparable to findings from a study conducted in Poland, which indicated that 43.3% of individuals with bronchial asthma had a body mass index between 25 and 29.9 (level 1 obesity) (Banasiak & Pawliczak, 2020). This phenomenon can be elucidated by the association between asthma and obesity, posited by a particular theory. According to this theory, individuals with asthma tend to curtail their physical activities due to apprehension of triggering a relapse of the condition. Consequently, their sedentary lifestyle leads to an elevated susceptibility to obesity (Andriani, et al., 2019). Most of the body mass index data in this study can also be explained by other research that shows that there is a correlation between an increase in the incidence of asthma in obese people and an increase in a person's body mass index and the incidence of asthma in obese people (Berawi & Ningrum, 2017). In obese patients, increased normal function of adipose tissue leads to a systemic proinflammatory state that increases the concentration of some cytokines, chemokines, and soluble fractions of receptors (Andayani, 2017).

Based on comorbid distribution data, it was shown that the majority of the patients (28.6%) did not have comorbidities. The research conducted at Chitungwiza Hospital in Zimbabwe yielded different results. The patients' common comorbidities include diabetes mellitus (DM), HIV/AIDS, chronic kidney failure, chronic obstructive pulmonary disease (COPD), coronary heart disease (CHD), and gastric disease. mental illness, sinusitis, TB, reflux disease (GERD), and hypertension. Research conducted in Zimbabwe also found that the comorbidities of the asthma patient population at Chitungwiza Hospital in Zimbabwe impacted asthma control (Ndarukwa, et al., 2020).

Based on subjective complaint data, it was found that the majority of patients had no complaints, with

28 cases (40%) on the first visit, 30 cases (42.9%) on the second visit, and 21 cases (60%) on the third visit. In contrast, findings from a study conducted in Iran revealed that nighttime wheezing (27.4%) and dyspnea (19.6%) were the most frequently reported subjective complaints (Sharifi, et al., 2019).

In this study, data on the highest frequency of asthma control status at the first, second, and third visits was well-controlled asthma with respective percentages of 68.6%, 80%, and 77.1%. These results were similar to research conducted in Lampung, Indonesia which showed that the most significant percentage was in the controlled asthma group (64.3%), and the study also concluded that good asthma control status was related to compliance among patients on therapy (Soemarwoto, et al., 2020). Research conducted in Aceh, Indonesia, stated that there was a relationship between the level of control of asthma patients and the level of knowledge of asthma patients. A patient with controlled asthma is more likely to have a comprehensive understanding of the symptoms that manifest, inciting factors for asthma, mechanisms underlying asthma, and the proper administration of medication (Andayani, 2017). There was a correlation between the patient's asthma control status and the patient's regularity in taking inhalers, and irregular use of inhalers can generate uncontrolled asthma control test (ACT) outcomes (Fadzila, et al., 2018).

In this study, it was found that the highest frequency of controller therapy was Budesonide-Formoterol, with 62 cases (86.6%) at the first visit, 61 cases (87.1%) at the second visit, and 34 cases (97%) at the third visit. The reliever therapy with the highest frequency was Budesonide-Formoterol, with 31 cases (41.3%) at the first visit, 32 cases (45.7%) at the second visit, and 23 cases (65.7%) at the third visit. Based on additional therapy data, it was found that the majority of patients did not receive additional therapy, with 67 cases (95.7%) at the first visit, 65 cases (92.9%) at the second visit, and 32 cases (91.4%) at the third visit. This is supported by a statement that the recommended controller therapy for asthma patients is inhaled corticosteroids (ICS) and a combination of ICS with LABA (long-acting β2 agonist) and the use of LABA therapy in combination with ICS is aimed at achieving good asthma control (Kam, et al., 2021). The use of low-dose ICS/formoterol as a reliever and controller therapy is recommended by the Global Initiative for Asthma (GINA). Patients only need to use one type of inhaler for this therapy, so this can make things easier for patients and overcome the problem of deficiencies in using ICS and dependence on using SABA. This therapeutic strategy is also useful when the patient requires reliever therapy because the patient receives ICS and rapid-onset bronchodilators to overcome inflammation when the patient experiences worsening symptoms (Senapathi, 2018; Papi, et al., 2020).

Strength and limitations

The strength of this study was that it included a number of characteristics rarely discussed in other studies. The theoretical benefit of this research was to make this research a reference and a basis that can be used for future research related to bronchial asthma, and the practical benefit of this research is that it makes it easier for medical personnel to recognize asthma patients and makes the management more effortless. Due to the fact that this study relied on secondary sources of information, the data could not be significantly enlarged. From this research data, we suggest that clinicians need to continuously evaluate the body mass index level of asthma patients at the Rumah Sakit Universitas Airlangga Hospital pulmonary outpatient clinic because class 1 obesity is still a major factor that can affect the patient's asthma control status.

CONCLUSION

The majority of bronchial asthma patients at Rumah Sakit Universitas Airlangga Hospital in Surabaya, Indonesia, were females between the ages of 50 and 59. They were non-smokers, obese class 1 patients with no subjective complaints, whose asthma was well-controlled using controller and reliever steps 1-2, and who were administered with Budesonide-Formoterol as controller and reliever therapy without any other treatment.

Acknowledgment
The authors would like to thank the board of directors and staff of Rumah Sakit Universitas Airlangga Hospital's ethics committee health research and medical records for their assistance in conducting this study.

Conflict of Interest
All authors have no conflict of interest.

Ethic Consideration
This study received ethical clearance from the Rumah Sakit Universitas Airlangga Hospital Research Ethics Committee with protocol number UA-02-22138 on 20-10-2022.

Funding Disclosure
None.

Author Contribution
Designed the study and drafted the manuscript: NAH, ANR, and BU. Collected data and performed background literature review: NAH and ANR. Performed statistical analysis: NAH. Supervised results and discussion: ANR and BU.

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