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The Profile of Patients with Allergic Rhinitis Before and During the Covid-19 Pandemic

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ABSTRACT

Background: Allergic rhinitis is an inflammatory reaction of the nasal mucosa mediated by IgE after exposure to an allergen as an immunological response, with classical symptoms such as a runny nose, sneezing, stuffy nose, nasal itching, red and watery eyes, and discomfort at the hard palate. The number of patients with allergic rhinitis who came to the hospital during the COVID-19 pandemic was affected by the increasing number of cases. The number of patients from March 2018 to February 2020 was 234, while the number of people from March 2020 to February 2022 was 59.

Objective: To identify the profile of patients with allergic rhinitis.

Methods: This research is a retrospective descriptive study using secondary data from medical records. The study population was patients with allergic rhinitis who visited the Allergy-Immunology Division of ORL-HNS outpatient department, Dr. Soetomo General Hospital, Surabaya, from March 2018 to February 2022.

Results: There were a total of 357 people, but only 293 people were included in the research inclusion and exclusion criteria, with the distribution of female patients was 40.96%, the age group of 20-59 years, at 49.49%, and the highest distribution of jobs was entrepreneurs, at 24.23%. The most common symptoms were a runny nose at 24.69%, the most quantitative Total Nasal Symptom Score moderate (5-8) at 47.44%, and the highest moderate-severe persistent classification at 33.79%.

Conclusion: The results showed that there was no significant relationship between age and Total Nasal Symptom Score of the patients, and there is a significant relationship between gender, jobs, clinical symptoms, and classification of allergic rhinitis according to ARIA-WHO of patients who arrived before and during the COVID-19 pandemic.

Keywords: *Allergic rhinitis, Total Nasal Symptom Score, COVID-19, pandemic*

1. INTRODUCTION

Allergic rhinitis (AR), based on Allergic Rhinitis and Its Impact on Asthma-World Health Organization (ARIA-WHO), is an inflammatory reaction of the nasal mucosa mediated by immunoglobulin E (IgE) after exposure to allergens as an immunological response. It is characterized by symptoms of a runny nose, sneezing, stuffy nose, itching in the nose, red and watery eyes, or discomfort in the palate. This disease can disrupt daily activities such as school, job, and sleep, interfering with the patient's quality of life.

Several studies state that the prevalence of AR increases progressively in developed countries and is currently growing rapidly in developing countries, especially Indonesia. According to a European Community Respiratory Health (ECRH) survey in 2018, it is estimated that around 10 to 30% of the adult population and 40% of the population of children and adolescents worldwide are diagnosed with AR. Allergic rhinitis can occur at any age, but the highest frequency of AR is found in adulthood and has appeared since childhood.

The diagnosis of AR is based on anamnesis, physical examination, and supportive examination. The degree of severity of

symptoms in patients with AR can be measured using the Total Nasal Symptom Score (TNSS). According to Mygind et al. (2014), TNSS is the total score of nasal symptoms and does not include non-nasal symptoms. The assessment score given is in the form of a score of 0–3 (0: no symptoms or signs; 1: mild, not disturbing; 2: moderate, symptoms and signs clear, disturbing, still tolerable; 3: severe, symptoms and signs challenging to tolerate). [2]

Coronavirus Disease-2019 (COVID-19) has become a pandemic throughout the world. The first case in Indonesia was discovered in March 2020. Clinical symptoms that appeared in people suspected of having COVID-19 included cough, runny nose, stuffy nose, reduced sense of smell, and shortness of breath, which can lead to death. To date, approximately 5 million cases have been found in Indonesia, with the highest number of new cases being 4,000 cases per day in 2020. This increasing number of COVID-19 cases has affected the number of visits to the hospital. There were 234 patient visits to the Allergy-Immunology Division of ORL-HNS outpatient department, Dr. Soetomo General Academic Hospital, Surabaya, from March 2018 to February 2020. The number of visits decreased from March 2020 to February 2022, to 59 people. [4-5]

This study aimed to determine the profile of AR patients who attended the ORL-HNS outpatient department at Dr. Soetomo General Academic Hospital, Surabaya, before and during the COVID-19 pandemic.

2. METHODS

This retrospective descriptive study used secondary data from medical records. The study population was patients diagnosed with AR who visited the Allergy-Immunology Division of the ORL-HNS outpatient department at Dr. Soetomo General Academic Hospital, Surabaya, from March 2018 to February 2022. The research samples were taken from the study population that met the inclusion and exclusion criteria. Inclusion criteria were patients who had been diagnosed with AR with positive skin prick test results, and had a complete medical record (MR), which included identity, MR number, age, gender, occupation, clinical symptoms, diagnosis according to the ARIA-WHO classification, and met the criteria for the Total Nasal Symptom Score (TNSS). The inclusion criteria in this study based on the date of the patient's visit to the ORL-HNS outpatient department at Dr. Soetomo General Academic Hospital Surabaya in the period before the COVID-19 pandemic, which ranged from March 1, 2018 to February 28, 2020, and the period during the COVID-19 pandemic, which ranged from March 1, 2020 to February 28, 2022.

Exclusion criteria in this study were patients with incomplete medical records and non-allergic rhinitis patients. Secondary data collection was present in Microsoft Excel in tabular form and then processed in an observational-descriptive manner using the IBM SPSS Statistics application version 23. All data indicating patient identity was abbreviated for confidentiality.

This research has received ethical approval from the Health Research Ethics Committee of Dr. Soetomo General Academic Hospital Surabaya before taking and processing medical record data on August 22, 2022, with Ref No. 1009/LOE/301.4.2/VIII/2022 (Attachment).

3. RESULT

The data results from collecting medical records of AR patients who visited ORL-HNS Outpatient Department Dr. Soetomo General Hospital Surabaya from March 1, 2018, to February 28, 2022 show that 357 people visited, but only 293 met the research inclusion and exclusion criteria.

Table 1 Profile of allergic rhinitis patients based on sex, age and occupation

Profile of AR patients	**Criteria**				**Amount**		Statistic analysis	
	Before pandemic		**During pandemic**					
	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	X^2	p-value
Sex								
Male	114	48,72	24	40,68	138	47,10	1,22	0,009*
Female	120	51,28	35	59,32	155	52,90		
Total	234	100,00	59	100,00	293	100,00		
Age								
1-19	66	28,21	15	25,42	81	27,65	0,81	0,07
20-59	145	61,97	42	71,19	187	63,82		

≥60	23	9,83	2	3,39	25	8,53		
Total	234	100,00	59	100,00	293	100,00		
Occupation								
Entrepreneurs Housewive Student Colleges student Retired Government-employee Teacher Unempeloyee	71 32 58 34 8 13 13 5	30,34 13,68 24,79 14,53 3,42 5,56 5,56 2,14	21 4 15 12 1 4 2 0	35,59 6,78 25,42 20,34 1,69 6,78 3,39 0,00	92 36 73 46 9 17 15 5	31,40 12,29 24,91 15,70 3,07 5,80 5,12 1,71	5,52	0,004*
Total	234	100,00	59	100,00	293	100,00		

* p value <0.05 was declared significant

Table 1 shows the profile of AR patients based on sex, age, and occupation before and during the COVID-19 pandemic. Female patients came to visit before the pandemic more than male patients. There were 120 female patients (51.28%) and 114 male patients (48.72%). Female patients came more frequently to visit during the pandemic than males. There were 35 female patients (59.32%) and 24 male patients (40.68%). Based on the results of statistical calculations, there was a significant difference between gender and the number of AR patients who visited before and during the COVID-19 pandemic, as demonstrated by the result p = 0.009 (p<0.05).

Most patients who came to visit before the pandemic were in the 20–59 age group, namely 145 (61.97%), while the fewest were in the age group ≥60 years, namely 23 (9.83%). Patients who came to visit during the pandemic were mainly in the 20–59 age group, with 42 people (71.19%), while the least was in the ≥60 age group, with two people (3.39%). The statistical calculations showed no significant difference between age and the number of AR patients who visited before and during the COVID-19 pandemic, as demonstrated by the result p = 0.07 (p > 0.05).

Entrepreneurs were the type of jobers that visited the most before the pandemic, namely as many as 71 people (30.34%), while the group that was unemployed the least was 5 people (2.14%). Entrepreneurs had the most to come to visit during the pandemic, with 21 (35.59%), while those who did not have a job were 0 (0%). Based on the results of statistical calculations, the results showed a significant difference between the type of job and the number of AR patients who visited before and during the COVID-19 pandemic, as shown by the result, p=0.04 (p<0.05).

Table 2 Characteristic of allergic rhinitis patients based on clinical symptom

Clinical Symptom	**Criteria**				**Amount**		**Statistic analysis**	
	Before pandemic		**During pandemic**					
	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	X^2	p-value
Sneezing	207	88,46	11	18,64	218	24,25	28,07	<0,001*
Stuffy nose	211	90,17	38	64,41	249	27,70		
Runny nose	222	94,87	10	16,95	232	25,81		
Itchy nose	190	81,20	10	16,95	200	22,25		

* p value <0.05 was declared significant

Table 2 shows the distribution of clinical symptoms of AR patients before and during the COVID-19 pandemic. Patients generally come with more than 1 symptom, which makes patients come to the hospital for treatment. Patients who came before the pandemic with the most complaints of a runny nose, namely 222 people (94.87%). Patients who came during the pandemic with the most complaints of stuffy noses were 38 people (64.41%).

Based on the statistical calculations, the results showed a significant difference between clinical symptoms and the number of AR patients who visited before and during the COVID-19 pandemic, as shown by the results of p<0.001 (p<0.05).

Table 3. Characteristic of allergic rhinitis patients based on *Total Nasal Symptom Score* (TNSS)

TNSS	**Criteria**				**Amount**		**Statistic analysis**	
	Before pandemic		**During pandemic**					
	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	X^2	p-value
1-4 (Mild)	40	17,09	12	20,34	52	17,75	2,87	0,08
5-8 (Moderate)	139	59,40	28	47,46	167	57,00		
9-12 (Severe)	55	23,50	19	32,20	74	25,26		
Total	234	100,00	59	100,00	293	100,00		

* p value <0.05 was declared significant

Table 3 shows the Total Nasal Symptom Score (TNSS) distribution of AR patients before and during the COVID-19 pandemic. Patients who came before the pandemic with the highest number of TNSS were moderate (5-8), 139 people (59.40%), and the least number of mild TNSS (1-4) were 40 people (17.09%). Patients who came during the pandemic with the highest number of TNSS were moderate (5-8), 28 people (47.46%), and the least number of mild TNSS (1-4) were 12 people (20.34%).

The results of statistical calculations showed that there was no significant difference between the TNSS and the number of AR patients who visited before and during the COVID-19 pandemic, as shown by the result p=0.08 (p>0.05).

Table 4. Characteristic of allergic rhinitis patients based on RA classification according to ARIA-WHO

AR Classification	**Criteria**				**Amount**		**Statistic analysis**	
	Before pandemic		**During pandemic**					
	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	Amount (n)	Presentation (%)	X^2	p-value
Mild Intermittent	46	19,66	6	10,17	52	17,75	10,38	0,009*
Moderate-Severe Intermittent	47	20,09	5	8,47	52	17,75		
Mild Persistent	42	17,95	18	30,51	60	20,47		
Moderate-Severe Persistent	99	42,31	30	50,85	129	44,03		
Total	234	100,00	59	100,00	293	100,00		

* p value <0.05 was declared significant

The table 4 shows the distribution of RA classification according to ARIA-WHO in RA patients before and during the COVID-19 pandemic. The classification of moderate to severe persistent AR was the most common AR classification before the pandemic, namely 99 people (42.31%), while the least was the mild persistent classification of 42 people (17.95%). The classification of moderate to severe persistent AR is also the classification of AR that most often comes during pandemic,

namely 30 people (50.85%), while the least is the moderate-severe intermittent classification of 5 people (8.47%).

Based on the results of statistical calculations, it was found that there was a significant difference between RA classification according to ARIA-WHO and the number of AR patients who visited before and during the COVID-19 pandemic, as shown by the result p=0.009 (p<0.05).

4. DISCUSSION

Medical record data of AR patients who visited the ORL HNS outpatient department division of allergy-immunology at Dr. Soetomo General Hospital, Surabaya, were obtained, and 357 medical records were obtained. Still, only 293 medical record data met the inclusion and exclusion criteria. Over a span of four years, including 2 years before and 2 years during the pandemic, there were 234 AR patients (79.86%) in the pre-pandemic period and 59 AR patients (20.14%) during the pandemic. The decrease in the number of patient visits is because the hospital, as a health service center, is a place that has a high risk for doctors and patients during a pandemic. This high risk occurs because the transmission of COVID-19 in health facilities is relatively high. This can occur due to a lack of public awareness about good and correct health protocols, such as wearing the proper mask, washing hands, and maintaining distance. Another causative factor is the existence of several medical procedures that cause the spread of the COVID-19 infection due to droplet transmission. The government suggests that staying at home during a pandemic and feeling fear about coming to the hospital are also causes of delays in patients ' treatment. [5,7]

Female patients who came before the COVID-19 pandemic were found to be more than men, with a number and percentage of 120 people (51.28%) for women and 114 people (48.72%) for men. Female gender was also more prevalent during the pandemic, namely as many as 35 people (59.32%) and 24 men (40.68%). From Table 1, it can be concluded that there was no difference in sex distribution before and during the pandemic. These results are from the study of Yang et al. (2021), which examined the characteristics of AR patients during the COVID-19 pandemic between January 2020 and May 2020 and found that there was no significant difference in the prevalence of AR between male and female sexes during the COVID-19 pandemic. [6,8]

Patients in the age group of 20 to 59 years were the most affected before the pandemic, with 145 patients (61.97%), while the least affected age group was the age group >60 years, with 23 people (9.83%). The age group of 20 to 59 years was also the largest during the pandemic, with 42 people (71.19%), while the age group above 60 years was the least, with two people (3.39%). The youngest age diagnosed with RA is 7 years, while the oldest is 78 years. These results are from a study by Yang et al., which examined the characteristics of AR patients during the COVID-19 pandemic between January 2020 and May 2020 and found that the age group of 20–59 years is the age group with a high risk factor for suffering from AR. Most of this age group is the productive age group, which is more often outside the home and has environments with high temperatures and humidity, such as job environments and dusty public places with poor room ventilation. [6,8]

The most common type of job for AR patients before the pandemic was entrepreneurs, with 71 people (30.34%), while the fewest were not working, as few as 5 people (2.14%). Entrepreneurs had the highest number of patients during the pandemic, with 21 people (35.59%), and patients who did not have a job were the least common type of job found during the pandemic, namely 0 (0%). The kind of job of entrepreneurs with AR in this study is not known more specifically. According to Dobashi K et al., 2020, that type of job does not directly affect the AR incidence rate. Environmental factors such as working in a room with unhealthy ventilation and frequent exposure to pollutant allergens are said to be contributors to the incidence of AR. [9-11]

Patients who came to the ORL-HNS outpatient department with symptoms of AR generally have more than one complaint, in the form of nasal symptoms, including a runny nose, sneezing, an itchy nose, and a stuffy nose. Meanwhile, non-nasal symptoms are symptoms of itchy ears, palate, and throat, and itchy, red, and watery eyes. Clinical symptoms of patients with RA before the pandemic included the most complaints of runny noses, namely 222 people (94.87%), 211 people with nasal congestion (90.17%), 207 people with sneezing (88.46%), and an itchy nose in as many as 190 people (81.20%). According to Kalmardzi et al., in their journal, which examined the impact of RA on the quality of life of patients in Iran in 2017, of the 146 samples studied, 118 experienced sneezing as the most common symptom.

Patients who came during the pandemic with the most complaints of stuffy nose, namely as many as 38 people (64.41%), complaints of sneezing, as many as 11 people (18.64%), and complaints of runny nose and itchy nose, each as many as 10 people (16.95%). This is from research that was conducted by Pérez-Herrera et al., in Bogota, Colombia, on 318 people diagnosed with RA during the COVID-19 lockdown in Bogota from March to May 2020. The results showed that 38% of patients experienced worsening clinical symptoms, and 69.6% experienced nasal obstruction symptoms. Nasal congestion is the most common symptom that makes RA patients come to the ORL outpatient department. This can be caused by the disruption of the patient's daily activities.

The highest total nasal symptom score before the pandemic was a moderate total score (5-8) with a total of 139 (59.40%), while the lowest total score was mild (1-4) with a total of 40 (17.09%). Moderate total scores (5-8) were also the most

common during the pandemic, namely 28 people (47.46%), and mild (1-4), for a total of 12 people (20.34%). The Total Nasal Symptom Score is used to assess the degree of severity of RA and non-RA. Evaluate the symptoms with a minimum score of 0 and a maximum score of 12, then calculate the score by adding the score for each nasal symptom and dividing it into 4 ranges of severity: 0 = no symptoms, 1-4 = mild symptoms, 5-8 = moderate symptoms, and 9-12 = severe symptoms. This follows research conducted by Tham et al. (2022), which showed no difference in the total score of the TNSS before and during the pandemic. [15-16]

Tham conducted a study of 68 people before the implementation of the COVID-19 lockdown period in Singapore from January to March 2020 and found that 30% of patients experienced worsening symptoms, with moderate scores (5-8). During the pandemic, from April to June 2020, 25% of RA patients experienced worsening symptoms, with moderate scores (5-8). This worsening of symptoms was assessed by increasing the score before and during the pandemic. Factors that can reduce the deterioration of symptoms during this lockdown period are reduced exposure to allergens outside the home, increased time for patients to rest, and increased patient attention to find out about treatment without leaving the house. [15-16]

The classification of AR according to ARIA-WHO was found before the pandemic, with the most moderate-severe persistent classification total of 99 (42.31%), while the least was in the mild persistent classification of 42 (17.95%). AR classification according to ARIA-WHO was found during the pandemic, with a moderate-severe persistent classification at most, with 30 (50.85%), while the least was in the moderate-severe intermittent classification, with 5 (8.47%). This was studied by Jung Sungsu et al. (2019) in their article, which said that the moderate-severe persistent RA phenotype had quite a high number of cases compared to other RA phenotypes, such as mild persistent, mild intermittent, and moderate-severe intermittent. [17-18]

The ARIA-WHO consensus in 2020 classifies RA based on impaired quality of life into mild and moderate-severe categories: mild if the disturbance experienced does not interfere with the sufferer's daily activities and moderate-severe if it interferes with daily activities. According to ARIA-WHO, based on time, classification is divided into intermittent and persistent. Intermittent criteria if symptoms are felt for less than 4 days a week or last less than 4 weeks, while persistent criteria if symptoms are felt for more than 4 days in 1 week and last for more than 4 weeks [1,17]

According to Dayal et al., in their study in India, there was a trend of decreasing AR cases based on phenotype before the pandemic for the January–March 2020 period, and during the April–June 2020 pandemic, the most AR phenotype results before and during the pandemic were mildly persistent, with a decrease in the number of cases by 86%, but no significant percentage difference was found compared to other AR phenotypes. The decline in cases with a mild persistent phenotype was due to the implementation of the lockdown at the start of the pandemic. This lockdown period can reduce the possibility of AR patients being exposed to pollutant allergens, which can increase disease morbidity if more patients are indoors. [17,19]

SThe results of the statistical analysis indicated that there was no significant difference between the age and TNSS scores of AR patients who arrived before and during the COVID-19 pandemic. However, there are significant differences between gender, type of job, clinical symptoms, and RA classification according to the ARIA-WHO classification of RA patients who arrived before and during the COVID-19 pandemic.

5. CONCLUSION

In this study, the profile of allergic rhinitis patients visiting the Outpatient Unit, Ear, Nose, Throat, Head, and Neck Surgery, Dr. Soetomo, Allergy-Immunology Division, numbered 293 people. The distribution of female sex is more numerous in the age group 20–59 years, the most, and the type of entrepreneurs' job is found most in people with RA. Symptoms of a runny nose were the most common symptoms, with a moderate quantitative Total Nasal Symptom Score (5-8) being the most dominant. The most common phenotype in the form of allergic rhinitis, according to ARIA-WHO, was in the moderate-severe persistent classification. There are significant differences between gender, type of job, clinical symptoms, and AR classification according to the ARIA-WHO classification of AR patients who arrived before and during the COVID-19 pandemic.

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