



Correlation between anxiety and score for allergic rhinitis

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Background: Allergic rhinitis (AR) is an atopic disorder caused by immunoglobulin E (IgE) reaction to inhaled allergens. The allergy causes sneezing, rhinorrhea, nasal congestion, and itching. Although AR is not life-threatening, it can seriously affect people's quality of life and impair their daily lives. This study aimed to investigate the correlation between anxiety and recurrence of AR.

Methods: This study was cross-sectional and followed 52 AR patients in the ENT Department between February and April 2023. This study uses questionnaires of the Hamilton Rating Scale for Anxiety (HARS) scores for anxiety and the Indonesian Score for Allergic Rhinitis (SFAR) questionnaire. Both questionnaires were sent to participants through the use of Google Forms. The statistical analysis used in this study was linear regression analysis.

Results: This study's findings reveal that most male participants (64.7%) reported experiencing nasal symptoms of mild to moderate severity. In comparison, 61.8% of males did not have a documented history of anxiety. The study observed that 83.3% of females reported experiencing mild nasal symptoms. Additionally, a significant percentage of females, precisely 77.8%, did not have an established history of anxiety. The results of the hypothesis testing reveal a statistically significant association between anxiety and SFAR. This association was detected in male and female subjects, with an overall statistical significance level of less than 0.05. The results of the SFAR scores indicated a significant positive association with the levels of anxiety scores.

Conclusions: Based on the findings of this study, it can be concluded that there is a correlation between the HARS score and the score indicating the recurrence of AR. The utilization of SFAR and HARS questionnaires in individuals diagnosed with AR promotes the identification of symptoms, which allows for quick implementation of suitable medications.

Keywords: Allergic rhinitis (AR); allergy; anxiety; disorder; recurrence

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Introduction

Allergic rhinitis (AR) is an atopic disorder affecting around 400 million people worldwide. It is caused by reactions brought on by immunoglobulin E (IgE) due to inhaled allergens. Before the age of 20 years, the occurrence of

some symptoms peaks, and between the ages of 20 and 40 years, they gradually decrease (1). After the age of 40 years, the symptoms gradually disappear. The upper respiratory tract was once assumed to be the exclusive location of AR. Previous studies have shown that AR is a

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systemic respiratory disease involving the upper and lower respiratory tract and often appears with asthma (2).

The prevalence of AR has yet to be acknowledged in Indonesia. Nevertheless, empirical evidence gathered from multiple hospitals indicates that the incidence rate ranges from 10% to 26%. Its prevalence has risen over the past few decades, primarily due to the different stimuli that present a challenge, including irritants, allergens, infections, pollen, and air pollution. The allergy causes sneezing, rhinorrhea, nasal congestion, and itching (3). Although AR is not life-threatening, it can impact the patient's ability to rest and work (4,5). Furthermore, research has indicated that chronic diseases, such as chronic respiratory conditions, can seriously affect people's quality of life and impair their daily lives. Consequently, a correlation between AR and a higher risk of psychiatric disorders may exist. Additionally, anxiety and depression have been associated with a higher risk of allergy-related conditions (6).

Several studies have established and proven an association between allergies and psychological disorders. According to research by Patten *et al.*, AR patients have greater rates of major depression [odds ratio (OR) =1.5], panic disorder, and social phobia than healthy people (OR of 1.7 and 1.3, respectively) (7). Cuffel *et al.* achieved similar findings, who studied 850,000 people and found that anxiety symptoms were 1.4 times more common in AR patients (8,9). This study aimed to investigate the correlation between anxiety and recurrence of AR. We present this article in accordance with the STROBE reporting checklist (available at <https://jxym.amegroups.com/article/view/10.21037/jxym-23-22/rc>).

Highlight box

Key findings

- The t-table value is 4.060 with a significant value of 0.000 <0.05. This indicates there is a correlation between anxiety and Indonesian Score for Allergic Rhinitis (SFAR) scores.
- The SFAR score will rise along with the level of anxiety score.

What is known and what is new?

- Allergic rhinitis (AR) is more common in female.
- Patients who lose their sense of smell, usually due to continuous nasal inflammation, have high rates of psychological problems such as anxiety.

What is the implication, and what should change now?

- AR patients who experience anxiety disorders should get psychological and psychiatric treatment.

Methods

This study followed AR patients in the ENT Department between February and April 2023. The present study employed a cross-sectional design to assess anxiety levels utilizing the Hamilton Rating Scale for Anxiety (HARS) questionnaire and evaluate AR recurrence using the Indonesian Score for Allergic Rhinitis (SFAR) questionnaire. Both questionnaires were sent to participants through the use of Google Forms. The metrics from the questionnaire were then categorized based on the results. The HARS has a total score range of 0–56, with scores 14 indicating no anxiety, scores 14–20 indicating mild anxiety, scores 21–27 indicating moderate anxiety, scores 28–41 indicating severe anxiety, and scores >41 indicating panic. There are 13 questions in the SFAR questionnaire. When the patient receives an SFAR score of at least 7, it will be decided whether or not the AR diagnosis is suspected. Inclusion criteria were male and female patients without psychopharmacologic or allergology treatment or psychotherapy. All patients underwent a clinical examination consistent with the diagnosis of allergic disorders and a hypersensitivity skin test to reveal hypersensitivity to environmental antigens. The statistical analysis used in this study was linear regression analysis. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta (Approval No. 115/EC-KEPK FKIK UMY/II/2023) on February 7, 2023. The Declaration of Ethics applies until February 7, 2024. Informed consent was obtained from all individual participants.

Results

The research findings are primary data originating from the answers to questionnaires by respondents. The study sample consisted of 52 patients, with a mean age of 34 years (range, 18–57 years) and a gender distribution of 18 males (34%) and 34 females (66%). The characteristics of the respondents have been listed in *Table 1*.

According to Made *et al.*, the results of the total nasal symptoms score (TNSS) questionnaire measurements allow for the classification of symptoms into three categories: mild [<7], moderate [7–10], and severe [>11] (10). Based on the data shown in *Table 2*, it can be observed that most male

Table 1 Characteristics of participants

Variable	N (%)
Gender	
Male	18 (34.0)
Female	34 (66.0)
Age (years)	
16–25	13 (24.0)
26–35	16 (32.0)
36–45	15 (28.0)
46–55	6 (12.0)
56–65	2 (4.0)

Table 2 The SFAR and anxiety category scores are grouped by gender

Category	Gender	
	Male (n=34)	Female (n=18)
SFAR, n (%)		
<7	12 (35.3)	3 (16.7)
≥7	22 (64.7)	15 (83.3)
Anxiety score, n (%)		
<14	21 (61.8)	14 (77.8)
14–20	7 (20.6)	4 (22.2)
21–27	3 (8.8)	0
28–41	3 (8.8)	0

SFAR, Score for Allergic Rhinitis.

Table 3 Hypothesis test results of anxiety score on SFAR

Model	Coefficients							
	Unstandardized coefficients		Standardized coefficients		t	Sig.	Collinearity statistics	
	B	Std. error	Beta	Tolerance			VIF	
Male								
(Constant)	5.961	0.634			9.401	<0.001		
Anxiety	0.212	0.043	0.659		4.956	<0.001	1.000	1.000
Female								
(Constant)	7.383	0.571			12.931	<0.001		
Anxiety	0.193	0.056	0.653		3.452	0.003	1.000	1.000

SFAR, Score for Allergic Rhinitis; VIF, variance inflation factor.

patients fall into the SFAR ≥ 7 group, comprising 64.7% of the male patient group. The SFAR ≥ 7 group showed a higher prevalence among female patients, including 83.3% of the female population. Furthermore, 21 male patients (61.8%) with no previous history of anxiety reported experiencing mild anxiety. A total of 7 patients, which represents 20.6% of the sample, reported experiencing moderate anxiety. In contrast, three individuals, representing 8.8% of the sample, said the same. Among the female patients, 14 exhibited not having previous occurrences of anxiety. In contrast, four individuals had a history of mild anxiety. This study did not find any reports of panic among the patients.

The findings of the hypothesis test, which aimed to investigate the effect of anxiety level on SFAR score, are displayed in *Table 3*. The study's results show a significant association between anxiety and SFAR, as indicated by the overall statistical significance level of less than 0.05 observed in both male and female participants. The SFAR score exhibits a positive correlation with the level of anxiety score. A small rise of 1% in anxiety levels among male patients is anticipated to substantially affect 21.2% of the SFAR. Among the female population, even a small rise of 1% in anxiety levels is associated with an increase of 19.3% in the severity of SFAR.

Discussion

This study examined the relationship between patient anxiety levels and the frequency of AR recurrence. The present study employed the Indonesian version of the SFAR questionnaire to determine the frequency of AR recurrence.

In contrast, the HARS questionnaire was utilized to assess the level of anxiety displayed by the participants. In this study, it was observed that 56% of the participants were in the age range of 16 to 35 years, while the remaining 44% belonged to the age group of 36 to 65 years. This finding is consistent with other research, which indicates that individuals of all ages can be affected by AR (11). Seasonal AR appears more common in pediatric groups, while chronic rhinitis is more common in adults (12).

In this study, female respondents contributed 66% of the total. Another study conducted by Made [2021] also involved 50 patients with AR, where most of the patients with AR were female (54.1%) (10). In other studies, Susanti *et al.* [2016] also obtained the same thing where AR patients are female, totaling 37 of 49 patients (75.51%) (13). Similar findings were also found in the study by Devi *et al.* [2019] which found that the most affected gender was female (83.3%) and male (16.7%) out of 42 total cases (14).

In patients with chronic diseases such as chronic urticaria, rheumatoid arthritis, chronic respiratory diseases, and cardiovascular diseases, anxiety is the most prevalent mental health disorder, yet research on anxiety disorder topic is uncommon in chronic diseases of the nose (15). Patients who lose or have their sense of smell, frequently accompanied by persistent nasal inflammatory processes, have been linked to high rates of psychological factors such as anxiety (16). Evidence related to psychological aspects of the manifestation of atopic disorders, including AR, is growing. Through neuroendocrine and immunologic changes, psychological factors may directly impact and play a significant role in the genesis and severity of atopic disorders (17-19).

In this cross-sectional study, we aimed to investigate the correlation between anxiety and AR. We also discovered that patients with AR had much higher anxiety levels than healthy people (20). The SFAR is one of the questionnaires that can be used to determine the value of the prevalence of AR in a population. The SFAR questionnaire has been used in France and six African countries, resulting in better sensitivity in diagnosing AR. SFAR uses a scoring system based on quantitative and subjective symptoms to measure the quality of life of AR patients. The questionnaire takes a short time to complete, and the content is easy to understand. After the respondent has completed the questionnaire, the score can be immediately calculated and recorded. A person is suspected of having AR if a score ≥ 7 is found (21).

The findings of this study indicate that both questionnaires can identify the beginning of AR. When AR reoccurs, individuals and their families can promptly recognize the symptoms and seek consultation from a doctor to receive early medical intervention. Several studies have shown that the diagnosis closely aligns with the gold standard method when validated by the skin prick test (22). Non-specialized people can utilize the SFAR questionnaire when the medical examination is unavailable due to its significant specificity and sensitivity (14,23).

Research conducted by Naiboho *et al.* [2017] stated that the sensitivity value of SFAR is 80%, indicating its ability to identify positive cases accurately. Similarly, the specificity of SFAR is 83.3%, reflecting its capacity to identify negative cases correctly (21). This shows how SFAR can be employed as a measuring device to identify the initial signs of recurrence of AR.

Although the outcomes of this study provide evidence of a correlation between anxiety levels and AR, there are some limitations to this study. First, this study was single-center, so the sample still needs to be expanded. Further prospective multicenter studies should also be executed to verify our outcomes. Secondly, although we have identified a correlation between anxiety and AR, there are still several factors that we have not examined, such as psychiatric medication history. So, future studies are expected to explore more patient-related information, including the history of these medications.

Conclusions

The effect of the anxiety score on recurrent AR is assessed in this study. According to the findings, screening for AR with a HARS score has been associated with an increased risk of recurrence. The utilization of SFAR and HARS questionnaires in individuals diagnosed with AR promotes the identification of symptoms, which allows for quick implementation of suitable medications.

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Footnote

Reporting Checklist: The authors have completed the STROBE reporting checklist. Available at <https://jxym.amegroups.com/article/view/10.21037/jxym-23-22/rc>

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Conflicts of Interest: All authors have completed the ICMJE uniform disclosure form (available at <https://jxym.amegroups.com/article/view/10.21037/jxym-23-22/coif>). The authors have no conflicts of interest to declare.

Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Universitas Muhammadiyah Yogyakarta (Approval No. 115/EC-KEPK FKIK UMY/II/2023) on February 7, 2023. The Declaration of Ethics applies until February 7, 2024. Informed consent was obtained from all individual participants.

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References

- Nur Husna SM, Tan HT, Md Shukri N, et al. Allergic Rhinitis: A Clinical and Pathophysiological Overview. *Front Med (Lausanne)* 2022;9:874114.
- Small P, Keith PK, Kim H. Allergic rhinitis. *Allergy Asthma Clin Immunol* 2018;14:51.
- Fröhlich M, Pinart M, Keller T, et al. Is there a sex-shift in prevalence of allergic rhinitis and comorbid asthma from childhood to adulthood? A meta-analysis. *Clin Transl Allergy* 2017;7:44.
- Alharethy S, Wedami MA, Syouri F, et al. Validation of the Arabic version of the score for allergic rhinitis tool. *Ann Saudi Med* 2017;37:357-61.
- Widuri A, Fakhriani R. Validity and Reliability of The Indonesian Modification of Score for Allergic Rhinitis. *Berkala Kedokteran* 2021;17:1.
- Rodrigues J, Franco-Pego F, Sousa-Pinto B, et al. Anxiety and depression risk in patients with allergic rhinitis: a systematic review and meta-analysis. *Rhinology* 2021;59:360-73.
- Patten SB, Williams JV. Self-reported allergies and their relationship to several Axis I disorders in a community sample. *Int J Psychiatry Med* 2007;37:11-22.
- Cuffel B, Wamboldt M, Borish L, et al. Economic consequences of comorbid depression, anxiety, and allergic rhinitis. *Psychosomatics* 1999;40:491-6.
- Muñoz-Cano R, Ribó P, Araujo G, et al. Severity of allergic rhinitis impacts sleep and anxiety: results from a large Spanish cohort. *Clin Transl Allergy* 2018;8:23.
- Made N, Savita M, Yudanto D, et al. Korelasi Total Nasal Symptom Score (TNSS) dengan kualitas tidur penderita rhinitis alergi mahasiswa fakultas kedokteran Universitas Mataram. *Intisari Sains Medis* 2021;12:83-7.
- Akhouri S, House SA. Allergic Rhinitis. *Treasure Island (FL)*; 2023. [cited 2023 Sep 16].
- Varshney J, Varshney H. Allergic Rhinitis: an Overview. *Indian J Otolaryngol Head Neck Surg* 2015;67:143-9.
- Susanti E, Pawarti DR, Soeprijadi S. Hubungan kadar RANTES sekret hidung dengan skor gejala total penderita rinitis alergi. *Oto Rhino Laryngologica Indonesiana* 2016;46:110.
- Devi S, Munir D, Sofyan F. The Sensitivity and Specificity of Score for Allergic Rhinitis (SFAR) Questionnaire as a Diagnostic Tool for Allergic Rhinitis in H. Adam Malik General Hospital, Medan. *Int J Chemtech Res* 2019;12:174-80.
- Bedolla-Barajas M, Morales-Romero J, Pulido-Guillén NA, et al. Rhinitis as an associated factor for anxiety and depression amongst adults. *Braz J Otorhinolaryngol* 2017;83:432-8.
- Katotomichelakis M, Simopoulos E, Tzikos A, et al. Demographic correlates of anxiety and depression

- symptoms in chronic sinonasal diseases. *Int J Psychiatry Med* 2014;48:83-94.
17. Kong IG, Rhee CS, Lee JW, et al. Association between Perceived Stress and Rhinitis-Related Quality of Life: A Multicenter, Cross-Sectional Study. *J Clin Med* 2021;10:3680.
 18. Rod NH, Kristensen TS, Lange P, et al. Perceived stress and risk of adult-onset asthma and other atopic disorders: a longitudinal cohort study. *Allergy* 2012;67:1408-14.
 19. Andersson NW, Hansen MV, Larsen AD, et al. Prenatal maternal stress and atopic diseases in the child: a systematic review of observational human studies. *Allergy* 2016;71:15-26.
 20. Xu Z, Zhang X, Liu H, et al. Associations between depressive and anxiety levels and allergic rhinitis in children: A cross-sectional study. *Arch Clin Psychiatry (São Paulo)* 2021;48:191-4.
 21. Naiboho D. Akurasi Score for Allergic Rhinitis (SFAR) terhadap Skin Prick Test (SPT). dalam *Penegakan Rinitis Alergi*. 2017.
 22. Bousquet J, Schünemann HJ, Togias A, et al. Next-generation Allergic Rhinitis and Its Impact on Asthma (ARIA) guidelines for allergic rhinitis based on Grading of Recommendations Assessment, Development and Evaluation (GRADE) and real-world evidence. *J Allergy Clin Immunol* 2020;145:70-80.e3.
 23. Mostafa HS, Qotb M, Hussein MA, et al. Allergic rhinitis diagnosis: skin-prick test versus laboratory diagnostic methods. *The Egyptian Journal of Otolaryngology* 2019;35:262-8.

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