Contents lists available at IOCS

Science Midwifery

journal homepage: www.midwifery.iocspublisher.org

Validity and reliability of the Indonesian knowledge, attitude, and practice of allergic rhinitis questionnaire

Rizka Fakhriani[1], Asti Widuri[2], Fadli Robby Amsriza[3], Deoni Daniswara[4]

[1,2,4]Department of Otorhinolaryngology, Head and Neck Surgery, Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

[3]Department of Surgery, Faculty of Medicine and Health Science, Universitas Muhammadiyah Yogyakarta, Yogyakarta, Indonesia

ARTICLE INFO

Article history:

Received Feb 6, 2025
Revised Feb 9, 2025
Accepted Feb 14, 2025

Keywords:

Allergic Rhinitis
Attitudes
Knowledge
Patients
Practice

ABSTRACT

Allergic rhinitis (AR) is a typical chronic condition commonly affecting the upper airway. Allergic rhinitis is marked by nasal congestion, rhinorrhea, pruritus, sneezing, and postnasal drip syndrome (PND), which includes eye itching and erythema. This study aims to assess the validity and reliability of the Indonesian version of the knowledge, attitude, and practice (KAP) of the allergic rhinitis questionnaire. The study employed a cross-sectional design. The study included patients with allergic rhinitis who were 18 or older and visited the otorhinolaryngology clinic between January and February 2024. The questionnaire was generated and disseminated using a Google form, and the statistical analysis was performed with SPSS 22.0. The correlation coefficient (r) between all questions on the knowledge dimension was consistently high, ranging from 0.302 to 0.828. The items on the attitude dimension had a strong positive association with the total score, as seen by the high correlation coefficients (all r = 0.962). The practice dimension also exhibited high correlation coefficients, ranging from 0.273 to 0.810 in total score. The questionnaire's validity and reliability have been established, confirming that the Indonesian version is recommended for future studies.

Corresponding Author:

Rizka Fakhriani,
Department of Otorhinolaryngology, Head and Neck Surgery,
Faculty of Medicine and Health Science,
Universitas Muhammadiyah Yogyakarta,
Brawijaya Street, Geblagan, Tamantirto, Kasihan, Bantul, Special Region of Yogyakarta, Indonesia, 55183
Email: rizkafakhriani@umy.ac.id

INTRODUCTION

Allergic rhinitis (AR) is a typical chronic condition commonly affecting the upper airway and is observed in people of every age (Ecevit et al., 2021; Richards et al., 2023; Wise et al., 2023). People with an abnormal immune response are at risk for producing immunoglobulin E (IgE) when contacting environmental allergens that are typically safe for most people, such as dust mites, pet fur, fungi, and pollen (Alnahas et al., 2023; Bousquet et al., 2020). The nasal symptoms of pollen

allergies arise as pollen grains, while relatively small, are primarily deposited in the nasal cavities (Kennedy, 2024).

The prevalence of allergic diseases is rising due to increased exposure to allergens. The World Allergy Organization states that over 1.39 billion people worldwide suffer from allergic diseases (Kılıç, 2023). The global prevalence of allergic disease tends to rise, especially in countries with low or middle incomes, with rates ranging from 1.0% to 54.5% (Bousquet et al., 2020; Ciofalo et al., 2019). Allergic rhinitis is not recognized in Indonesia. However, data collected from several hospitals shows that the occurrence rate varies between 10% and 26% (Fakhriani et al., 2024). Allergic rhinitis affects approximately 5% of children by age 3, and the prevalence increases with age. It is found in around 8.5% of 6–7-year-olds, 14.6% of 13–14-year-olds, and between 11.8% and 46% of people aged 20-44 (Bousquet et al., 2020; Liu & Liu, 2022). Furthermore, the prevalence of allergic rhinitis is higher in males than females before puberty, but this pattern is reversed during puberty (Liu & Liu, 2022).

Allergic rhinitis is marked by nasal congestion, rhinorrhea, pruritus, sneezing, and postnasal drip syndrome (PND), which includes eye itching and erythema (Li et al., 2023; Rahim et al., 2021). The combination of allergic rhinitis and asthma is frequently seen, known as the united airway concept. Allergic rhinitis also presents a risk for the development of asthma (Lourenço et al., 2022). Asthmatic people may experience inadequate disease control due to the presence of allergic rhinitis (Moitra et al., 2023). Allergic rhinitis can severely affect a person's quality of life, resulting in medical, psychological, and social effects. Patients and their families may experience insomnia, fatigue, poor academic performance, reduced work efficiency, depression, and anxiety (Dierick et al., 2020; Thamrongsak et al., 2022). Hence, the World Allergy Organization (WAO) statement urges countries to proactively promote and encourage additional research in the field of atopic disorders, such as allergic rhinitis, to identify and define their actual effects accurately (Alnahas et al., 2023). This study aims to assess the validity and reliability of the knowledge, attitude, and practice questionnaire with allergic rhinitis in Indonesia.

RESEARCH METHOD

The study employed a cross-sectional design to assess the reliability and validity of the Indonesian version of the knowledge, attitude, and practice questionnaire with allergic rhinitis in Indonesia. Based on physical examination, the study included a sample of 40 patients diagnosed with allergic rhinitis. The patients that were included in the study were selected via consecutive sampling. The study included patients with allergic rhinitis who were 18 or older and visited the ENT clinic between January and February 2024. Patients who were unwilling to participate, unable to read, or had communication difficulties were excluded from the study.

Before starting the study, the patients were provided with information regarding the objective of the research, and their consent was acquired. The questionnaire was developed based on previous research and the Chinese guidelines for diagnosing and treating allergic rhinitis (revised in 2022) (Gu et al., 2023; Nolte et al., 2006; Retinasekharan et al., 2021). The questionnaire was then altered and adjusted to align with specific characteristics and values of Indonesian culture. The final questionnaire consisted of details about demographics related to knowledge, attitude, and practice. The knowledge dimension consisted of 10 questions, each with 1 point for correct answers and 0 points for incorrect answers. The score ranged from 0 to 10 points. The attitude dimension consists of nine items rated on a five-point Likert scale. Positive attitude questions are assessed on a scale ranging from strongly agree (5 points) to disagree (1 point) strongly. Items A1 and A4, related to negative attitudes, are given negative scores. The score range spans from 9 to 45 points. The practice dimension has nine items on a five-point Likert scale, ranging from always (5 points) to never (1 point). The score range extends from 9 to 45 points. Scores above 70% in each component indicated sufficient knowledge, a positive attitude, and active practice (Lee & Suryohusodo, 2022).

The authors conducted forward translation. The first and second authors translated the initial items of the knowledge, attitudes, and practices questionnaire, and the first author then synthesized them together. All authors then reviewed the translations to ensure they were understandable and culturally appropriate for the Indonesian context. Following the reaching of an agreement, a competent English translator performed a back-translation to guarantee that a non-expert could comprehend the translated items and assess the equivalence in meaning between the back-translated items and the original items. A digital questionnaire and a consent form were developed, accompanied by a detailed description of the research.

The Health Research Ethics Committee of the Faculty of Medicine and Health Sciences at Universitas Muhammadiyah Yogyakarta has approved this study. The reference number for this approval is 280/EC-KEPK FKIK UMY/XI/2023. Before answering the questionnaire, participants must confirm their willingness to participate. Participation was optional and confidential, and participants were notified of the ability to withdraw from the study at any time.

RESULTS AND DISCUSSIONS

This study was conducted on 40 patients at a single hospital in Yogyakarta, Indonesia. Most participants (29 or 72.5%) were 25 or older. In addition, 25 out of 40 participants, accounting for 62.5% of the total, were female. Table 1 displays the description of the participants' characteristics.

Table 1. Characteristics of participants

Variable	Characteristic	N= 40	%
Age	26 - 35	5	12,5%
	≤ 25	29	72,5%
	36 - 45	2	5,0%
	≥ 46	4	10,0%
Gender	Male	15	37,5%
	Female	25	62,5%
Education	High school and below	9	22,5%
	College degree or above	31	78%
Occupation	Student	24	60,0%
	Self-employed	3	7,5%
	Employees	8	20,0%
	Housewife	5	12,5%
Residence	Rural/suburban	16	40,0%
	Urban	24	60,0%
Duration of disease	≤ 3	15	37,5%
	3-5	8	20,0%
	≥ 6	17	42,5%
Allergen test	Yes	16	40%
	No	24	60%
Known their allergen	Yes	22	55%
	No	18	45%
Like sports	Yes	24	60%
	No	16	40%

The questionnaire on allergic rhinitis contains elements related to knowledge, attitudes, and practices that were translated and modified to Indonesian culture by the authors through a focus group discussion process. The questionnaire was designed using prior research and Chinese guidelines for diagnosing and treating allergic rhinitis. The questionnaire comprises several questions to assess the depth of knowledge, attitudes, and practices among people suffering from allergic rhinitis. Table 2 displays both the original questionnaire and the translated version in Indonesian.

Table 2. The validity and reliability of the Knowledge, Attitude, and Practice questionnaire with allergic rhinitis in Indonesia

		Original Version		Indonesian Version
Knowledge	1.	The typical symptoms of allergic rhinitis are paroxysmal sneezing, watery nose, nasal itching, and nasal congestion, which ocular symptoms may accompany.	1.	Gejala khas rinitis alergi diantaranya bersin-bersin, hidung meler, hidung gatal, hidung
	2.	The allergens that cause rhinitis vary depending on where you live.	2.	Jenis alergen yang menyebabkan rinitis dapat bervariasi, tergantung dimana Anda tinggal.
	3.	Dust mites are common allergens of allergic rhinitis.	3.	Tungau debu adalah salah satu alergen penyebab rinitis alergi.
	4.	Allergic rhinitis is often accompanied by asthma.	4.	Rinitis alergi sering kali disertai asma.
	5.	Skin prick test, as one kind of allergen test, leads to no side effects.	5.	Skin prick test (tes tusuk kulit), merupakan salah satu jenis tes untuk mengetahui penyebab alergen, dan tidak menimbulkan efek samping.
	6.	Blood tests are more objective than skin prick tests.	6.	Tes alergi melalui darah lebih objektif daripada tes tusuk kulit.
	7.	Allergic rhinitis is partly hereditary.	7.	Rinitis alergi dapat disebabkan oleh faktor keturunan.
	8.	Allergic rhinitis requires long-term medication.	8.	Rinitis alergi membutuhkan pengobatan jangka panjang.
	9.	Sublingual desensitization is a treatment for allergic rhinitis.	9.	Salah satu pengobatan rhintis alergi adalah imunoterapi melalui obat yang diberikan di bawah lidah.
	10.	Chinese medicine has no effect on treating allergic rhinitis.	10.	Pengobatan Cina tidak bermanfaat dalam mengobati rinitis alergi.
Attitude	1.	I think allergic rhinitis has significantly affected my quality of life.	1.	Menurut saya, rinitis alergi telah memberikan pengaruh yang besar terhadap kualitas hidup saya.
	2.	I think allergic rhinitis can be cured.	2.	Menurut saya, rinitis alergi dapat disembuhkan.
	3.	I think avoiding allergens can prevent rhinitis from occurring.	3.	Menurut saya, dengan menghindari penyebab alergi dapat mencegah terjadinya rinitis.
	4.	I think once my rhinitis is relieved, there is no need for further treatment.	4.	Menurut saya, setelah rinitis saya sembuh, saya tidak perlu melakukan pengobatan lebih lanjut.
	5.	I think long-term treatment for allergic rhinitis has increased my financial burden.	5.	Menurut saya, pengobatan rinitis alergi jangka panjang menambah masalah pada keuangan saya.
	6.	I think wearing a mask can improve my rhinitis symptoms.	6.	Menurut saya, pemakaian masker dapat mengurangi gejala rinitis saya.
	7.	I am willing to try traditional Chinese medicine for allergic rhinitis	7.	Saya bersedia mencoba pengobatan tradisional Cina untuk mengatasi rinitis alergi
	8.	I am willing to try sublingual immunotherapy.	8.	Saya bersedia melakukan terapi alergi melalui obat yang diberikan di bawah lidah.
	9.	I am willing to try surgical treatment.	9.	Saya bersedia untuk menjalani tindakan pembedahan untuk mengatasi penyakit alergi saya.
Practices	1.	I will follow the doctor's instructions and continue taking medication for the long term, even if my symptoms have improved.	1.	Saya akan mematuhi arahan dokter dan terus meminum obat untuk jangka panjang, meskipun gejala-gejala yang saya alami telah membaik.
	2.	I will stay away from and avoid contact with allergens that may trigger rhinitis.	2.	Saya akan menghindari kontak dengan penyebab alergi yang dapat memicu rinitis.
	3.	I will actively seek knowledge about allergic rhinitis.	3.	Saya akan berusaha secara aktif mencari informasi seputar rinitis alergi.
	4.	I will have regular check-ups during the treatment	4.	Saya akan melakukan pemeriksaan rutin

	Original Version		Indonesian Version
	period.		selama masa pengobatan.
5.	I will closely monitor for any adverse reactions to medication during treatment.	5.	Saya akan memantau dengan teliti setiap efek samping obat selama pengobatan.
6.	I will focus more on the effectiveness of medication rather than its price.	6.	Saya akan lebih fokus pada keberhasilan pengobatan daripada biayanya.
7.	I will maintain a positive and healthy attitude to treat allergic rhinitis	7.	Saya akan mempertahankan perilaku yang positif dalam mengobati rinitis alergi.
8.	I will maintain a regular diet and sleep schedule during the treatment period.	8.	Saya akan menjaga pola makan dan pola tidur yang teratur selama masa pengobatan.
9.	I will exercise during the treatment period.	9.	Saya akan berolahraga selama masa pengobatan

A validity test was performed on 40 patients, generating a correlation coefficient (r-value) of 0.2638. The r table displays the r value for each provided item, as seen in Table 3.

Table 3. Results of validity and reliability test

Items	R	r table	P	Interpretations
		Knowledge		
1	0,8284748	0,2638	0,767	Valid, High Reliability
2	0,4821548	0,2638	0,767	Valid, High Reliability
3	0,8284748	0,2638	0,767	Valid, High Reliability
4	0,8284748	0,2638	0,767	Valid, High Reliability
5	0,4022948	0,2638	0,767	Valid, High Reliability
6	0,3471128	0,2638	0,767	Valid, High Reliability
7	0,8284748	0,2638	0,767	Valid, High Reliability
8	0,3024698	0,2638	0,767	Valid, High Reliability
9	0,4784399	0,2638	0,767	Valid, High Reliability
10	0,4022948	0,2638	0,767	Valid, High Reliability
		Attitude		
1	0,962311	0,2638	0,93	Valid, Very Good Reliability
2	0,962311	0,2638	0,93	Valid, Very Good Reliability
3	0,962311	0,2638	0,93	Valid, Very Good Reliability
4	0,962311	0,2638	0,93	Valid, Very Good Reliability
5	0,362354	0,2638	0,93	Valid, Very Good Reliability
6	0,962311	0,2638	0,93	Valid, Very Good Reliability
7	0,962311	0,2638	0,93	Valid, Very Good Reliability
8	0,447194	0,2638	0,93	Valid, Very Good Reliability
9	0,603801	0,2638	0,93	Valid, Very Good Reliability
		Practices		
1	0,2734209	0,2638	0,805	Valid, Very Good Reliability
2	0,6188838	0,2638	0,805	Valid, Very Good Reliability
3	0,6419762	0,2638	0,805	Valid, Very Good Reliability
4	0,7893136	0,2638	0,805	Valid, Very Good Reliability
5	0,762048	0,2638	0,805	Valid, Very Good Reliability
6	0,6460203	0,2638	0,805	Valid, Very Good Reliability
7	0,8102642	0,2638	0,805	Valid, Very Good Reliability
8	0,7552933	0,2638	0,805	Valid, Very Good Reliability
9	0,4884685	0,2638	0,805	Valid, Very Good Reliability

The correlation coefficient (r) between all questions on the knowledge dimension was consistently high, ranging from 0.302 to 0.828. The chosen r-table value was 0.2638, indicating a significance level of 0.05. All r values for these variables are above the threshold value, therefore proving the validity of all knowledge items. Moreover, its high reliability (P = 0.767) suggests that the knowledge dimension is reliable in evaluating the required knowledge.

The items on the attitude dimension had a strong positive association with the total score, as seen by the high correlation coefficients (all r = 0.962). These findings indicate that these items are reliable in evaluating the intended attitude dimension. The scale demonstrates a good level of reliability and consistency, as seen by a reliability coefficient of 0.93 (P = 0.93).

The practice dimension exhibited high correlation coefficients, ranging from 0.273 to 0.810 in total score. The values reached the critical threshold of the r table (0.2638), indicating that all items on the practice dimension were suitable for utilization. The practice dimension was reliable (P = 0.805), showing that it consistently reflected the evaluated practices.

This study addressed the lack of literature on the validation and reliability of the knowledge, attitude, and practice questionnaire with allergic rhinitis in Indonesia. It is essential to assess how the quality of knowledge, attitudes, and practices about allergic rhinitis might identify gaps in information and unfavorable mindsets and practices, which could lead to more severe allergy diseases. The results of the validity study indicated that the Indonesian version demonstrated strong validity ($r > 0.263$) with a high level of statistical significance ($p < 0.001$). The validity assessment of a questionnaire evaluates its ability to measure the intended construct accurately. It is accomplished by verifying the validity of conclusions and inferences based on the questionnaire's responses. The study utilized internal consistency as the reliability test. The Cronbach's Alpha score for the Indonesian-modified Allergic Rhinitis questionnaire was determined to be 0.749 with our research. It suggests the instrument is reliable, as Cronbach's Alpha scores higher than 0.7 are acceptable.

There are various limitations in this study. Test-retest was not performed in this study. Furthermore, it is essential to note that this study was limited to a single hospital; hence, its findings may not apply to the community's entire population of people with allergic rhinitis. Furthermore, the data was gathered via social media, which introduces the possibility of bias due to the exclusion of specific target populations. Another limitation arises from the diversity of responses obtained via Google web forms. Google Forms is a user-friendly survey platform; however, it cannot monitor IP addresses (Muslih et al., 2021; Sharma & Tikka, 2020).

Therefore, this questionnaire for allergic rhinitis is a study instrument demonstrating strong internal consistency. It is suitable for evaluating patients' understanding of allergic rhinitis and developing efficient educational programs for treating allergic rhinitis patients by assessing their knowledge, attitude, and practice. Furthermore, the findings of this study are expected to be considered by stakeholders in the healthcare sector when developing a methodology for the assessment and treatment of allergic rhinitis. It will involve identifying risk factors to prevent complications associated with allergic rhinitis. Also, the research results on the validity and reliability of allergic rhinitis in patients with this condition will be disseminated as educational material for general practitioners and participants in the academic programs of specialists in otorhinolaryngology and head and neck surgery.

CONCLUSION

This study developed and verified a questionnaire for people living in Indonesia who have allergic rhinitis. The scale exhibited satisfactory reliability and validity, including strong internal consistency. The measure evaluated patients' knowledge, attitudes, and practices regarding their disease. The high response rate and low unanswered questions were essential signs of patients' understanding of the questionnaire.

References

Alnahas, S., Abouammoh, N., Althagafi, W., & Abd-Ellatif, E. E. (2023). Prevalence, severity, and risk factors of allergic rhinitis among schoolchildren in Saudi Arabia: A national cross-sectional study, 2019. *World Allergy Organization Journal*, *16*(10), 100824. https://doi.org/10.1016/j.waojou.2023.100824

Bousquet, J., Anto, J. M., Bachert, C., Baiardini, I., Bosnic-Anticevich, S., Walter Canonica, G., Melén, E., Palomares, O., Scadding, G. K., Togias, A., & Toppila-Salmi, S. (2020). Allergic rhinitis. *Nature Reviews Disease Primers*, *6*(1), 95. https://doi.org/10.1038/s41572-020-00227-0

Ciofalo, A., Pasquariello, B., Iannella, G., Manno, A., Angeletti, D., Gulotta, G., Pace, A., & Magliulo, G. (2019). The role of nasal cytology in the diagnosis of allergic and non-allergic rhinitis in adult and children.

Uropean Review for Medical and Pharmacological Sciences, *23*, 5065–5073. https://doi.org/https://doi.org/10.26355/eurrev_201906_18170

Dierick, B. J. H., van der Molen, T., Flokstra-de Blok, B. M. J., Muraro, A., Postma, M. J., Kocks, J. W. H., & van Boven, J. F. M. (2020). Burden and socioeconomics of asthma, allergic rhinitis, atopic dermatitis and food allergy. *Expert Review of Pharmacoeconomics & Outcomes Research*, *20*(5), 437–453. https://doi.org/10.1080/14737167.2020.1819793

Ecevit, M. C., Özcan, M., Haberal Can, İ., Çadallı Tatar, E., Özer, S., Esen, E., Atan, D., Göde, S., Elsürer, Ç., Eryılmaz, A., Uslu Coşkun, B., Yazıcı, Z. M., Dinç, M. E., Özdoğan, F., Günhan, K., Bilal, N., Korkut, A. Y., Kasapoğlu, F., Türk, B., … Önerci, M. (2021). Turkish Guidelines for Diagnosis and Treatment of Allergic Rhinitis (ART). *Turkish Archives of Otorhinolaryngology*, *59*(1), 1–157. https://doi.org/10.4274/tao.2021.suppl.1

Fakhriani, R., Daniswara, D., & Widuri, A. (2024). Correlation between anxiety and score for allergic rhinitis. *Journal of Xiangya Medicine*, *9*, 3–3. https://doi.org/10.21037/jxym-23-22

Gu, W., Yan, D., Yuan, Z., Jiang, X., Qian, Y., Dong, H., & Shen, Z. (2023). Knowledge, attitudes, and practice towards allergic rhinitis in patients with allergic rhinitis: a cross-sectional study. *BMC Public Health*, *23*(1), 1633. https://doi.org/10.1186/s12889-023-16607-6

Kennedy, R. (2024). Mechanisms and Comparative Treatments of Allergic Rhinitis including Phototherapy. *Allergies*, *4*(1), 17–29. https://doi.org/10.3390/allergies4010002

Kılıç, mahmut. (2023). The Frequency of Asthma and Allergy Symptoms in Adults and its Related Factors. *The Anatolian Journal of Family Medicine*. https://doi.org/10.5505/anatoljfm.2023.85619

Lee, F., & Suryohusodo, A. A. (2022). Knowledge, attitude, and practice assessment toward COVID-19 among communities in East Nusa Tenggara, Indonesia: A cross-sectional study. *Frontiers in Public Health*, *10*. https://doi.org/10.3389/fpubh.2022.957630

Li, Q., Zhang, X., Feng, Q., Zhou, H., Ma, C., Lin, C., Wang, D., & Yin, J. (2023). Common Allergens and Immune Responses Associated with Allergic Rhinitis in China. *Journal of Asthma and Allergy*, *Volume 16*, 851–861. https://doi.org/10.2147/JAA.S420328

Liu, Y., & Liu, Z. (2022). Epidemiology, Prevention and Clinical Treatment of Allergic Rhinitis: More Understanding, Better Patient Care. *Journal of Clinical Medicine*, *11*(20), 6062. https://doi.org/10.3390/jcm11206062

Lourenço, O., Cvetkovski, B., Kritikos, V., House, R., Scheire, S., Costa, E. M., Fonseca, J. A., Menditto, E., Bedbrook, A., Bialek, S., Briedis, V., Boussery, K., Canonica, G. W., Haahtela, T., Kuna, P., Mullol, J., Orlando, V., Samolinski, B., Wallace, D., … Bosnic-Anticevich, S. (2022). Management of allergic rhinitis symptoms in the pharmacy Pocket guide 2022. *Clinical and Translational Allergy*, *12*(10). https://doi.org/10.1002/clt2.12183

Moitra, S., Simoni, M., Baldacci, S., Maio, S., Angino, A., Silvi, P., Viegi, G., La Grutta, S., Ruggiero, F., Bedini, G., Natali, F., Cecchi, L., Berger, U., Prentovic, M., Gamil, A., Baïz, N., Thibaudon, M., Monnier, S., Caimmi, D., … Annesi-Maesano, I. (2023). Symptom control and health-related quality of life in allergic rhinitis with and without comorbid asthma: A multicentre European study. *Clinical and Translational Allergy*, *13*(2). https://doi.org/10.1002/clt2.12209

Muslih, M., Susanti, H. D., Rias, Y. A., & Chung, M.-H. (2021). Knowledge, Attitude, and Practice of Indonesian Residents toward COVID-19: A Cross-Sectional Survey. *International Journal of Environmental Research and Public Health*, *18*(9), 4473. https://doi.org/10.3390/ijerph18094473

Nolte, H., Nepper-Christensen, S., & Backer, V. (2006). Unawareness and undertreatment of asthma and allergic rhinitis in a general population. *Respiratory Medicine*, *100*(2), 354–362. https://doi.org/10.1016/j.rmed.2005.05.012

Rahim, N. A., Jantan, I., Said, M. M., Jalil, J., Abd Razak, A. F., & Husain, K. (2021). Anti-Allergic Rhinitis Effects of Medicinal Plants and Their Bioactive Metabolites via Suppression of the Immune System: A Mechanistic Review. *Frontiers in Pharmacology*, *12*. https://doi.org/10.3389/fphar.2021.660083

Retinasekharan, S., Md Shukri, N., Ismail, A. F., & Abdullah, B. (2021). Knowledge, Attitude, and Practice of Intranasal Corticosteroid in Allergic Rhinitis Patients: Development of a New Questionnaire. *Healthcare*, *10*(1), 8. https://doi.org/10.3390/healthcare10010008

Richards, G. A., McDonald, M., Gray, C. L., de Waal, P., Friedman, R., Hockman, M., Karabus, S. J., Lodder, C. M., Mabelane, T., Mosito, S. M., Nanan, A., Peter, J. G., Quitter, T. H. C., Seedat, R., van den Berg, S., van Niekerk, A., Vardas, E., & Feldman, C. (2023). Allergic rhinitis: Review of the diagnosis and management: South African Allergic Rhinitis Working Group. *South African Family Practice*, *65*(1). https://doi.org/10.4102/safp.v65i1.5806

Sharma, R., & Tikka, S. K. (2020). COVID-19 online surveys need to follow standards and guidelines: Comment on "Does COVID-19 pandemic affect sexual behaviour? A cross-sectional, cross-national online survey" and "Binge watching behavior during COVID 19 pandemic: A cross-sectional, cross-national online survey." *Psychiatry Research*, *290*, 113173. https://doi.org/10.1016/j.psychres.2020.113173

Thamrongsak, C., Chirdkiatgumchai, V., Jotikasthira, W., Kiewngam, P., Kanchongkittiphon, W., & Manuyakorn, W. (2022). Improvement of inattentive and hyperactive symptoms after real-life rhinitis treatment in school-aged children. *International Journal of Pediatric Otorhinolaryngology*, *157*, 111138. https://doi.org/10.1016/j.ijporl.2022.111138

Wise, S. K., Damask, C., Roland, L. T., Ebert, C., Levy, J. M., Lin, S., Luong, A., Rodriguez, K., Sedaghat, A. R., Toskala, E., Villwock, J., Abdullah, B., Akdis, C., Alt, J. A., Ansotegui, I. J., Azar, A., Baroody, F., Benninger, M. S., Bernstein, J., … Zhang, L. (2023). International consensus statement on allergy and rhinology: Allergic rhinitis – 2023. *International Forum of Allergy & Rhinology*, *13*(4), 293–859. https://doi.org/10.1002/alr.23090