The knowledge of general population regarding Allergic Rhinitis: An observational study from Lahore, Punjab, Pakistan.

Comment [JTBS1]: The title does not reflect the study population as it mainly comprises medical students/professionals, which is a major bias

Abstract:

Introduction:

Allergic rhinitis is a varied disorder characterized by symptoms such as sneezing, nasal blockage, nasal itching, and a runny nose. The present study aimed to assess~~ed~~ general population's knowledge about Allergic rhinitis and to identify gaps in patient~~'~~s' understanding along with the factors that may impact knowledge regarding the disease.

Methods:

A cross-sectional observational study design was implemented to collect data from general population of Lahore on a structured questionnaire containing 12 items related to knowledge. The questionnaire was distributed to physician diagnosed Allergic rhinitis patients. The questionnaire with closed-ended questions was completed by ~~a population of~~ 240 participants of both genders. The study spanned over ~~the time~~a period of eight months.

Results:

Among 238 respondents, 81.3% were students and majority were female (58.3%). It revealed that only 33.3% of respondents had correct knowledge, while 70.4% had incorrect knowledge. Among demographic variables, female respondents presented better knowledge ~~as~~ compared to the male population. Moreover, education status was positively associated with knowledge of respondents. The *p-values<0.05* were considered statistically significant.

Comment [JTBS2]: Isn't it 240?

Conclusion:

This study reveals a significant gap in knowledge of the respondents, highlighting the need for targeted education and intervention. Improved knowledge is crucial to promoting good practices and achieving desired outcomes. Educational interventions and counselling should be provided to patients to enhance knowledge and practices of Allergic rhinitis patients.

Comment [JTBS3]: No mention of the differences between the medical students/professionals and general population

KEYWORDS: Allergic Rhinitis; Knowledge; Treatment; Prevention; Educational Intervention

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1. INTRODUCTION

Allergic rhinitis is a heterogeneous disorder identified by symptoms of sneezing, nasal congestion/obstruction, nasal itching and rhinorrhea.[1] It is an immunoglobulin E (IgE) - mediated immune reaction to inhaled allergens involving mucosal inflammation driven by type 2 cells. Environmental factors play a key role in the expression of the disease.[1] It is a global health burden causing certain co morbidities such as asthma, sinusitis, nasal polyps, and conjunctivitis deteriorating overall health and quality of life.[2] However, it remains an underestimated and frequently dismissed illness, often seen as little more than a minor illness treated by over the counter drugs.[2]

It is classified into two major categories allergic and non-allergic rhinitis.[1]Stimuli that are neither allergic nor contagious such as weather changes, exposure to caustic odors or cigarette smoke, variations in barometric pressure are causes of (Non-Allergic Rhinitis) NAR and it also gives negative systemic IgE test results. [3]

Allergic rhinitis is a prevalent condition that impacts as many as 10-20% of people worldwide. [2] Between 1990 and 2010, two significant international studies were done on the prevalence of allergic diseases in adults (European Community Health Survey, ECRHS) and children (International Study of Asthma and Allergy in Childhood, ISAAC).[1]These investigations revealed that AR begins early in life, having a frequency of over 5% at three years of age.[2] According to the phase III study of ISAAC, the prevalence of AR varied from 8.5% in 6-7 years old to 14.6% in 13-14 years old.[1] The incidence of this condition varies widely across Asia, from 27% in South Korea to 32% in UAE. [5] Prevalence of allergic rhinitis symptoms in Pakistan are 28.58% [6] A study in USA reported 62.6% of patients with moderate or severe disease, 47.6% patients with persistent symptoms, 50% patients using two or more AR medications and 38.8% patients with good symptom control (Seasonal Allergic Rhinitis and Perennial Allergic Rhinitis). [7]

Patients frequently report the following traditional symptoms of allergic rhinitis: nasal congestion, nasal itching, rhinorrhea and sneezing. [5] Allergic conjunctivitis ~~with symptoms~~manifestated~~of~~ by itching, tears, and redness of the eyes is also linked with AR. [6] External cues that could indicate allergic rhinitis consist of persistent mouth breathing, rubbing ~~at~~ of the nose or a transverse nasal-crease, ~~a lot of~~ sniffling or throat clearing and allergic shiners (dark circles under the eyes that are due to nasal congestion). [4] ~~A n~~Nose examination usually

Comment [JTBS4]: Such stimuli can also trigger symptoms in poorly or not controlled allergic patients by aggravating the inflammation already present

Comment [JTBS5]: Classic sign of nasal obstruction, the latter however more often associated with adenoid hypertrophy in children.

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~~indicates~~ revealsswelling and pallor of the nasal mucosa, ~~pale~~ clearand thin secretions, structural abnormalities, and nasal polyps. [6] The treatment of patients with AR ~~is a combination of four basic methods which are often applied simultaneously~~consists of:patient education, allergenavoidance~~ing allergens~~, pharmacotherapy andallergen immunotherapy. [2] Pharmacotherapy includes the following drug categories: Glucocorticoids (Intranasal, Oral), ~~H1 receptor antagonist (~~Second-Generation H1-Antihistamines~~)~~ (Oral/Intranasal), Antileukotrienes, Ipratropium bromide (Intranasal), α-sympathomimetics (intranasal, oral), Saline solutions (Intranasal), Anti-IgE antibodies (Subcutaneous) andhormones (Intranasal). [8]

The clinical diagnosis of allergic rhinitis is done if the patient presents with one or more symptoms in line with the disease. [7] Allergy testing is also recommended to check specific IgE antibodies where causative allergen is needed to target. [8] Performing sino-nasal imaging routinely is not recommended in patients showing a clear diagnosis of AR. [4] If allergic rhinitis symptoms are strongly affecting the patient's quality of life negatively, topical steroids are strongly recommended. [8] For primary complaints of itching and sneezing, non-sedating second generation antihistamines are strongly recommended. [7] Oral leukotriene receptor antagonists LTRAs are not recommended as a primary therapy for AR patients. [8] When pharmacologic monotherapy is insufficient for treating AR patients, combined pharmacologic therapy may be used. [6] Clinicians should provide sublingual or subcutaneous immunotherapy to individuals with AR ~~whose~~ whenpharmacologic therapy, with or without environmental restrictions, is not enough to alleviate their symptoms. [9]

The selection of allergic rhinitis treatment by pharmacist, as recommended in the ARIA Pocket Guide for Pharmacist (2003) is categorized into three groups depending on intensity and frequency of symptoms mild-intermittent, mild persistent/moderate-severe intermittent, and moderate-severe persistent.[8] For mild intermittent symptoms, the recommended treatment options include an oral H1-blocker, a nasal H1-blocker, a decongestant, a nasal chromone, or nasal saline.[6] For mild persistent or moderate-severe intermittent symptoms, the treatment options are similar, including an oral H1-blocker, a nasal H1-blocker, a decongestant, a nasal steroid.[9] If there is no improvement after 7–15 days of treatment, further intervention is advised. For moderate-severe persistent symptoms, the recommendation is to refer the patient to a physician. [10]

Comment [JTBS6]: Such as? Turbinate hypertrophy maybe?

Comment [JTBS7]: Not usually. A fraction of patients might present polyps but not all nasal polypose patients are atopic

Comment [JTBS8]: Reserved for severe cases or complications, not routinely used in AR

Comment [JTBS9]: Re-check this. There's no such indication

Comment [JTBS10]: Don't agree with this statement. One symptom alone is not sufficient to affirm a diagnosis. Please review clinical diagnosis criteria

Comment [JTBS11]: Reference?

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A spectrum of environmental allergens includes pollens, ragweed, house dust mite, cockroach droppings, animal allergens, certain chemicals, molds, odors, and passive smoking. [5] A list of other factors is forthcoming which are nasal polyposis, ciliary dyskinesia syndrome, exercise, pregnancy, and menstrual cycle. [8] There are also some drug-induced causes of allergic rhinitis which are rhinitis medicamentosa, oral contraceptives and Aspirin. [11]

Comment [JTBS12]: although nasal symptoms might be present in allergic drug reactions, that is not the case here. Rhinitis medicamentosa is an entity by itself, often associated with AR due to nasal decongestant overuse. I suggest revising this paragraph

The data of patients from 22 countries show that 27.2% of all AR patients with data collected over a 6-day period do not take their medicines as prescribed. Merely 11.3% of these adhered to the prescribed drugs and time intervals (MPR ≥70% and PDC ≤1.25). Most of the patients discontinue the treatment when feeling better. [12]

Self-medication is common among patients suffering from allergic rhinitis.[10] As patients suffering from allergies are unaware of the debilitating effects of the disease once progressed and other comorbidities such as asthma, pharmacist being the most approachable healthcare provider can be the bridge to fill the gaps in patients' knowledge and understanding of the disease.[13] Pharmacists can effectively support patients in managing their intermittent and mild persistent allergic rhinitis, leading to improved quality of life. [10]

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2. METHODOLOGY

Study Design&Setting:

The present study is a cross-sectional observational study.~~, in which the d~~Datawas collectedfromAllergic rhinitis patients visiting different community pharmacies of Lahore, Pakistan. This study was conducted for a duration of eight months from February-2024 to September-2024.The study population comprised~~of~~ adult patients ~~of the~~ (age 18 and above).

Comment [JTBS13]: how was it collected? In the form of questionnaire? Who handed it to the patients?

Ethical Considerations:

Comment [JTBS14]: Was there a signed informed consent?

Ethical Approval was attained by the university ethical review board (ERB) and the study was carried out strictly following the guidelines and protocols. Upon enrolment of the study subjects, the detailed information of the study regarding methodology and purpose was ~~informed~~ conveyedto the patients.The personal information of participants was kept confidential. Participants were informed that they could ~~easily~~ withdraw from the studyat anytime.

Inclusion& Exclusion criteria:

~~The p~~Physician diagnosed Allergic rhinitis adult patients were recruited for the present study. ~~The u~~Undergraduate students of different universities of Lahore, who fall into the criteria and

Comment [JTBS15]: How, when and by who was this diagnosis made? Was it just patient reported? Was it confirmed by a physician participating in the study?

presented consent to participate in the current study were included. ~~The p~~Patients with co-morbidities especially asthma and COPD were excluded along with ~~the~~ patients who did not ~~presented~~ consent to participate in the study.

Based on the inclusion criteria, a total of 240 study subjects of both genders were recruited in the study (100 male and 140female).

Data Collection

~~The data was collected from the Allergic rhinitis patients visiting community pharmacies, upon consent to participate in the study.~~ The data collection form consisted of demographic variables of the study subjects including age, gender, occupation, marital status, education, source of information regarding allergic rhinitis and presence of health care professional in immediate family. However, self-designed and validated questionnaire was utilized for ~~accessing~~ assessingknowledgeof the Allergic rhinitis patients. The questionnaire was designed based ~~upon~~ onthe extensive literature review and validated through expert validation, face validation and pilot study. Questionnaire contained 12 items for Knowledge assessment (marked 1 for correct answer and 0 for incorrect answer). According to Bloom's criteria, 60% was considered the cut off ratio for assessment. The knowledge of the respondents was categorized as appropriate, if 60% of the questions were answered correct.

Comment [JTBS16]: Why is this particular group of participants specifically mentioned?

Comment [JTBS17]: Inclusion and exclusion criteria should be clearly stated in a simpler manner. I suggest revising this paragraph

Comment [JTBS18]: Was this the questionnaire? Or was there a separate form for the variables mentioned?

Comment [JTBS19]: Was it designed by the authors? More information should be provided (or reference if the work was previously published)

Comment [JTBS20]: The correct responses to the questionnaire should be provided, since it is not widely known

Statistical Analysis:

For the statistical analysis, (SPSS) version 21.0 was used for analyzing the collected data. Descriptive and inferential statistics were applied for analyzing the frequencies and association between variables. The p-values of <0.05 were considered statistically significant.

RESULTS

A total of 240 study subjects were included in the current study, the demographic variables are mentioned in the Table 1. However, the knowledge of participants in response to each question is presented in Table-2, whereas, the overall knowledge ratio of the respondents in summarized in Table-3.

Table-1: Demographic characteristics of the study subjects (N=240)

No.	**Variables**	**Categories**	**N (%)**
1	Gender	Male	100 (41.7)

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		Female	140 (58.3)
2	Age	Less than 20	39 (16.3)
		20-25 years	182 (75.8)
		25-30 years	09 (3.8)
		30 years and above	10 (4.2)
3	Occupation	Student	195 (81.3)
		Corporate job holder	23 (9.6)
		Businessman	5 (2.1)
		Housewife	12 (5)
		Jobless	2 (0.8)
		Others	3 (1.3)
4	Education	Secondary	47 (19.6)
		Bachelors	177 (73.8)
		Masters	16 (6.7)
5	Marital status	Married	32 (13.3)
		Unmarried	208 (86.7)
6	Healthcare professional in family	Yes	144 (60)
		No	96 (40)
7	Source of information	Seminars	6 (2.5)
		Research articles	21 (8.8)
		Literature brochures	156 (65)
		Medical magazines	4 (1.7)
		Workshops	2 (0.8)
		Social media platforms	51 (21.3)

Table-2: Response of participants according to knowledge related questions of Allergic rhinitis

No	Questions	Incorrect N (%)	Correct N (%)
1	Allergic rhinitis is a hypersensitive reaction particularly due to pollen, dust etc.	236 (98.3)	4 (1.7)
2	Allergic rhinitis a genetic disease	139 (57.9)	101 (42.1)
3	Allergic rhinitis is not a contagious disease	174 (72.5)	66 (27.5)
4	Children at high risk of allergic disease	198 (82.5)	42 (17.5)
5	Allergic rhinitis causes sneezing, nasal itching often accompanied with watery eyes	236 (98.3)	4 (1.7)
6	Allergic rhinitis patient experience redness and swelling with buildup of polyps that causes sinus pain	217 (90.4)	23 (9.6)
7	AR causes nasal discharge thick and green in color in patients with chronic suffering from nasal polyps.	195 (81.3)	45 (18.8)
8	Allergy skin test help with diagnosis of AR particularly in Pakistan.	199 (82.9)	40 (16.7)
9	Immunotherapy such as allergy shots help patients with AR in reducing symptoms	219 (91.3)	21 (8.8)

Comment [JTBS21]: What is the question here?

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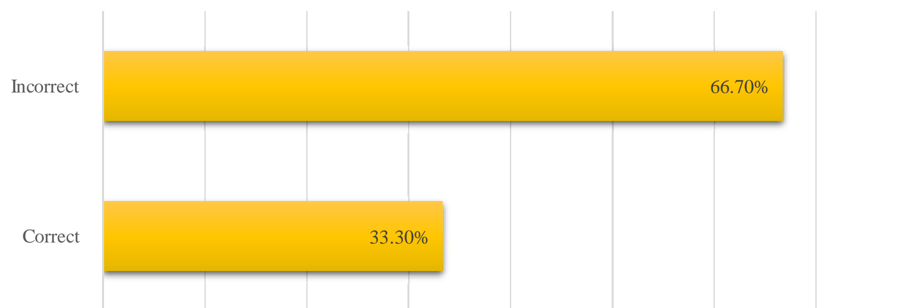
10	Antihistamines and intra nasal corticosteroids are the preferred choice for the treatment of AR	208 (86.7)	32 (13.3)
11	Long term usage of nasal steroids in treatment of AR causes dependency	200 (83.3)	40 (16.7)
12	Allergic rhinitis is more prevalent in urban areas.	199 (82.9)	41 (17.1)

Table-3: Knowledgeof respondents regarding Allergic rhinitis

Variable	Categories	N (%)
Knowledge	Correct	80 (33.3)
	Incorrect	160 (66.7)

Figure-1: Knowledgeof respondents regarding Allergic rhinitis

Comment [JTBS22]: Redundant information. Choose either the table or the graph



The association of demographic variables with the knowledge of respondents is summarized in the table-4.

Table-4: The association of demographic variables with respondents' knowledge:

No.	Variables	Categories	Knowledge Category		*p-value**	η^2
			Appropriate	Inappropriate		
1	Gender	Male	14	86	*<0.001*	.359
		Female	64	74		
2	Age	~~Less than~~ ≤20	14	25	.128	-
		20-25 years	64	118		
		26~~5~~-30 years	0	9		
		≥30 years ~~and above~~	2	8		
3	Occupation	Student	70	125	.286	-

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		Corporate job holder	5	18		
		Businessman	0	5		
		Housewife /jobless	4/1	8/1		
4	Education	Bachelor's	69	108	0.002	.012
		Secondary	11	36		
		Masters	0	16		
5	Marital status	Married	10	22	.788	-
		Unmarried	70	138		
6	Healthcare professional in your family	Yes	49	95	.759	-
		No	31	64		
7	Source of information	Medical books	42	114	.026	.132
		Seminar / research articles	2/10	4/11		
		Workshops	1	1		
		Social media	25	26		

4. DISCUSSION

Allergic rhinitis is an allergen induced symptomatic disorder characterized ~~of~~ by inflammation of the nasal ~~membrane~~ mucosadue to IgE antibodies directed against specific allergens. ~~i~~Its symptoms include~~s~~ disturbance in sleep change of mood, tired body which ultimately effects the quality of life it may got confused with nasal polyps and asthma[13]
In this research paper KAP study is conducted majorly on future health care provider to see their knowledge attitude and practices towards allergic rhinitis this shows the general knowledge of students and attitude and practices of health care providers is poor.
The knowledge of respondents regarding allergic rhinitis in this study is inadequate, that is poor knowledge. Depending on demographics, knowledge of females is better than males, age group between 20-25 have better knowledge than other age groups overall knowledge is inappropriate.
A cross-sectional study was conducted at Zhejiang University School of Medicine and is Similar to our study in which knowledge was poor. [14]

Comment [JTBS23]: Confusing sentence..these should not be referred to as symptoms but rather as consequences of the symptoms. I struggle to understand the last part regarding nasal polyps and asthma…

Comment [JTBS24]: This should be mentioned earlier in the paper as it is a major bias! maybe the whole study should be focused on this population alone, as their medical knowledge is not comparable to the general population

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A cross-sectional study was conducted in khartoum state, Sudan in which respondents have adequate knowledge regarding AR and its management [15]. In this study gender does not influence the knowledge of AR but age, qualification, years of practice, and university of graduation ~~e~~affects knowledge. Many of the medical students in the present study revealed poor attitude towards allergic rhinitis, its management and prevention. A similar study was conducted, and patients showed the mean attitude score of 29.51 ± 3.52 indicating unfavorable attitude. Knowledge, attitudes, and practice towards allergic rhinitis in patients with allergic rhinitis. [16] A KAP study executed in China exhibited positive attitude in AR patients, 364 of 480 participants had positive attitudes[17].

Comment [JTBS25]: What is meant by "positive attitudes"?

In this research paper the practice regarding allergic rhinitis is determined by the percentage method out of 240 total sample size 27.1% (65) people have good practice towards allergic rhinitis and 72.9% (175) have poor practice towards allergic rhinitis so in overall it shows poor practices. here is a similar study in which practices need to be improved regarding allergic rhinitis [15] and here is a opposite study in which attitude is good regarding AR [16]. The presence of healthcare professional in the family was positively associated with good knowledge in the respondents.~~.~~ These results are in accordance with the cross-sectional observational study conducted in Lahore, Pakistan, which also depicted the positive association with the knowledge because of presence of healthcare professional in the family [18].

Comment [JTBS26]: What is meant by "practice"?

Comment [JTBS27]: Is this regarding only the general population, excluding those who are medical students/professionals themselves?

5. CONCLUSION

This Study shows the levels of KAP regarding allergic rhinitis among the future health care provider and the general population. The results indicate a notable gap in knowing the condition, which ultimately leads to insufficient management and possible aggravation of symptoms. ~~For this t~~There is ~~a highly~~ need of educational interventions to increase awareness and knowledge of AR. By this intervention knowledge may improves which shows a positive attitude and that ultimately leads to good practices.

Comment [JTBS28]: How was this evaluated or inferred from the data collected?

Comment [JTBS29]: Clarify this statement

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