

Caregivers Knowledge of Allergic Rhinitis and Its Home Remedies among Preschool Children

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Abstract

Background: Allergic rhinitis (AR), as a respiratory inflammatory disease, constitutes a complex immunological response in the nasal mucous membranes. Home remedies mean a non-medical treatment to attempt to cure or treat an ailment with common household items or foods. **Aim:** To assess caregivers knowledge of allergic rhinitis and its home remedies among preschool children. **Design:** A descriptive cross-sectional research design. **Sample:** A simple random sample consisted of 318 caregivers and their children with signs and symptoms of allergic rhinitis. **Settings:** The current study was carried out at a patient's pediatric clinic at the Obstetric and Pediatric University Hospital at Minia City. **Tools:** Data was gathered using three tools: **(Tool I)** was a structured interview questionnaire that consisted of **two parts:** part (1) socio-demographic characteristics for caregivers; part (2) socio-demographic characteristics for children. **(Tool II)** Knowledge of caregivers regarding allergic rhinitis. **(Tool III)** Caregivers practice questionnaire regarding home remedies for allergic rhinitis. **Results:** The current study revealed that 41.8% of the studied sample's age ranged from >28 to 38 years, with a mean age of 30.93 ± 6.822 , 81.8% of them were female, 57.2% of the studied sample had poor knowledge, and 70.1% of them had poor practice toward home remedies for allergic rhinitis. **Conclusion:** This study showed poor knowledge and practice toward allergic rhinitis among the studied sample, there was a strong positive correlation between the total score of knowledge and the total score of practices of the studied sample toward allergic rhinitis. **Recommendations:** Conduct an educational program for all caregivers to spread the AR knowledge because they are the first handler of disease to help in early prevention and management of it.

Keywords: Allergic Rhinitis, Caregivers, Home Remedies, Knowledge, Preschool children

Introduction

Allergic rhinitis (AR) is a global illness that confuses many researchers and an allergic rhinitis attack can increase lower airway hyper responsiveness (Liu et al., 2022). Allergic rhinitis is an inflammatory condition of the nasal cavity caused by an immunoglobulin E-mediated type 1 hypersensitivity reaction to a specific external allergen, characterized by four symptoms: watery rhinorrhea, nasal congestion, itching, and sneezing. Allergic rhinitis has a very high prevalence and tends to increase gradually with various factors including environmental stimuli, as a result, medical costs for care tend to increase, the high prevalence of this condition, the severe deterioration in quality of life (QOL), and the social burden of care have led to various treatment options, including anti-allergy medications, immunotherapy, environmental controls, nasal irrigation, and surgery (Park et al., 2023).

Allergic rhinitis is caused by microparticles in the air that are called aeroallergens. When these microparticles reach the nasal mucosa by inhalation, the type 1 hypersensitivity reaction occurs against these allergens in sensitive individuals. Therefore, allergen avoidance and environmental controls are the first-line treatment of AR, with significant coverage in the treatment guidelines (Mengi et al., 2022). The treatment of the condition potentially focuses on alleviating the symptoms rather than addressing the root cause of the issue. Hence, patients are often recommended to avoid direct contact with allergens such as pollen, dander, dust mites, and cockroach infestations, which can potentially stimulate the arousal of rhinitis (Mao et al., 2022).

Nasal epithelial cells exposed to external allergens induce Th2 inflammatory responses that then spread to the upper airway mucosa. The allergen-mediated inflammatory immune response begins with increased secretion of epithelial cell-derived cytokines, and the process of allergen sensitization involves the participation of antigen-presenting cells, T lymphocytes, and B lymphocytes and depends on environmental allergen exposure. Sensitization results in generation of allergen-specific IgE, which circulates in the peripheral blood and attaches itself to the surface of all mast cells and basophils, including those of the nasal mucosa. Subsequent nasal exposure to allergen activates these cells, and the release of classic mediators of the allergic reaction triggers acute nasal symptoms. Therefore, the nasal epithelium might be responsible for the vast majority of allergic inflammation in response to inhaled allergens (Kim et al., 2022).

Many studies reported that the current therapy of AR includes anti-histamines, steroids, montelukast (a selective cysteinyl leukotriene receptor antagonist) and immunotherapies. However, these therapies have unwanted side effects and a high risk of AR recurrence, especially during the pollen season (Ding et al., 2023). Children often struggle with medication compliance, and some parents hesitate to give medication, namely corticosteroids, at a young age. Allergen avoidance measures could then be a good option for parents to apply to their offspring, to manage AR symptoms (Tomé & Lourenço, 2023).

Primary care providers are an important source of health information for patients, as many patients choose treatment related to their health based on a recommendation

from a trusted source, and they play a key role in educating their patients on preventing diseases and treating simple ailments at home (Abdullah et al., 2022).

Herbal therapy is a frequently preferred treatment modality for allergic rhinitis by patients who are dissatisfied with conventional treatment modalities. Numerous studies have investigated the efficacy and safety of herbal agents in the management of AR (Bayram et al., 2021). Home remedies are simple measures of symptom management for minor health complaints. Examples can be wet packs, foodstuffs, skin applications and baths (Chen et al., 2020). It's a traditional therapy often utilizing natural products, nutritional supplements, or physical measures, its effectiveness may be supported by familial, local, or culturally accepted stories or rituals (Islam et al., 2021).

Caregivers should be educated by community health nurses about the need of avoiding allergens and pollutants both inside and outside the house. Persuading parents not to smoke in the home, as well as avoiding gas cookers can help children's symptoms. Its common sense to avoid major exposures to known allergies like pets, house dust mites, and mold (Scadding et al., 2021). A caregiver is someone who is responsible for looking after another person, for example, a person who has a disability, or is ill or very young (Faronbi et al., 2019). A family caregiver is 'a person who cares for relatives who are long-term ill, elderly or disabled (Jarling et al., 2020).

Significance of the Research

Children's and adult's respiratory allergies are a major cause of morbidity, one of the most common disorders of the respiratory system that affects people of all ages and both sexes is allergic rhinitis. Nasal congestion, sneezing, rhinorrhea, itching in the nose, and other symptoms of allergic rhinitis are widespread (Chavan et al., 2023).

Allergic rhinitis (AR) is a widely prevalent condition of the upper respiratory tract. It affects about 10% to 40% of the population worldwide (10–30% in adults and up to 40% in children). The prevalence of the disease in some countries is continuously increasing, possibly due to lifestyle changes and increased urbanization (Hallit et al., 2018). Poorly controlled AR can lead to complications, such as otitis media, chronic sinusitis, and conjunctivitis (Zhou et al., 2022).

Nasal irritation may be alleviated with the use of several tried-and true home remedies and palliative care techniques (Jain et al., 2023). Allergies have significant socioeconomic impacts on the lives of the sufferers; therefore, a good knowledge, attitude and practice towards AR is needed for long-term disease prevention (Prasad et al., 2022).

SUBJECTS and METHODS

The study aims

This study aimed to assess caregivers knowledge of allergic rhinitis and its home remedies among preschool children.

Research Questions

This study responded the following questions:

1. What is the caregivers' level of knowledge and practice of allergic rhinitis and its home remedies among preschool children?
2. Is there a correlation between the caregivers' level of knowledge of allergic rhinitis and its home remedies

and sociodemographic data among preschool children?

3. Is there a correlation between the caregivers' level of knowledge of allergic rhinitis and the practice for their home remedies among preschool children?

Inclusion Criteria:

A child under five years old who have signs and symptoms of allergic rhinitis.

Exclusion Criteria

A child born with congenital malformations of the nose and mouth as cleft palate and cleft lip.

Study Design

A descriptive cross-sectional research design was used in the present study.

Study Setting

The study was conducted at a pediatric outpatient clinic at Minia University Hospital for Maternity and Childhood. Obstetric and Pediatric Minia University Hospital located in northeast of Minia University, and west of the Nile River. The hospital consists of 4 floors, other than the ground floor. It consists of 20 clinics and 2 units. Pediatric outpatient clinic is located on the first floor and provides a wide range of health care services for urban and rural populations in the near and far districts of the Minia governorate. The clinic works for six days for pediatric patients (from Sunday to Thursday, from 9 a.m. to 12.30 p.m.).

Study Population:

A simple random sample technique was used. The outpatient pediatric clinic accepts all children patients with different age. The sample was collected by using the inclusion requirements, in the current study the participants have signs and symptoms for allergic rhinitis who were visiting outpatient pediatric clinic at Obstetric and Pediatric Minia University Hospital during the study period from August 2022 to January 2023.

Data Collection Tools:

A structured interviewing questionnaire was designed and used by the investigator after extensive reviewing of the related literature. The questionnaire was consisted of three tools covering the following:

Tool (I): Structured interviewing questionnaire and contained two parts :

Part (1): - Socio-Demographic characteristics for caregivers

Was made up of eleven (13) items related to age, gender, residence, education, occupation, marital status, type of family, number of children in family, floor number in which you live, number of rooms, ventilation, crowded index by Torshizian and Grimes., 2020 and source of information regarding allergic rhinitis. The crowding index was calculated by using the following equation ; $\frac{\text{Number of family members}}{\text{Number of house rooms}}$.

There are three categories of crowding index as follow ; Not crowded ≤ 1.0 person per room, Crowded $>1.0 \leq 1.5$ people per room , and severely crowded >1.5 people per room. The family member crowding index(F.C.I) formula adopted from Torshizian and Grimes.

Part (2): Socio-Demographic characteristics for preschool children

Was made up of six (5) items related to the child as age, gender, child order in the family, type of delivery, type of feeding if less than 2 years.

Tool (II): Knowledge of caregivers regarding allergic rhinitis

This tool was adapted by (Alreshidi, et al., 2017) and modified by the investigator. It used to assess the knowledge of caregivers regarding allergic rhinitis. It consists of thirty (30) questions: six (6) questions about definition of allergic rhinitis include: - is it hypersensitivity of nasal mucosa, allergic rhinitis is genetically inherited disease, allergic rhinitis is run in the families, is a contagious disease, is linked to asthma and conjunctivitis, allergic rhinitis is a chronic disease.

Nine (9) questions about causes of allergic rhinitis include: - pet dander, dust mite, pollen, body spray, moisture, air pollution, all types of smoking bad ventilation and others.

Five (5) questions about symptoms of allergic rhinitis include: - nasal congestion, nasal itching, runny nose, sneezing and others.

Six (6) questions about complication of allergic rhinitis include: - otitis media middle ear effusions, adenoid hypertrophy, respiratory distress, affect social health activity and others and four (4) questions about prevention and drug treatment include: - using steroid nasal sprays for treatment, using antihistamines for treatment, if strictly follow doctor's instructions and if they know that symptoms can be prevented.

Scoring system for tool (II): Knowledge of caregivers regarding allergic rhinitis

The response of "yes", "no", or "I don't know" will be scored 1 for "yes", and "zero" for both "no", or "I don't know." These scores will be summed and converted into a percent score.

It classified into 3 categories:

- Good knowledge if score > 70%. (>21).
- Average knowledge if score from 50 - 70% (15-21).
- Poor knowledge if score <50% (<15) (Al-Rasheedi, 2023).

Tool (III): Caregivers practice questionnaire regarding home remedies for allergic rhinitis

This tool was developed by the investigator based on reviewing literature (Alreshidi et al., 2017; AlOtaibi & AlAteeq 2018; Adegbiyi et al., 2022; Fasola et al., 2022) of allergic rhinitis, it was used to assess caregiver's practice regarding home remedies to children under five years who having AR, it consists of fifteen (15) questions that help control allergic rhinitis such as (it's can minimize your symptoms of allergic rhinitis, it's a natural ways used to decrease symptoms of allergic rhinitis, the symptoms of allergic rhinitis are minimized by not being exposed to pollen).

Scoring system for tool (III): Caregivers practice questionnaire regarding home remedies for allergic rhinitis:

The response of "yes", "no", or " " will be scored 1 for "yes", and "zero" for "no". These scores was summed and converted into a percent score.

It classified into 2 categories:

- Good practice if score > or equal 70%. (> 11)
- Poor practice if score <70% (< 11) (Adegbiyi et al., 2022).

Validity

The tools' content validity was established to see how well they measured what was supposed to be measured. A panel of five experts in the fields of community health nursing evaluated the developed tools.

Reliability:

Assessed internal consistency, it was possible to establish how closely the items measure the same definition and how closely they are related to one another. It was created in its final form and then subjected to the Cronbach's alpha coefficient test (0.96 and 0.71, respectively), which was used to assess its reliability.

Pilot study:

Pilot study was conducted on 10% (31 patients) of the intended sample size to evaluate the study instruments' content, efficacy, and time requirements. The basic sample was left alone, and the pilot research was included in the study.

Data collection procedure:

- Permission to conduct the study was obtained from the Director of Minia University Hospital for Maternity and Childhood. The approval of an ethical committee at the Faculty of Nursing at Minia University was obtained.
- The current study was conducted by preparing different data collection tools, which were done through the schedules of each outpatient clinic. The selected sample was informed individually by the investigator about the purpose and nature of the study, and then the investigator obtained oral consent from those who accepted to participate in this study.
- The investigator met caregivers from Obstetric and Pediatric University Hospital, and it took around 10–20 minutes to fill the tools with an average of 5–10 caregivers per day. The investigator visited each hospital for two days a week from 9:30 a.m. to 12:30 p.m. until the pre-determined sample size was achieved between the beginning of August 2022 and the end of June 2023 (through six months).
- The investigator completed the questionnaires for the illiterate caregivers, whereas the educated completed the questionnaires by himself.

Ethical consideration:

The Minia University Faculty of Nursing's Research Ethics Committee awarded its preliminary written approval. After receiving information about the goals and benefits of the study, participants verbally agreed. Each evaluation form was labelled and left blank to protect participant privacy and anonymity. They were made aware that they might revoke their consent to participate in the current study at any time

Statistical Analysis:

Statistical Package for Social Studies (SPSS) version 24 was applied to arrange, classify, and analyze the collected data. For qualitative and quantitative variables, respectively,

the mean and standard deviations of the data were reported using descriptive statistics. To demonstrate the relationship between the quantitative measures, correlation was used. The

Chi-square was utilized in tests of relation, and a statistically significant difference should be taken into account when the p-value ≤ 0.05.

Results

(1): Distribution of the studied sample according to their socio-demographic characteristics of the caregivers (NO = 318), 2022.

Caregiver's socio-demographic characteristic	No	%
Age		
18-28 yrs.	123	38.7
>28-38yrs	133	41.8
>38-48 yrs.	62	19.5
Mean ± SD 30.93 ± 6.822		
Sex		
Male	58	18.2
Female	260	81.8
Residence		
Urban	125	39.3
Rural	193	60.7
Education		
Read and write	44	13.8
Preparatory	79	24.8
Secondary	127	39.9
University or higher	68	21.4
Occupation		
Employee	63	19.8
Not employee	255	80.2
Marital status		
Single	2	.6
Married	305	95.9
Widow	9	2.8
Divorce	2	.6
Type of family		
Nuclear	127	39.9
Extended	191	60.1
Number of children in family		
≤ 3	249	78.3
> 3	69	21.7
Floor number in which you live		
First	21	6.6
Second	98	30.8
Third	111	34.9
Fourth	68	21.4
Fifth	20	6.3
Ventilation		
Natural	260	81.8
Artificial	1	.3
Both	57	17.9
NO of windows		
One	79	24.8
Two	203	63.8
Three	36	11.3

Table 1 shows that 41.8% of the studied sample had an age range of >28 to 38 years, with a mean age of 30.93 ± 6.822, and that 81.8% of the studied sample were female and 18.2% of them were male. Also, 60.7% of the studied sample lived in rural areas, 39.9% had secondary education, 80.2% were not employed, 95.9% were married, and 60.1% lived in extended family types. On the other hand, 78.3% of the studied sample had less than three children; 34.9% lived on the third floor; 81.8% used natural ventilation; and 63.8% had only two windows

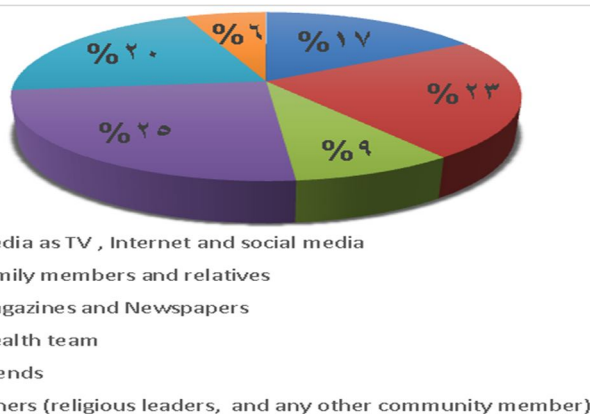


Figure (1) Distribution of the studied sample according to their Source of information regarding allergic rhinitis (NO = 318), 2022.

Figure (1) illustrates that, 25% of the studied sample obtained their information from health team followed by 23% through family members and relatives, and 20% from their friends.

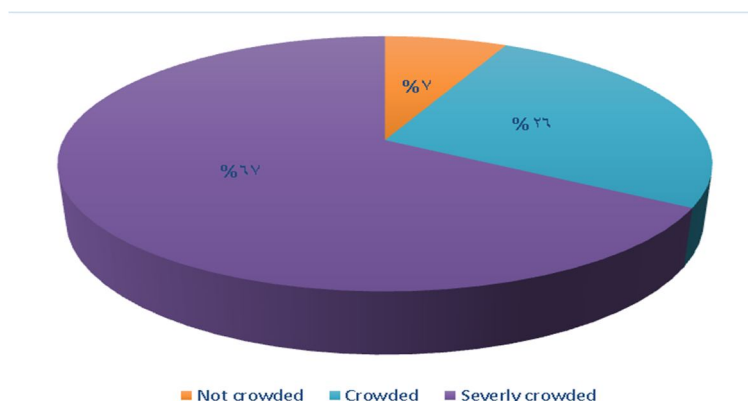


Figure (2) Distribution of the studied sample according to their Crowded home (NO = 318), 2022.

The above figure demonstrates that 67% of the studied sample were lived in severely crowded home and 7% were lived in home not crowded.

Table (2): Distribution of the studied sample according to their socio-demographic characteristics of the child (NO = 318), 2022.

Child socio-demographic characteristic	No	%
Age		
< 3 yrs	183	57.5
> 3-5 yrs	135	42.5
Sex		
Male	141	44.3
Female	177	55.7
Child order in the family:		
First	46	14.5
Second	116	36.5
Third	93	29.2
Fourth	51	16.0
Fifth	10	3.1
Sixth	2	.6
Type of delivery		
Normal delivery	136	42.8
Caesarean Section	182	57.2
Type of feeding for child less than 2 years		
Breast feeding	93	29.2
Bottle feeding	2	.6
Both	82	25.8

Table (2) shows that 57.5% of the studied sample had an age less than three years, and 55.7% of the studied sample were female. Also, 36.5% of the studied sample were the second child in the family, and 57.2% of the studied sample were delivered by caesarean section (CS). Finally, 29.2% of children less than 2 years old were fed through breast feeding (BF).

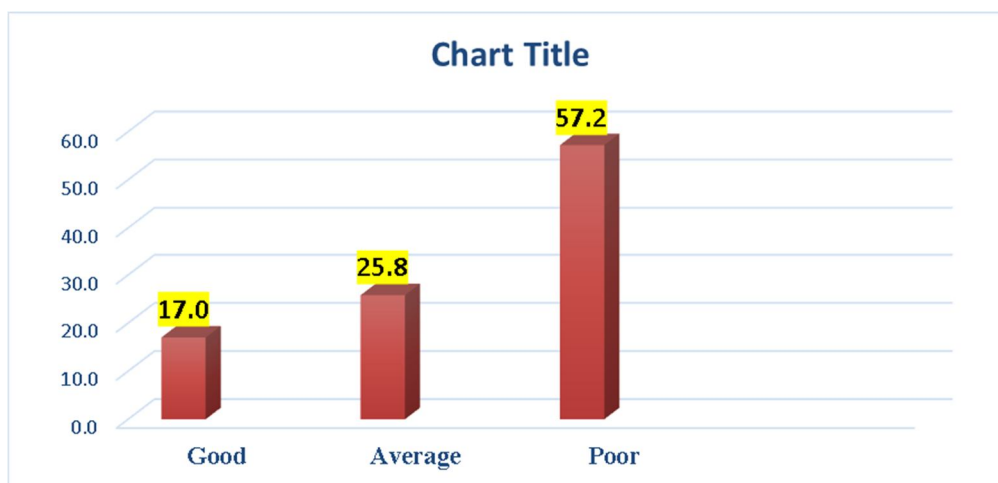


Figure (3): Distribution of the studied sample according to their total score of knowledge toward allergic rhinitis (NO = 318), 2022.

Figure 3 illustrates that 57.2% of the studied sample had poor knowledge of allergic rhinitis, while 17% had good knowledge and 25.8% were in the average range.

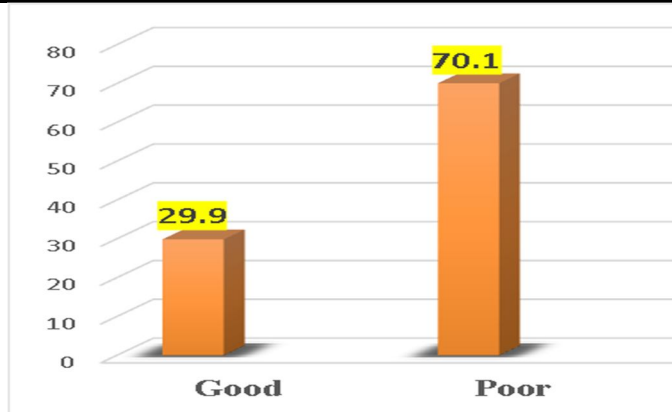


Figure (4). Distribution of the studied sample according to their total score of practice toward home remedies for allergic rhinitis (NO = 318), 2022.

Figure 4 illustrates that 70.1% of the studied sample had poor practice toward home remedies for allergic rhinitis, while 29.9% had good practice.

Table (3): Relation between total score of knowledge toward allergic rhinitis of the studied sample and their sociodemographic characteristics of the caregivers (NO = 318), 2022.

Caregiver's socio-demographic characteristic	Total score of knowledge						X ²	(p-value)
	Poor (182)		Average (82)		Good (54)			
	NO	%	NO	%	NO	%		
Age								
18-28 yrs	72	58.5	30	24.4	21	17.1	2.247	0.991
>28-38yrs	75	56.4	36	27.1	22	16.5		
>38-48 yrs	35	56.5	16	25.8	11	17.7		
Sex								
Male	21	36.2	21	36.2	16	27.6	13.165	0.001*
Female	161	61.9	61	23.5	38	14.6		
Residence								
Urban	54	43.2	43	34.4	28	22.4	16.574	0.001*
Rural	128	66.3	39	20.2	26	13.5		
Education								
Read and write	22	50.0	17	38.6	5	11.4	10.351	0.111
Preparatory	53	67.1	12	15.2	14	17.7		
Secondary	73	57.5	33	26.0	21	16.5		
University or higher	34	50.0	20	29.4	14	20.6		
Occupation								
Employee	29	46.0	23	36.5	11	17.5	5.676	0.05*
Not employee	153	60.0	59	23.1	43	16.9		
Marital status								
Single	1	50.0	1	50.0	0	0.0	2.667	0.849
Married	174	57.0	79	25.9	52	17.0		
Widow	6	66.7	1	11.1	2	22.2		
Divorce	1	50.0	1	50.0	0	0.0		
Type of family								
Nuclear	62	48.8	43	33.9	22	17.3	7.973	0.02*
Extended	120	62.8	39	20.4	32	16.8		
Number of children in family								
≤ 3	136	54.6	64	25.7	49	19.7	6.291	0.04*
> 3	46	66.7	18	26.1	5	7.2		
Floor number in which you live								
First	18	85.7	1	4.8	2	9.5	16.441	0.04*
Second	60	61.2	22	22.4	16	16.5		
Third	66	59.5	27	24.3	18	16.2		
Fourth	31	45.6	24	35.3	13	19.1		
Fifth	7	35.0	8	40.0	5	25.0		
Ventilation								
Natural	146	56.2	68	26.2	46	17.7	1.389	0.846 ^{NS}
Artificial	1	100.0	0	0.0	0	0.0		
Both	35	61.4	14	24.6	8	14.0		
Number of windows								
One	47	59.5	17	21.5	15	19.0	1.926	0.75 ^{NS}
Two	113	55.7	55	27.1	35	17.2		
Three	22	61.1	10	27.8	4	11.1		
Crowding index								
Not crowded	9	60	4	26.7	2	13.3	1.094	0.895 ^{NS}
Crowded	29	52.7	17	30.9	9	16.4		
Severely crowded	144	58.1	61	24.6	43	17.3		
No	149	61.3	65	26.7	29	11.9		

NS= Not statistically significance * Statistically significant at $P - \text{value} \leq .05$ ** Statistically significant at $P - \text{value} \leq .01$.

Table (3) reveals the relation between the total score of knowledge toward allergic rhinitis of the studied sample and the socio-demographic characteristics of the caregivers; statistically significant differences were found in the study sample's regarding sex, residence, education level, occupation, family type, number of children in the family, and floor number in which you live, where the p-values were (0.001, 0.001, 0.05, 0.02, 0.04, and 0.02), respectively.

Table (4): Relation between total score of knowledge toward allergic rhinitis of the studied sample and their sociodemographic characteristics of the child (NO = 318), 2022.

Child socio-demographic characteristic	Total score of knowledge						X ²	(p-value)
	Poor (182)		Average (82)		Good (54)			
	NO	%	NO	%	NO	%		
Age								
< 3 yrs	101	55.2	52	28.4	30	16.4	1.557	0.459 ^{NS}
> 3-5 yrs	81	60.0	30	22.2	24	18.3		
Gender								
Male	82	58.2	34	24.1	25	17.7	0.396	0.820 ^{NS}
Female	100	56.5	48	27.1	29	16.5		
Child order in the family								
First	28	60.9	11	23.9	7	15.2	12.423	.258 ^{NS}
Second	64	55.2	27	23.3	25	21.5		
Third	48	51.6	27	29.0	18	19.4		
Fourth	35	68.6	13	55.5	3	5.9		
Fifth	6	60.0	4	40.0	0	0.0		
Sixth	1	50.0	0	0.0	1	50.0		
Type of delivery:								
Normal delivery	75	55.1	38	27.9	23	16.9	.609	0.737 ^{NS}
Cesarean section (CS)	107	58.8	44	24.2	31	17.0		
Type of feeding for child less than 2 years (177)								
Breast feeding	47	50.5	26	28.0	20	21.5	13.380	0.01*
Bottle feeding	1	100.0	0	0.0	1	100.0		
Both	49	59.8	22	26.8	11	13.4		

NS= Not statistically significance * Statistically significant at $P - \text{value} \leq .05$ ** Statistically significant at $P - \text{value} \leq .01$.

Table (4) shows a relation between the total score of knowledge toward allergic rhinitis of the studied sample and their socio-demographic characteristics; statistically, significant differences were found in the study sample regarding type of feeding for children less than 2 years, where the p-values were 0.01.

Table (5): Relation between total score of practice toward home remedies for allergic rhinitis of the studied sample and their socio-demographic characteristic of caregivers (NO = 318), 2022.

Caregiver's socio-demographic characteristic	Total score of Practice				X ²	P-value
	Poor (223)		Good (95)			
	NO	%	NO	%		
Age						
18-28 yrs	85	69.1	38	30.9	0.242	0.886 ^{NS}
>28-38yrs	93	69.9	40	30.1		
>38-48 yrs	45	72.6	17	27.4		
Sex						
Male	33	56.9	25	43.1	5.926	0.02*
Female	190	73.1	70	26.9		
Residence						
Urban	76	60.8	49	39.2	8.55	0.003**
Rural	147	76.2	46	23.8		
Education						
Read and write	35	79.5	9	20.5	18.46	0.001**
Preparatory	68	86.1	11	13.9		
Secondary	77	60.6	50	39.4		
University or higher	43	63.2	25	36.8		
Occupation						
Employee	41	65.1	22	34.9	0.955	0.328 ^{NS}
Not employee	182	71.4	73	28.6		
Marital Status						
Single	2	100.0	0	0.0	3.347	0.341 ^{NS}
Married	211	69.2	94	30.8		
Widow	8	88.9	1	11.1		
Divorce	2	100.0	0	0.0		
Type of family						
Nuclear	83	65.4	44	34.6	2.298	0.130 ^{NS}
Extended	140	73.3	51	26.7		
Number of children in family						
≤ 3	177	71.1	72	28.9	0.503	0.478 ^{NS}
> 3	46	66.7	23	33.3		
Floor number in which you live						
First	21	100.0	0	0.0	23.35	0.001**
Second	78	79.6	20	20.4		
Third	74	66.7	37	33.3		
Fourth	36	52.9	32	47.1		

Caregiver's socio-demographic characteristic	Total score of Practice				X ²	P-value
	Poor (223)		Good (95)			
	NO	%	NO	%		
Fifth	14	70.0	6	30.0		
Ventilation						
Natural	180	69.2	80	30.8	0.870	0.647 ^{NS}
Artificial	1	100.0	0	0.0		
Both	42	73.3	15	26.3		
Number of windows						
One	65	82.3	14	17.7	7.635	0.02*
Two	133	65.5	70	34.5		
Three	25	69.4	11	30.6		
Crowding index: Person/Room						
Not crowded	12	80.0	3	20.0	1.888	0.386 ^{NS}
Crowded	135	63.6	20	36.4		
Severely crowded	176	71.0	72	29.0		

NS= Not statistically significance * statistically significant at $P - value \leq .05$ ** statistically significant at $P - value \leq .01$.

Table (5) shows a relation between the total score of practice toward home remedies for allergic rhinitis of the studied sample and their socio-demographic characteristics as caregivers; statistically, significant differences were found in the study sample regarding sex, residence, education, floor number in which they live, and number of windows, where the p-values were (0.02, 0.003, 0.001, 0.001, and 0.02) respectively.

Table (6): Relation between total score of practice toward home remedies for allergic rhinitis of the studied sample and their sociodemographic characteristics of the child (NO = 318), 2022.

Child socio-demographic characteristic	Total score of practice				X ²	P-value
	Poor (223)		Good (95)			
	NO	%	NO	%		
Age						
< 3 yrs	13	71.0	53	29.0	0.171	0.679 ^{NS}
> 3-5 yrs	93	68.9	42	31.1		
Sex						
Male	100	70.9	41	29.1	0.077	0.782 ^{NS}
Female	123	69.5	54	30.5		
Child order in the family						
First	34	73.9	12	26.1	3.162	0.675 ^{NS}
Second	80	69.0	36	31.0		
Third	68	73.1	25	26.9		
Fourth	35	68.6	16	31.4		
Fifth	5	50.0	5	50.0		
Sixth	1	50.0	1	50.0		
Type of delivery:						
Normal delivery	95	69.9	41	30.1	0.008	0.927 ^{NS}
Cesarean section (CS)	128	70.3	54	29.7		
Type of feeding for child less than 2 years (177)						
Breast feeding	61	65.6	32	34.4	9.909	0.007**
Bottle feeding	0	0.0	2	100.0		
Both	66	80.5	16	19.5		

NS= Not statistically significance * Statistically significant at $P - value \leq .05$ ** Statistically significant at $P - value \leq .01$.

Table (6) shows a relation between the total score of practice toward home remedies for allergic rhinitis of the studied sample and their socio-demographic characteristics; statistically, significant differences were found in the study sample type of feeding for children less than 2 years, where the p-values were (0.007).

Table (7) Correlations between total score of knowledge and total score of practices of the studied sample toward allergic rhinitis (NO = 318), 2022.

Variables	A total score of knowledge	A total score of practices
A total score of knowledge		
r.Value	1	0.435
P.Value	-	0.001
A total score of practices		
r.Value	0.435	1
P.Value	0.001	-

N.B *Significant is considered highly significant at p-value <0.01.**

Table (7) reveals that there is a positive statistically significant correlation between the total score of knowledge and the total score of practices of the studied sample toward allergic rhinitis, which has the strongest positive statistically significant correlation

Discussion

Epidemiological data presented in the Allergic Rhinitis and its impact on Asthma (ARIA) guidelines indicates that AR affects 10 to 40% of the global population. AR is characterized by repeated attacks and is not easily curable. The most widely scattered illness that can be found

in all age groups in western medicine is allergic rhinitis (**Madhuranga et al., 2023**). As regards to allergic rhinitis hazards, the early onset of symptoms and later development to asthma allergic rhinitis effect on all age group. Therefore, it is essential to early prevent, reduce the prevalence, risk of childhood asthma and allergies. In addition to, AR is

determined by Level of information and early exposure to outdoor and indoor environmental pollution e.g., environmental tobacco smokes (ETS) and allergens during different time window (Lu et al., 2023).

Vathanophas et al., (2019), & Saxena et al., (2019), reported that the best natural remedy for allergies is, when possible, avoidance. Both doctors and natural healers will suggest that you limit or avoid allergens, which are what causes your allergic reaction. Some home remedies for allergies, like nasal irrigation or certain essential oils, can help relieve some allergy symptoms.

The current study revealed that more than one-third of the studied sample had an age range of >28 to 38 years, with a mean age of 30.93 ± 6.822 , and that the majority of them were female among the participants. This is logic because at this age, the participant may have more than one child under less age of five, and most males were busy with their jobs, so the mothers or other caregivers in the family went to the outpatient clinic. This agreement with Gu et al., (2023), who conducted a study on "Knowledge, attitudes, and practice towards allergic rhinitis in patients with allergic rhinitis: a cross-sectional study," demonstrated that more than a third of the participants were 26–35 years old and more than half of them were female in their study in Chinese. Moreover, this study is inconsistent with Bøgelund et al., (2022), who conducted a study about "preference for sublingual immunotherapy with tablets in a Spanish population with allergic rhinitis" and reported that the caregivers included in the studied sample were 42 years old on average, and more than half were female.

The study findings denote that nearly two-thirds of the studied sample lived in rural areas, and more than one-third had secondary education. The majority were not employed. This result is due to the lack of health services in rural areas, and they seek these services in outpatient clinics in the city, neglecting education at the expense of early marriage. They also work in farming, not having secure jobs. This disagrees with Aburiziza et al., (2022), who conducted a study about "the prevalence, clinical picture, and triggers of allergic rhinitis in the Saudi population" and reported that the prevalence of allergic sensitization rose steadily from less than one quarter in villages to one quarter in rural towns to nearly one third in cities, indicating that the degree of socioeconomic development and urbanization may have a direct impact on the prevalence rate of allergic sensitization. Furthermore, this result is not agreed upon by Gu et al., (2023) in their study in Chinese, who reported that nearly two-thirds of people live in urban areas, more than half have high school or technical school education or below, and more than half have long-term stable jobs.

The result of the current revealed that most of them married, and nearly two-thirds lived in extended family types. This is due to the rural tradition of early marriage and living together in one house, sharing the same food, and staying together. This agreement with Phetruang et al., (2023), who conducted a study about "The Situation of Smoke Exposure at Home and Respiratory Problems in Early Childhood, Nakhon Si Thammarat Province," demonstrated that the majority of the caregivers were married and nearly one quarter were engaged in agriculture.

Also noted in the results that more than three-quarters of the studied caregiver sample had fewer than three children; more than one-third lived on the third floor; the majority used natural ventilation; and nearly two-thirds had

only two windows. This is due to the fact that rural people have large houses and spaces in addition to natural ventilation and farms. This was similar to Liu et al., (2023), who conducted a study about "Allergen detection and logistic multifactor analysis of allergic rhinitis" and found that the proportion of environmental factors was higher, including the number of residents (≤ 3), daily ventilation and cleaning (no), and living environment (rural) in the observation group.

The result of the current study illustrated that, one quarter of the studied sample obtained their information from health team followed by nearly one quarter through family members and relatives, and 20% from their friends. This result is rationalized by that despite allergic rhinitis is a severe and chronic disease but its underestimated especially in developing countries, and as caregiver studied sample live in rural area and have moderate educational level they depend on others to reach that information as they get the chance for it, so they obtain that information from health team, family members and clinic. This result is consisted with Adegbiyi et al., (2022), who reported that nearly two third of ear, nose and throat specialist/other doctors were the commonest sources of knowledge on allergic rhinitis (59.8%) followed by more than third from ear, nose and throat surgeon (34.1%) and more than one quarter from other sources included friends/relatives (28.5%).

The findings of the current study indicate that, regarding child sociodemographic characteristics, more than half of them were less than three years old, and more than half of them were female. This result was in line with Chew et al., (2023), who conducted a study about "The trend of the burden of allergic rhinitis pre- and post-COVID-19 pandemic in the urban population of Perak, Malaysia" and stated that the AR prevalence fell drastically across all age groups but increased by more than one third among those aged 5 years old and less. These results are inconsistent with Hong et al., (2020), who conducted a study about clinical manifestations of allergic rhinitis by age and gender in a 12-year single-center study and reported that the prevalence of allergen sensitization progressively decreased with age after peaking at between 20 and 29 years, with a higher rate in males than in females ($P = .046$).

The result of the present study indicated that more than one-third of the children were the second child in the family, and more than half of them were delivered by caesarean section (CS). Nearly one-third of children less than 2 years old were fed through breast feeding (BF). This result is due to the increase in the rate of CS in the last period, and most mothers in rural areas prefer breast feeding and lack financial resources for artificial feeding. The current study agrees with the study of He et al., (2023), who conducted a study about "The global/local (limited to some regions) effect of cesarean delivery on the risk of pediatric allergic rhinitis: a systematic review and meta-analysis" and reported that the results of subgroup analysis by region (Asia, Europe, South America, and North America) showed that the risk of allergic rhinitis in children delivered by cesarean section was most increased in South America (OR: 1.67, 95%: 1.10–2.52) as there is an association between cesarean section as the mode of delivery and the increased risk of pediatric allergic rhinitis, and cesarean section is a risk factor for allergic rhinitis.

The findings of the current study illustrated that more than half of the studied sample had poor knowledge of allergic rhinitis, while a minority had good knowledge, and more than one quarter were in the average range. The reason for this

finding is that most participants are from rural areas and live in extended families, where they spend most of their time in daily home activities and lack awareness regarding many diseases. They also depend on medication to treat their children. The current study, supported by **Paul et al., (2020)**, "Knowledge assessment study among caregivers about various allergic disorders in a hospital-based pediatric outpatient department in North India," mentioned that limited knowledge and the existence of misconceptions regarding allergic disorders in the general population necessitate the need to improve awareness. On the other hand, it was found that the result of the current study contradicted the study of **Adegbiji et al., (2022)**, who conducted a study on "Knowledge, Attitudes, and Practices of Health Seeking Behaviors of Parents of Children with Allergic Rhinitis in Nigeria," who reported that parental knowledge of awareness of allergic rhinitis in Nigeria was less than half.

The findings of the present study revealed that nearly three-quarters of the studied sample had poor practice toward home remedies for allergic rhinitis, and more than one-quarter had good practice. The reason for this finding is that a lack of sufficient knowledge among caregivers about any disease leads to poor practice for it, and vice versa. These findings are in agreement with **Al-Rasheedi's (2023)** study in Northern Saudi Arabia, which mentioned that less than one quarter of AR patients had excellent practices with INCS treatment for their AR. This finding is congruent with the study done by **Mohammed et al., (2022)** on their study in Khartoum, Omdurman, and Bahri, which showed that only approximately 5% of the participants had a poor level of practice, and **Gu et al., (2023)** in the same line, who reported poor knowledge and unfavorable attitudes but good practice toward AR. The mean practice score was 34.13 ± 7.55 (possible range: 9–45), indicating good practice in their study in China.

There were statistically significant differences between the total score of knowledge toward allergic rhinitis of the studied sample and the socio-demographic characteristics of the caregivers, such as sex and occupation. From the researcher's opinion, this may be related to the knowledge actually affected by our socio-demographic data as occupation and sex, and this is owing to workers' ability to use social media, search for accurate information, read posters provided by the government in various workplaces, and share any new information regarding allergic rhinitis with coworkers. This finding is consistent with **Mohammed et al., (2022)** study in Khartoum, Omdurman, and Bahri, which showed a statistically significant relationship between pharmacists' knowledge and socio-demographic characteristics such as age (p -value = 0.001). This finding is contradicted with the study of **Miao et al., (2023)**, who conducted a study about "exacerbation of allergic rhinitis by the commensal bacterium *Streptococcus salivarius*" and reported that there were no significant differences in age or sex between the AR and HC groups, and the types of AR (severity, seasonality, and frequency) were about equally distributed among patients with AR.

The current study revealed that there was a highly statistically significant relationship between the total score of knowledge toward allergic rhinitis and their residence. This may be rationalized as caregivers who live in rural areas have less access to all health services and modern medical devices with more experienced doctors. This finding is inconsistent with **Nur Husna et al., (2022)**, who conducted a study about "Allergic Rhinitis: A Clinical and Pathophysiological

Overview" and reported that AR is more prevalent in urban areas compared with rural areas. Also, a study by **Song et al., (2023)** titled "Geographical Differences of Risk of Asthma and Allergic Rhinitis According to Urban and Rural Areas" reported that the risk of asthma was higher in urban areas compared to rural areas. Also, this finding is inconsistent with **Adegbiji et al., (2022)**, who reported that the majority of the patients and parents were urban dwellers, while rural dwellers were poorly represented in their study in Nigeria.

The study finding denoted that there was a relation between the total score of knowledge toward allergic rhinitis of the studied sample and their family type, number of children in the family, and floor number in which they live. From the researcher's opinion, caregivers depend on their families who live with them at home to provide care for their children, and they have less experience and health information regarding diseases. The more children there are, the less interest the mother has in knowing useful health information because she is busy most of the time. In order to prevent their children from falling out of the windows and hurting themselves, families who live on the second floor avoid areas with sufficient ventilation. This result is consistent with **Edyta et al., (2023)** study about "Evaluation of selected aspects of the hygiene hypothesis and their effect on the incidence of allergy, which reported that having numerous siblings has a protective effect against developing AR; the same protective effect was observed in households with a large number of people, and families with many children have lower rates of AR and asthma. This finding is not consistent with **Nafei & Behniafard (2023)**, who conducted a study on "The relationship between house type and truck traffic with allergic rhinitis in adolescents" and reported that the prevalence of allergic rhinitis did not differ significantly according to the type of house and the floor ($P > 0.05$).

There was a highly statistically significant relationship between the total score of knowledge toward allergic rhinitis of the studied sample and their education. The results of the present study indicate that slightly more than two-thirds of the studied sample with preparatory education has poor knowledge about allergic rhinitis. This finding can be explained by the fact that a low educational level and lack of information result in poor knowledge and orientation. This result is in the same line with **Ocak et al., (2017) & Lee et al., (2020) & Al-Rasheedi et al., (2023)** study in Northern Saudi Arabia, which mentioned that the study explored a positive association between education status and the knowledge category ($p < 0.001$). Hence, a patient's education is also a critical factor to consider when a physician imparts INCS knowledge, as the instructions in the medication leaflet may not be understandable by all AR patients.

The results of the present study indicate significant differences between the total score of knowledge toward allergic rhinitis of the studied sample and the sociodemographic data of the child regarding type of feeding for children less than 2 years. This result can be rationalized by the fact that breast feeding is considered a protective factor against many diseases, such as allergic rhinitis, and children exposed to supplementary feeding alone are not protected from allergic rhinitis. This finding is consistent with **Yazar & Midaglazole's.,(2022)** study on "The prevalence and associated factors of asthma, allergic rhinitis, and eczema in Turkish children and adolescents," which reported that eating habits, breastfeeding, and the student's gender were

determined to be related factors for allergic rhinitis symptoms in the past 12 months.

There was a highly statistically significant relationship between the total score of practice toward home remedies for allergic rhinitis and their sex and residence. Because the sample knowledge is lacking and the majority of them are from rural areas, their practice will also be poor due to the mothers' involvement with household tasks. This is in line with **Song et al., (2023)** study in Yangsan, Republic of Korea, which reported that genetic variations between urban and rural populations within each country may differ and could also contribute to the urban and rural differences in the incidence of allergic disease.

Noticed from the current study that, as regards the relation between the total score of practice toward home remedies for allergic rhinitis and the presence of statistically significant differences regarding education, this finding reflects the fact that the lower the educational level, the lower the level of practice. This finding is parallel to **Chew et al., (2022)**, who conducted a study about "The management of allergic rhinitis by pharmacists in public services: a proposed pharmacist-led education model (AR-PRISE)" and reported that patient education is very important and essential for good practice of home remedies so that if caregivers do not fully understand this disease, they are dissatisfied with the treatment, and a cure is not available for the problems encountered.

There was a relation between the total score of practice toward home remedies for allergic rhinitis and statistically significant differences regarding the floor number in which caregivers live and the number of windows. This is because of the first floor's moisture, which is a known risk factor for allergic rhinitis, as well as the declining number of windows, which worsens ventilation and raises the possibility of developing symptoms. This was positively associated with **Liu et al., (2023)**, who reported that window ventilation may effectively use sunlight and ultraviolet rays in the air to kill mites and other microorganisms, avoid the breeding of mites and mold, remove harmful gases in indoor air, and breathe fresh air with more ventilation, which can improve the body's immunity and reduce respiratory diseases.

This result showed that there was a relationship between the total score of practice toward home remedies for allergic rhinitis and statistically significant differences regarding the type of feeding for children younger than 2 years. This is logical because children who depend on breastfeeding and artificial feeding have more busy mothers than those who depend on breastfeeding alone, which also puts them at risk for weakened immunity and exposure to a variety of diseases. This was in line with **Adam et al., (2023)**, who conducted a study about "Complementary feeding practices are related to the risk of food allergy in the ELFE cohort" and reported that the delayed (>10 months) introduction of at least two major allergenic foods (out of dairy products, wheat, egg, and fish) is associated with a higher risk of food allergy or rhino conjunctivitis and **Venter et al., (2021)** reported a positive association between the food diversity score at 6 months old and the risk of food allergy at 1 year.

The current study findings revealed that there is a positive statistically significant correlation between the total score of knowledge and the total score of practices in the studied sample toward allergic rhinitis, which has the strongest positive statistically significant correlation. This

may be rationalized by the knowledge level of the people about any disease leading to good practice and handling with it; this means increasing the information and knowledge makes the person dealing and practicing with the disease in a good manner. This finding is congruent with **Gu et al., (2023)**, who reported positive correlations among knowledge, attitudes, and practices, as observed in previous studies by **Al-Rasheedi (2023)** and reported a positive correlation between knowledge and practice scores (Spearman's rho of 0.451, $p < 0.001$), and Mohammed et al. (2022), indicating that improving knowledge should translate into better attitudes and practices toward AR.

From the investigator's point of view, the assessment of caregivers' knowledge of allergic rhinitis and its home remedies among preschool children help us determine the level of knowledge and caregiver practice regarding home remedies among them

Conclusion

The study finding concluded that more than half of the caregivers have poor knowledge of allergic rhinitis, while minority of them had good knowledge and slightly more than one quarter in the average range. As regards caregiver practice, more than two/ third of them have poor practice toward home remedies for allergic rhinitis, while nearly one third have good practice. Also from this study it can be concluded that, there were statistically significant differences between the total score of knowledge toward allergic rhinitis of the studied sample and the socio-demographic characteristics of the caregivers. Moreover, from this study it can be concluded that there was a strong positive statistically significant correlation between the total score of knowledge and the total score of practices of the studied sample toward allergic rhinitis.

Recommendations

Based on the findings of the current study, the following recommendations are made.

- Conduct an educational program for all caregivers to spread the AR knowledge because they are the first handler of disease to help in early prevention and management of it.
- Providing continuous health education programs and counseling for caregivers about AR and their families to help them learn how to manage it
- Carry out frequent meetings with caregiver; discuss their problems and their needs and try to make plans to referral system.
- Provide educational media in all health centers about AR as healthcare professionals are the main source of medical knowledge

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