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# QUALIFICATION WORK

on the topic: **«CLINICAL AND PHARMACOLOGICAL ASPECTS OF THE RATIONAL USE OF DRUGS FOR THE SYMPTOMATIC TREATMENT OF ALLERGIES»**

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## ANNOTATION

The qualification work is devoted to the study of clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies and the assessment of the awareness of higher education students and pharmacy professionals in this area.

The work is presented on 54 pages of printed text and consists of an introduction, three chapters, conclusions, references and appendices. The work is illustrated with 2 tables and 32 figures.

Keywords: OTC medicines, symptomatic treatment, allergy, survey.

## АНОТАЦІЯ

Кваліфікаційна робота присвячена вивченню клінічних та фармакологічних аспектів раціонального використання лікарських засобів для симптоматичного лікування алергії та оцінці обізнаності студентів вищих навчальних закладів та фармацевтичних фахівців у цій сфері.

Робота представлена на 54 сторінках друкованого тексту та складається зі вступу, трьох розділів, висновків, списку літератури та додатків. Робота ілюстрована 2 таблицями та 32 рисунками.

Ключові слова: безрецептурні лікарські засоби, симптоматичне лікування, алергія, опитування.

**CONTENT**

## LIST OF ABBREVIATIONS

ADR – adverse drug reaction;

AR – allergic rhinitis;

ARIA – Allergic Rhinitis and Its Impact on Asthma;

CNS – central nervous system;

DSCG – disodium cromoglycate;

FDA – Food and Drug Administration;

GCs – glucocorticosteroids;

IL-4 – interleukin-4;

IV – intravenous;

NUPh – National University of Pharmacy;

OTC – over-the-counter;

PONV – postoperative nausea and vomiting;

SJS – Stevens-Johnson syndrome;

SPT – skin prick testing;

TEN – toxic epidermal necrolysis;

URT – upper respiratory tract;

WHO – World Health Organization.

# INTRODUCTION

**Relevance of the topic.** Allergies, also known as allergic diseases, are various conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. These diseases include hay fever, food allergies, drug allergies, atopic dermatitis, allergic asthma, and anaphylaxis [3, 23]. Management of allergies typically involves avoiding the allergy trigger and taking medications to improve the symptoms. Several medications may be used to block the action of allergic mediators, or to prevent activation of cells and degranulation processes. These include antihistamines, glucocorticoids, epinephrine (adrenaline), mast cell stabilizers, and antileukotriene agents are common treatments of allergic diseases [2, 4].

Pharmaceutical care is a key element of the health care system, in particular in allergic diseases. The participation of a pharmacist in the treatment process allows to reduce the risk of complications, optimize therapy and provide patients with the appropriate level of medical care. That is why the role of pharmaceutical care in self-treatment of allergic manifestations is extremely important and requires further development and improvement [2, 25, 26].

**Aim of the study.** To research the awareness of higher education students and pharmacy professionals regarding clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies.

**Tasks of the study:**

1. A review of the scientific literature on the pathophysiology of allergy, approaches to the treatment of its main clinical forms, as well as the main groups of drugs used to treat allergic manifestations.

2. Development of questionnaires for surveying pharmaceutical professionals and senior students of specialty 226 Pharmacy and Industrial Pharmacy of the National University of Pharmacy (NUPh) regarding their awareness

of the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies.

3. Conducting anonymous survey among the specified contingents and analysis of the respondents' answers.

**Object of the study.** Results of the survey of pharmaceutical professionals and students on the issues of clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies.

**Subject of the study.** Theoretical and practical aspects of the rational use of drugs for the symptomatic treatment of allergies.

**Methods of the study.** To achieve the research goal, the following methods were used in the work: bibliographic, modern information search method, sociological and system-analytical.

**Practical significance of the obtained results.** The results of the study can be used in the educational process in the training of future pharmaceutical specialists and in the improvement of the qualifications of pharmaceutical professionals.

**Approbation of the results of study and publications.** The results of the study were presented at the XXXI International Scientifical and Practical Conference of Young Scientists and Students TOPICAL ISSUES OF NEW MEDICINES DEVELOPMENT, which took place at the NUPh, Kharkiv, on April 23-25, 2025. Based on the results of the research, theses «Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies» were published in the collection of materials of the aforementioned conference (Appendix B).

**Structure and scope of the qualification paper.** The work is presented on 54 pages of printed text and consists of an introduction, three chapters, conclusions, a list of sources used (30 names) and 2 appendices. The work is illustrated with 2 tables and 32 figures.

# CHAPTER 1. THEORETICAL ASPECTS OF THE RATIONAL USE OF DRUGS FOR THE SYMPTOMATIC TREATMENT OF ALLERGIES

Allergies, also known as allergic diseases, are various conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. These diseases include hay fever, food allergies, drug allergies, atopic dermatitis, allergic asthma, and anaphylaxis. Symptoms may include red eyes, an itchy rash, sneezing, coughing, a runny nose, shortness of breath, or swelling [2, 3, 23].

Pharmaceutical care is a key element in the health care system, in particular in allergic diseases. It contributes not only to increasing the effectiveness of treatment, but also significantly improves the quality of life of patients. The participation of a pharmacist in the treatment process allows reducing the risk of complications, optimizing therapy and providing patients with the appropriate level of medical care. That is why the role of pharmaceutical care in self-treatment of allergic manifestations is extremely important and requires further development and improvement [2, 25, 26].

## 1.1. Pathophysiology of allergy

The term “allergy” was introduced in 1906 by von Pirquet, who recognized that in both protective immunity and hypersensitivity reactions, antigens had induced changes in reactivity. With the passage of time the word has become corrupted and is now frequently used synonymously with IgE-mediated allergic disease. It was von Pirquet’s intent that the term should apply to the “uncommitted” biologic response, which may lead either to immunity (a beneficial effect) or allergic disease (a harmful effect) [12].

In the initial stages of allergy, a type I hypersensitivity reaction against an allergen encountered for the first time causes a response in a type of immune cell called a TH2 lymphocyte, a subset of T cells that produce a cytokine called interleukin-4 (IL-4). These TH2 cells interact with other lymphocytes called B cells,

whose role is production of antibodies. This interaction stimulates the B cell to begin production of a large amount of a particular type of antibody known as IgE. Secreted IgE circulates in the blood and binds to an IgE-specific receptor on the surface of other kinds of immune cells called mast cells and basophils, which are both involved in the acute inflammatory response. The IgE-coated cells, at this stage, are sensitized to the allergen.

If the same allergen is encountered later, it can bind to IgE molecules held on the surface of mast cells or basophils. Cross-linking of IgE and Fc receptors activates the sensitized cell. Activated mast cells and basophils undergo a process called degranulation, during which they release histamine and other chemical mediators of inflammation (cytokines, interleukins, leukotrienes, and prostaglandins) from their granules into the surrounding tissues, causing systemic manifestations such as vasodilation, mucus secretion, nerve stimulation, and smooth muscle contraction (Fig. 1.1). This results in rhinorrhea, itching, dyspnea, and anaphylaxis [6, 12].

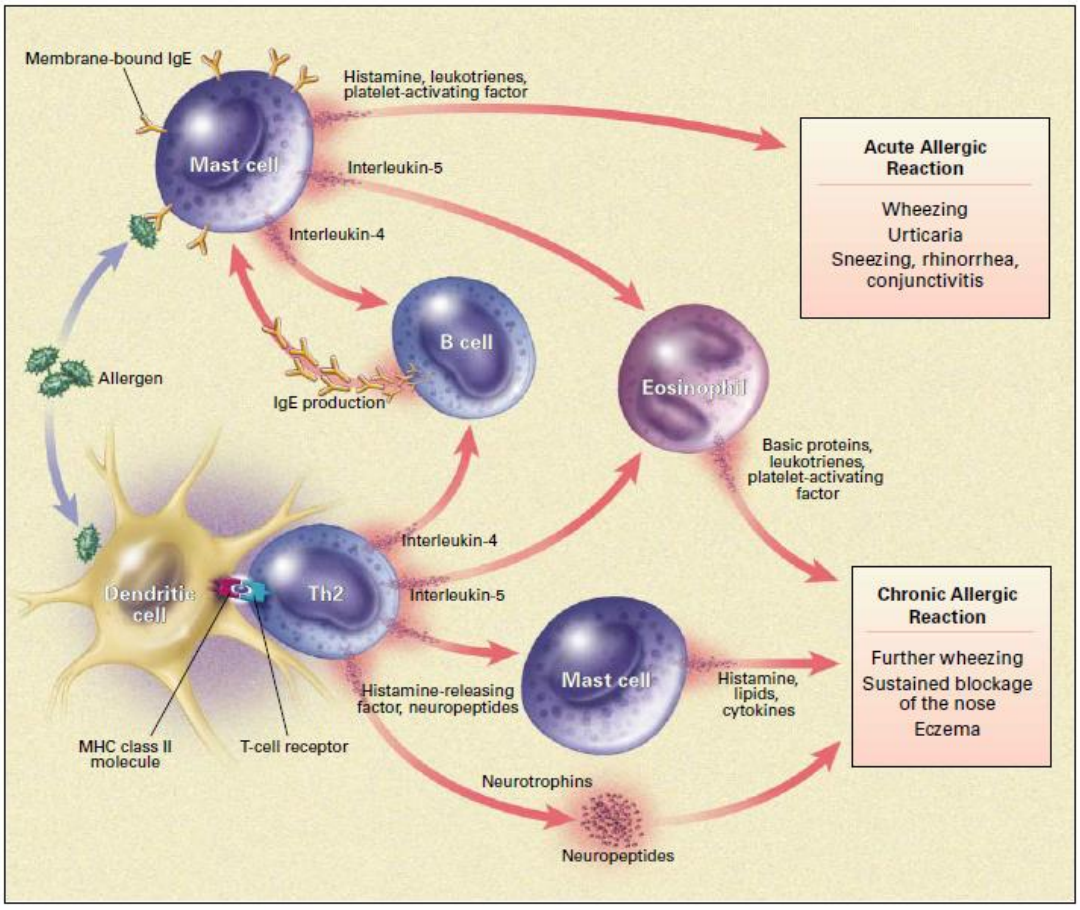


Fig. 1.1. Pathways leading to acute and chronic allergic reactions [12]

Acute allergic reactions result from the release of preformed granule-associated mediators, membranederived lipids, cytokines, and chemokines when an allergen interacts with IgE that is bound to mast cells or basophils by the α chain of the high-affinity IgE receptor.

In a person with atopy, exposure of the skin, nose, or airway to a single dose of allergen produces a cutaneous wheal-and-flare reaction, sneezing and runny nose, or wheezing within minutes. Depending on the amount of the allergen, these immediate hypersensitivity reactions are followed by a late-phase reaction, which reaches a peak six to nine hours after exposure to the allergen and then slowly resolves. In the skin, late-phase reactions are characterized by an edematous, red, and slightly indurated swelling; in the nose, by sustained blockage; and in the lung, by further wheezing [12].

### 1.2. Pollinosis and allergic rhinitis, food allergy, drug allergy: general characteristics, approaches to diagnosis and treatment

Pollinosis is defined as the appearance of respiratory symptoms (rhinoconjunctivitis and/or asthma) as a result of the inhalation of pollen to which the individual is sensitized. It is well known that allergic rhinitis and asthma are very common in the general population, the estimated prevalence being 15-25%, though the figures may vary according to patient age and geographical distribution. Pollen is one of the main causes of allergic rhinitis and asthma. According to the findings of the epidemiological study, a full 51.9% of all patients with allergic rhinitis are sensitized to some type of pollen (the latter being the most common allergen), versus 43.8% of all asthmatics. Based on these figures, it can be seen that pollinosis is an important illness in itself [9, 14].

Allergic rhinitis (AR) is a symptomatic nasal disease that occurs after exposure to allergens through IgE-mediated hypersensitivity reactions, characterized by 4 main symptoms: watery rhinorrhea, nasal congestion, nasal itching, and sneezing. The prevalence of AR is increasing worldwide. It is estimated

that AR affects approximately 60 million people in the United States, with a prevalence of about 10-30% in adults and almost 40% in children [1, 14].

When AR patients are exposed to allergens, allergic reactions develop in 2 different patterns according to time sequence. One is the early reaction, in which sneezing and rhinorrhea develops in 30 minutes and disappears. The early reaction is the response of mast cells to offending allergens (type I hypersensitivity). Stimulated mast cells induce nasal symptoms by secreting chemical mediators such as histamine, prostaglandins and leukotrienes. The other pattern is the late reaction, which shows nasal obstruction approximately 6 hours after exposure to allergens and subsides slowly. In contrast to the early reaction, eosinophil chemotaxis is the main mechanism in the late reaction, which is caused by chemical mediators produced in the early reaction. Several inflammatory cells, eosinophils, mast cells and T-cells migrate to nasal mucosa, break up and remodel normal nasal tissue, and these processes result in nasal obstruction which is the main symptom of AR patients [14].

Allergic Rhinitis and Its Impact on Asthma (ARIA) published the guidelines for AR and revised them in 2008. The points of the ARIA guidelines are as follows: AR is subdivided by symptom duration and the severity of AR, a stepwise therapeutic approach is needed depending on the ARIA classification, and patients with persistent AR should be evaluated for asthma [1, 12].

In the past, AR was subdivided by the kind of allergens into seasonal or perennial AR. The later is caused by indoor allergens such as house dust mites, cockroaches, animal dander or fungi, and the former by outdoor allergens, pollens. However, in some areas, pollens can induce perennial AR when patients are exposed to the pollens adhering to indoor carpet, furniture or bedclothes after the pollen season. In addition, perennial AR symptoms do not persist all around the year, and seasonal AR patients sensitized to multiple allergens may have rhinitis symptoms in all seasons. Furthermore, there are seasonal exacerbations in perennial AR patients when they are exposed to pollens. For these reasons, in 2001, ARIA suggested “intermittent” and “persistent” instead of “seasonal” and “perennial”. Also, disease

severity was classified as “mild” and “moderate-severe” considering its influence on work/school performance, daily activities and sleep [1, 12].

The diagnosis of AR is based on a typical history of allergic symptoms and diagnostic tests. When 2 or more symptoms out of watery rhinorrhea, sneezing, nasal obstruction and nasal pruritus persist for ≥1 hour on most days, AR is strongly suspected. Skin testing is the most important to find offending allergens. There are various testing methods including the scratch, prick/puncture, intradermal and patch tests [18].

The treatment goal for allergic rhinitis is relief of symptoms. Therapeutic options available to achieve this goal include avoidance measures, nasal saline irrigation, oral antihistamines, intranasal corticosteroids, combination intranasal corticosteroid/ antihistamine sprays; leukotriene receptor antagonists, and allergen immunotherapy Fig. 1.2) [22].

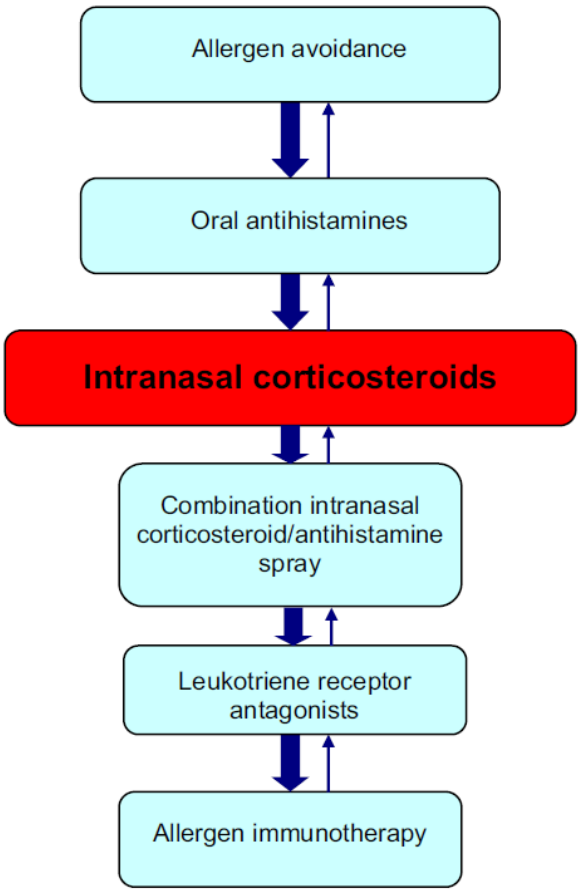


Fig. 1.2. A stepwise algorithm for the treatment of allergic rhinitis [22]

The first-line treatment of allergic rhinitis involves the avoidance of relevant allergens (e.g., house dust mites, moulds, pets, pollens) and irritants (e.g., tobacco smoke). Pollen and outdoor mould exposure can be reduced by keeping windows closed, using window screen filters, using an air conditioner, and limiting the amount of time spent outdoors during peak pollen seasons. For patients allergic to animal dander, removal of the animal from the home is recommended and usually results in a significant reduction in symptoms within 4–6 months. However, compliance with this recommendation is poor and, therefore, the use of high-efficiency particulate air filters and restricting the animal from the bedroom or to the outdoors may be needed to attempt to decrease allergen levels [1, 22].

The second-generation oral anti-histamines (e.g., desloratadine [Aerius], fexofenadine (Allegra), loratadine (Claritin), cetirizine (Reactine) are the first-line pharmacological treatments recommended for all patients with allergic rhinitis.

Intranasal corticosteroids are also first-line therapeutic options for patients with mild persistent or moderate/severe symptoms and they can be used alone or in combination with oral antihistamines. When used regularly and correctly, intranasal corticosteroids effectively reduce inflammation of the nasal mucosa and improve mucosal pathology. Studies and meta-analyses have shown that intranasal corticosteroids are superior to antihistamines and leukotriene receptor antagonists in controlling the symptoms of allergic rhinitis, including nasal congestion, and rhinorrhea. They have also been shown to improve ocular symptoms and reduce lower airway symptoms in patients with concurrent asthma and allergic rhinitis [22, 24].

The International Primary Care Respiratory Group, British Society for Allergy and Clinical Immunology, and American Academy of Allergy Asthma and Immunology recommend initiating therapy with an intranasal corticosteroid alone for mild to moderate disease and using second-line therapies for moderate to severe disease [24].

The intranasal corticosteroids available in Morocco include fluticasone furoate (Avamys), beclomethasone (Beconase), fluticasone propionate (Flonase),

triamcinolone acetonide (Nasacort), mometasone furoate (Nasonex), and budesonide (Rhinocort). Since proper application of the nasal spray is required for optimal clinical response, patients should be counseled on the appropriate use of these intranasal devices.

The most common side effects of intranasal corticosteroids are nasal irritation and stinging. However, these side effects can usually be prevented by aiming the spray slightly away from the nasal septum. Evidence suggests that intranasal beclomethasone and triamcinolone, but not other intranasal corticosteroids, may slow growth in children compared to placebo. However, long-term studies examining the impact of usual doses of intranasal beclomethasone on growth are lacking [15, 29].

It is important to note that most patients with allergic rhinitis presenting to their primary-care physician have moderate-to-severe symptoms and will require an intranasal corticosteroid.

Allergen immunotherapy involves the subcutaneous administration of gradually increasing quantities of the patient's relevant allergens until a dose is reached that is effective in inducing immunologic tolerance to the allergen. Allergen immunotherapy is an effective treatment for allergic rhinitis, particularly for patients with intermittent (seasonal) allergic rhinitis caused by pollens, including tree, grass and ragweed pollens.

Oral and intranasal decongestants (e.g., pseudoephedrine, phenylephrine) are useful for relieving nasal congestion in patients with allergic rhinitis. However, the side-effect profile associated with oral decongestants (i.e., agitation, insomnia, headache, palpitations) may limit their long-term use. Furthermore, these agents are contraindicated in patients with uncontrolled hypertension and severe coronary artery disease. Prolonged use of intranasal decongestants carries the risk of rhinitis medicamentosa (rebound nasal congestion) and, therefore, these agents should not be used for more than 3–5 days [15, 29].

Food allergies affect up to 6% of young children and 3%–4% of adults. They encompass a range of disorders that may be IgE and/or non-IgE mediated, including

anaphylaxis, pollen food syndrome, food-protein–induced enterocolitis syndrome, food-induced proctocolitis, eosinophilic gastroenteropathies, and atopic dermatitis. Many complex host factors and properties of foods are involved in the development of food allergy [6, 29].

Although food allergies are commonly encountered by paediatricians, and although the public and lay press demonstrate a marked interest in food allergies and intolerances, this diagnostic arena is little regarded by most gastroenterologists dealing with adult patients. Adverse reactions to foods vary in clinical presentation, severity and underlying aetiology. Patients, the public, doctors and other health professionals frequently confuse non-allergic food reactions with food allergy. Adverse reactions to foods can be broadly divided in to those with an immune basis – food allergies and coeliac disease, or those without an immune basis – termed food intolerances (Figure 1.3) [17, 28].

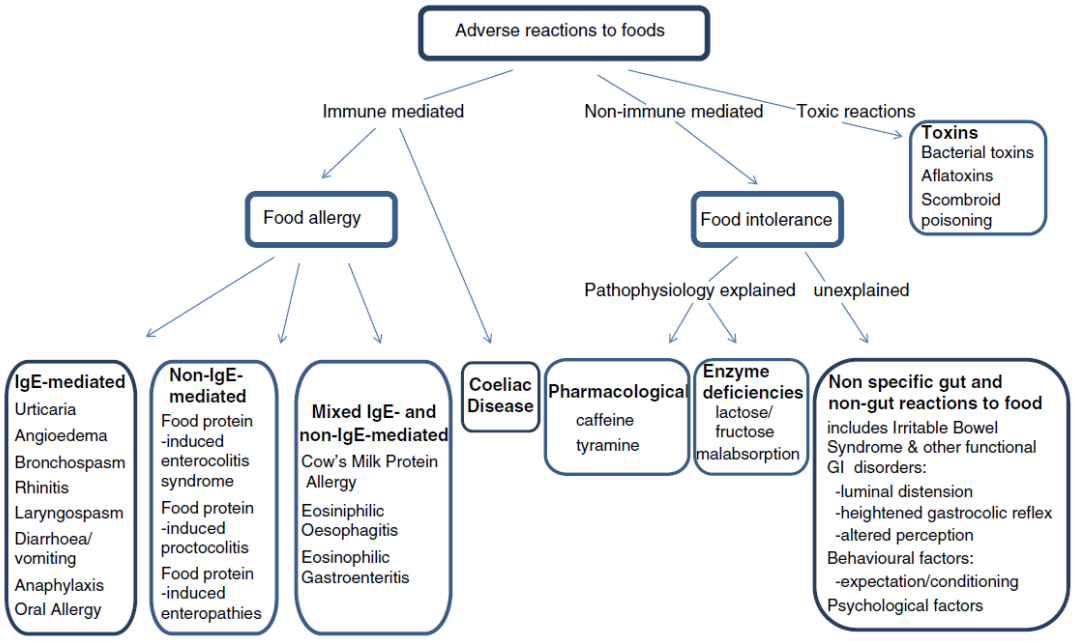


Fig. 1.3. Classification of adverse reactions to foods [28]

Food allergy is an adverse immune-mediated response, which occurs reproducibly on exposure to a given food and is absent during avoidance. A diagnosis of food allergy requires evidence of sensitisation and specific symptoms on exposure to a particular food. The immune response in food allergy can be

classified into IgE-mediated, non-IgE-mediated or a mixture of both. IgE-mediated food allergy requires food allergen sensitisation (with the development of serum specific IgE antibody to a food allergen), and secondly the development of signs and symptoms on exposure to that food. In non-IgE-mediated food allergy, T-cell-mediated processes predominate and there may be histological evidence of an underlying immune process such as eosinophilic inflammation of the gastrointestinal tract [6, 28].

Although any food can trigger an allergic response, relatively few protein families account for the majority of allergic reactions. In the US, milk, egg, peanut, tree nuts, fish, shellfish, soy, and wheat are the major food allergens. Seeds, particularly sesame, also appear to be an increasingly recognized allergen in many countries. In general, proteins with more than 62% homology to human proteins are unlikely to be allergenic [17, 29].

Conventional diagnostic tests for IgE-mediated food allergy include skin prick testing (SPT) and serum-specific IgE testing (sIgE). SPT detect the presence of circulating IgE to specific antigens, but are in vivo tests and can provide near-instant results. Food extracts, and controls, are applied to the skin before it is pricked by a lancet. After 20 min the diameter of any induration is measured and compared with tables of clinically significant wheal size for corresponding allergens. Although higher levels of allergen-specific IgE and larger SPT wheal sizes are associated with increased likelihood of allergic reactions, they still lack precision and do not predict severity of allergic reactions [21, 29].

The standard of care for treating food allergies consists of identifying the responsible food allergen and educating patients on how to avoid ingesting the food unknowingly and how to recognize and treat early signs of an allergic reaction in case of accidental ingestion. Given the increasing prevalence of food allergy and associated hospitalizations, this approach is clearly not optimal and there is a strong need to develop effective therapies [29].

Elimination diets are vital in managing allergy, but there is no official role for elimination diets in the diagnosis of IgE-mediated food allergy. However, in practice

the response to an elimination diet gives useful information in cases where a food challenge is not being performed.

Managing IgE-mediated food allergy is a two-pronged approach of avoidance and preparation for accidental exposure. Antihistamines have a supportive role in treating anaphylaxis. They reduce itching and urticaria but are not lifesaving and should not delay adrenaline injection. Intravenous injection of antihistamines can cause hypotension. Glucocorticoids are similarly not lifesaving but their delayed action may reduce biphasic and prolonged reactions [28].

Adverse drug reactions (ADRs) are defined by the World Health Organization (WHO) as any noxious, unintended, and undesired effect of a drug that occurs at doses used for prevention, diagnosis, or treatment. ADRs are commonly encountered in both inpatient and outpatient settings ADRs are classified as either predictable reactions that may occur in anyone (type A) or unpredictable reactions that occur in susceptible individuals (type B) [11, 30].

Drug allergy is one type of unpredictable ADR that encompasses a spectrum of immunologically-mediated hypersensitivity reactions with varying mechanisms and clinical presentations. It accounts for approximately 5–10% of all ADRs [30].

Drug allergy not only affects patient quality of life, but may also lead to delayed treatment, use of suboptimal alternate medications, unnecessary investigations, increased morbidity and even death. Furthermore, identification of drug allergy is challenging given the myriad of symptoms and clinical presentations associated with the condition. Therefore, if a drug induced allergic disorder is suspected, consultation with an allergist experienced in the identification, diagnosis and management of drug allergy is recommended.

Factors associated with an increased risk of developing a drug allergy include patient-related factors (e.g., age, gender, genetic polymorphisms, or infections with certain viruses) and drug-related factors (e.g., frequency of exposure, route of administration, or molecular weight). Drug allergy typically occurs in young and middle-aged adults, and is more common in women. Genetic polymorphisms in the human leukocyte antigen as well as viral infections such as human

immunodeficiency virus and the Epstein–Barr virus, have also been linked to an increased risk of developing immunologic reactions to drugs. Susceptibility to drug allergy is influenced by genetic polymorphisms in drug metabolism. In addition, topical, intramuscular, and intravenous (IV) routes of administration are more likely to cause allergic drug reactions than oral administration [30].

The diagnosis of drug allergy requires a thorough history and the identification of physical findings and symptoms that are compatible with the characteristics and timing of drug-induced allergic reactions. Depending on the history and physical examination, diagnostic tests such as skin testing and graded challenges may be required. Therefore, if drug allergy is suspected, evaluation by an allergist experienced in these diagnostic procedures is recommended.

Skin testing procedures, such as SPT and intradermal tests (test in which the allergen is injected into the skin dermis) are useful for the diagnosis of IgE-mediated (type I) reactions. Skin testing protocols are standardized for penicillin, and are also useful (but rarely positive) for local anesthetics, muscle relaxants, and very sensitive for high-molecular-weight protein substances, such as insulin or mAbs [21, 30].

The measurement of histamine and tryptase levels have proved useful in confirming acute IgE-mediated reactions, particularly anaphylaxis; however, negative results do not rule out acute allergic reactions. A complete blood count can help diagnose hemolytic (type II) drug-induced reactions, such as hemolytic anemia, thrombocytopenia, or neutropenia [19].

The most effective strategy for the management of drug allergy is avoidance or discontinuation of the offending drug. When available, alternative medications with unrelated chemical structures should be substituted. Cross-reactivity among drugs should be taken into consideration when choosing alternative agents [19, 30].

Additional therapy for drug hypersensitivity reactions is largely supportive and symptomatic. For example, topical corticosteroids and oral antihistamines may improve cutaneous symptoms. In the event of anaphylaxis, the treatment of choice is epinephrine. Systemic corticosteroids may also be used to treat severe systemic reactions, but should never be given prior to or replace epinephrine in the treatment

of anaphylaxis. Severe drug reactions, such as Stevens-Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN), are best treated in an intensive care or burn unit setting [19, 30].

### 1.3. Clinical and pharmacological aspects of the rational use of antihistamines, mast cell membrane stabilizers, topical glucocorticosteroids, and decongestants

Management of allergies typically involves avoiding the allergy trigger and taking medications to improve the symptoms. Allergen immunotherapy may be useful for some types of allergies.

Several medications may be used to block the action of allergic mediators, or to prevent activation of cells and degranulation processes. These include antihistamines, glucocorticoids, epinephrine (adrenaline), mast cell stabilizers, and antileukotriene agents are common treatments of allergic diseases. Anticholinergics, decongestants, and other compounds thought to impair eosinophil chemotaxis are also commonly used. The severity of anaphylaxis often requires epinephrine injection.

H1-antihistamines, the mainstay of treatment for allergy, were developed from anticholinergic drugs more than 70 years ago. They act as inverse agonists rather than antagonists of histamine H1-receptors which are members of the G-protein family. The older first generation H1-antihistamines penetrate readily into the brain to cause sedation, drowsiness, fatigue and impaired concentration and memory causing detrimental effects on learning and examination performance in children and on impairment of the ability of adults to work and drive. Their use should be discouraged. The newer second-generation H1-antihistamines are safer, cause less sedation and are more efficacious [5].

The vast majority of H1 antihistamines exert their antihistaminic action by acting as inverse agonists at the H1 receptors; binding to and stabilizing the inactive state of the H1 receptor and reducing the intrinsic activity of the receptor even in the absence of an agonist. Based on their pharmacological structure, H1 antihistamines

are traditionally classified into six groups: ethanolamines, ethylene diamines, alkylamines, piperazines, piperidines, and phenothiazines. This classification is, however, of limited clinical relevance, and currently H1 antihistamines are classified as ‘first generation’, also known as ‘sedating antihistamines’, and ‘second generation’, which are relatively non-sedating (Table 1.1) [13].

Table 1.1

**Comparison between first- and second-generation H1 antihistamines**

| | First generation | Second generation |
|---|---|---|
| Receptor selectivity | Inverse agonists at H1 receptors<br>Weak antimuscarinic<br>anti-α-adrenergic (promethazine)<br>anti-serotonergic (cyproheptadine) | Highly selective for H1 receptors |
| Central H1 occupation | High occupancy | 0 - 30% occupancy |
| Examples | Alimemazine<br>Chlorphenamine<br>Clemastine<br>Cyproheptadine)<br>Hydroxyzine<br>Promethazine<br>Cyclizine<br>Cinnarizine | Cetirizine<br>Levocetirizine (isomer of cetirizine) Loratadine<br>Desloratadine (metabolite of loratadine)<br>Mizolastine<br>Astemizole (not currently used)<br>Terfenadine (not currently used)<br>Fexofenadine (metabolite of terfenadine) |
| Clinical uses | Allergic rhinitis<br>Atopic dermatitis<br>Acute and chronic urticaria<br>Insect bites and stings<br>Anaphylaxis (IV chlorphenamine)<br>URT infection (no evidence)<br>Insomnia<br>Sedative premedication (promethazine) | Allergic rhinitis<br>Atopic dermatitis<br>Acute and chronic urticaria<br>Insect bites and stings<br>Seasonal asthma with allergic rhinitis<br>URT infection (no evidence) |

| | | |
|---|---|---|
| | Vertigo and motion sickness (cinnarizine)<br>Treatment / prevention of PONV (cyclizine) | |
| Side effects | CNS depression (somnolence, impaired cognitive and psychomotor performance); other CNS effects (seizures, dyskinesia, dystonia, hallucinations)<br>Anticholinergic effects (dry mouth, blurred vision, urine retention)<br>Drugs of abuse<br>Drugs of suicide and infants' homicide<br>Weight gain (cyproheptadine) | Minimal or no CNS depression<br>Minimal or no anticholinergic effects<br>Polymorphic ventricular tachycardias with torsade de pointes and ventricular fibrillation (astemizole and terfenadine; both not in clinical use) |

The terms 'third generation' and 'new generation' antihistamines are sometimes used to describe some newly produced antihistamines that are selective isomers or active metabolites of older second-generation antihistamines [13].

First-generation H1 antihistamines such as alimemazine, chlorphenamine, clemastine, cyproheptadine, hydroxyzine, and promethazine are non-selective in binding to the H1 receptor. Most of these drugs have weak antimuscarinic anticholinergic effects, some have alpha-adrenergic blocking effects (promethazine), and others can inhibit both histamine and 5-hydroxytryptamine activity (cyproheptadine). Owing to their lipophilicity and relatively low molecular weight, first-generation H1 antihistamines readily penetrate the non-fenestrated capillaries of the central nervous system (CNS; blood-brain barrier) and bind to central H1 receptors, interfering with the actions of histamine on these receptors.

Second-generation H1 antihistamines such as cetirizine, desloratadine, fexofenadine, levocetirizine, loratadine and mizolastine have significantly less affinity for muscarinic cholinergic, α-adrenergic and 5-hydroxytryptaminergic receptors and penetrate poorly into the CNS because of their low lipid solubility and

relatively high molecular weight. Their propensity to occupy central nervous system H1 receptors varies from none for fexofenadine to 30% for cetirizine [5, 13].

H1 antihistamines, both first and second generation, have well-documented anti-allergic and anti-inflammatory effects. They exert these effects through their inverse agonist activity at peripheral H1 receptors and through other non-receptormediated mechanisms (e.g. inhibition of mast cell and basophil histamine release and inhibition of inflammatory cell activation). They are currently well established as first- or second-line treatments for a variety of allergic disorders.

All H1 antihistamines are of potential value in the management of seasonal (intermittent) and perennial (persistent) allergic rhinitis in which they relieve nasal and conjunctival itching, sneezing and rhinorrhoea and improve the quality of life. They are also useful in the treatment of acute and chronic urticaria as they provide symptomatic relief of itching and reduce the number, size and duration of individual hives. However, the evidence for using first-generation drugs in the treatment of these disorders remains surprisingly small by current standards and most available evidence is derived from large randomized, controlled trials using second-generation drugs. Moreover, first generation H1 antihistamines have an unsatisfactory benefit-to-risk ratio owing to their sedating effects, and although generally less expensive than second-generation drugs, when costs attributed to their adverse effects are considered, the difference may be less than expected. Second-generation H1 antihistamines should, therefore, be the preferred choice in the treatment of these disorders because of their lack of sedative, cognitive and psychomotor performance-impairing and antimuscarinic anticholinergic adverse effects [13].

First-generation H1 antihistamines such as chlorphenamine and promethazine are used intravenously for the management of anaphylaxis when hypotension is unresponsive to epinephrine. Since most second-generation H1 antihistamines have low aqueous solubility, they are not available in formulations for injection and hence cannot be used in such circumstances.

Owing to their ability to cross the blood-brain barrier, first generation H1 antihistamines such as promethazine are used as non-prescription sleeping aids;

promethazine is commonly used as a sedative premedication in children; and cinnarizine, promethazine and cyclizine, are used for the prevention and treatment of symptoms of vertigo and motion sickness. Moreover, cyclizine has a well-established role in the prevention and management of postoperative nausea and vomiting. The anti-emetic effect of these drugs stems from their antimuscarinic properties and from their ability to block the histaminergic signal from the vestibular nucleus to the vomiting centre in the medulla [5, 13].

A wide variety of adverse effects has been attributed to first generation H1 antihistamines. They readily penetrate the blood-brain barrier and hence have the potential to cause CNS depression, which usually manifests as somnolence and impaired cognitive and psychomotor performance. Their use can also lead to a variety of other adverse CNS effects, including seizures, dyskinesia, dystonia and hallucinations. First generation H1 antihistamines have also been associated with fatalities in accidental or intentional overdose, and are potential agents of suicide and of infants' homicide. Moreover, some first generation H1 antihistamines are drugs of abuse leading to euphoria and hallucinations. First-generation H1 antihistamines commonly cause antimuscarinic anticholinergic effects such as dry mouth, blurred vision and dysfunctional urine voiding. Gastrointestinal upset, jaundice and pancytopenias have also been reported. Cyproheptadine causes appetite stimulation and inappropriate weight gain secondary to anti-serotonin effects [5, 13].

Second-generation H1 antihistamines are considerably less likely than first-generation drugs to cause adverse effects. In manufacturers' recommended doses, the second-generation H1 antihistamines impair CNS function significantly less than the first-generation H1 antihistamines. Moreover, they lack any anticholinergic antimuscarinic effects. There are occasional reports of fixed-drug eruptions, exacerbations of existing urticarial and hepatitis after cetirizine or loratadine ingestion [5, 13].

Compared with oral antihistamines, intranasal antihistamines offer the advantage of delivering a higher concentration of medication to a specific targeted area, resulting in fewer adverse effects. Currently, azelastine and olopatadine are the

two FDA-approved intranasal antihistamine preparations for the treatment of allergic rhinitis. Their onset of action occurs within 15 minutes and lasts up to four hours. Adverse effects include a bitter aftertaste, headache, nasal irritation, epistaxis, and sedation. Although intranasal antihistamines are an option in patients whose symptoms did not improve with second-generation oral antihistamines, their use as first- or second-line therapy is limited by their adverse effects and cost compared with second-generation oral antihistamines, and by their decreased effectiveness compared with intranasal corticosteroids [10, 24].

Mast cell stabilizers are medications used to prevent or treat certain allergic disorders. They block mast cell degranulation, stabilizing the cell and thereby preventing the release of histamine and related mediators.

Treatment of allergic diseases relies on clinically prescribed drug classes such as mast cell stabilizers and H1 antagonists, which control the symptoms associated with allergic diseases. Mast cell stabilisers act by stabilizing the mast cell upon allergen exposure to inhibit the release of chemical mediators while H1 antagonists antagonise histamine at the H1 receptor to eliminate the effects mediated by this biogenic amine released during an allergic reaction. Although the first generation mast cell stabilisers such as disodium cromoglycate (DSCG) and nedocromil sodium effectively inhibit mast cell degranulation, the second-generation mast cell stabilisers typified by olopatadine and ketotifen additionally possess antihistaminic properties which present anti-allergic agents with dual activity [8].

Intranasal cromolyn is available over the counter and is thought to act by inhibiting the degranulation of mast cells. Although safe for general use, it is not considered first-line therapy for allergic rhinitis because of its decreased effectiveness at relieving symptoms compared with antihistamines or intranasal corticosteroids, and its inconvenient dosing schedule of three or four times daily [24].

Mast cell stabilizing drugs inhibit the release of allergic mediators from mast cells and are used clinically to prevent allergic reactions to common allergens. Despite the relative success of the most commonly prescribed mast cell stabilizer,

disodium cromoglycate, in use for the preventative treatment of bronchial asthma, allergic conjunctivitis and vernal keratoconjunctivitis, there still remains an urgent need to design new substances that are less expensive and require less frequent dosing schedules [8].

Glucocorticosteroids (GCs) have a pronounced antiallergic effect, affecting all links in the pathogenesis of an allergic reaction. GC therapy in allergology can be systemic (parenteral and enteral) and topical (intranasal sprays, eye drops, ointments).

GCs have a significant anti-inflammatory effect, inhibiting all phases of inflammation. This is due to their ability to influence the formation of inflammatory mediators, the vascular component, as well as the cells involved in inflammation. Under the influence of GCs, small vessels narrow, capillary wall permeability and exudation decrease. In the area of inflammation, the accumulation of leukocytes decreases, the activity of macrophages and fibroblasts decreases. GCs stabilize cell and lysosomal membranes, prevent the release of lysosomal enzymes with proteolytic activity, as a result, the alterative phase of inflammation is suppressed [15, 16, 27].

The immunosuppressive effect of GCs is associated with the suppression of the activity of T- and B-lymphocytes, a decrease in the production of interleukins and other cytokines, a decrease in the content of complement in the blood, circulating lymphocytes and macrophages, as well as the suppression of the factor - migration inhibitor. The antiallergic effect of GCs is due to the stabilization of the cell membranes of basophilic granulocytes, which contain mediators of allergy.

To eliminate skin allergic reactions, topical corticosteroids are widely used in the dosage forms of gels, lotions, ointments and creams.

Intranasal corticosteroids are highly effective in preventing and relieving nasal symptoms associated with both early- and late-phase allergic responses. In general, they relieve nasal congestion and itching, rhinorrhea, and sneezing, and in some studies they almost completely prevented late-phase symptoms. Although

some relief may occur within a few days, a full response to the drugs may take up to several weeks [16, 27].

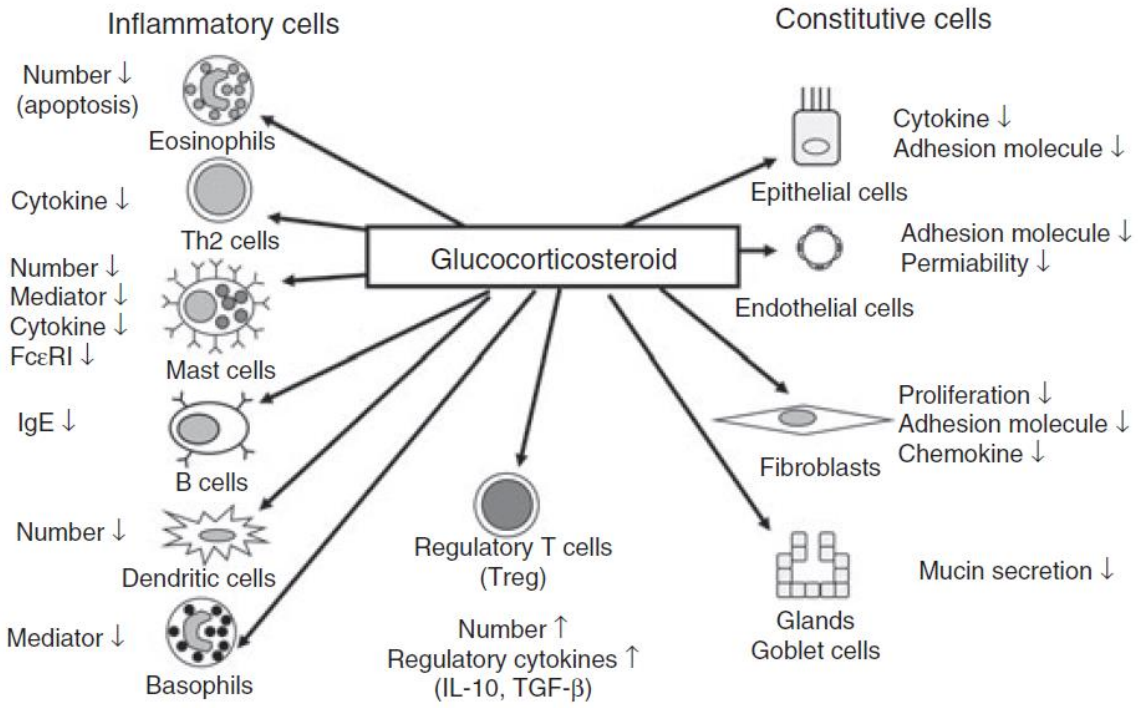


Fig. 1.4. Effect of glucocorticosteroids on nasal mucosa [16]

GCs for intranasal use are the most active agents for the treatment of allergic rhinitis. The greatest local effect is possessed by beclamethasone, budesonide, fluticasone, mometasone. Drugs of this group reduce and prevent the symptoms of rhinitis, and in patients with polypous rhinosinusitis they lead to a decrease in the size of polyps. The use of fluticasone propionate as monotherapy is highly effective in reducing the main eye symptoms in patients with hay fever.

Intranasal corticosteroids are the mainstay of treatment of allergic rhinitis. They act by decreasing the influx of inflammatory cells and inhibiting the release of cytokines, thereby reducing inflammation of the nasal mucosa. Their onset of action is 30 minutes, although peak effect may take several hours to days, with maximum effectiveness usually noted after two to four weeks of use [24].

Many studies have demonstrated that nasal corticosteroids are more effective than oral and intranasal antihistamines in the treatment of allergic rhinitis.

Although there is no evidence that one intranasal corticosteroid is superior to another, many of the available products have different age indications from the US Food and Drug Administration (FDA). Only budesonide carries the FDA pregnancy category B safety rating.

The adverse effects most commonly experienced with the use of intranasal corticosteroids are headache, throat irritation, epistaxis, stinging, burning, and nasal dryness. Although the use of intranasal corticosteroids has raised concern for potential systemic adverse effects, including the suppression of the hypothalamic-pituitary axis, the products currently available have not been shown to have such effects. Despite the data, all intranasal corticosteroids carry a warning that long-term use may restrict growth in children [16, 24].

Decongestants are a group of drugs that can provide short-term relief of nasal congestion.

The most commonly used OTC drugs are nasal decongestants that are used systemically or locally in the form of drops or nasal sprays. These preparations are most commonly used in viral infections to alleviate the symptoms (nasal obstruction, vomiting, increased nasal secretion, difficulty breathing, etc.), but it is necessary to inform the users about the type of preparation, the active substance it contains and the correct dosage regimen. Given their availability and the prevalence of safety precautions, these preparations can lead to numerous prolonged conditions and complications (medicaments rhinitis). Also, an increasing number of allergens, in many parts of the world, and climate change, cause allergic manifestations, so the users decide on the solubility and purchase of drops or sprays without consultation with a physician or pharmacist. Due to the long-lasting symptoms with short periods of improvement, nasal drops/nasal sprays are increasing used for months, even for years. However, it is necessary to inform that many products have restrictions in use, which depend on age, and some are contraindicated in children younger than two years of age, pregnant women, persons with thyroid gland diseases, cardiovascular diseases, prostate problems [17].

The mechanism of action is based on the reduction of blood vessels' swelling in the nose, which helps in the opening of the airway. Among sympathomimetic vasoconstrictors for topical use in the nose, imidazole (naphazoline, oxymetazoline and xylomethazoline) and catecholamine derivatives (epinephrine, ephedrine and phenylephrine) produce vasoconstriction of the nasal blood vessels by stimulation through the endogenous release of noradrenaline, which acts on alpha receptors.

Decongestants are used to reduce nasal obstruction and relieve pain in common colds, flu, sinusitis, acute or chronic rhinitis, upper respiratory tract allergy, pollen cough, septum deviation, nasal mucosa hypotrophy, nasal polyps, etc. Allergic rhinitis is one of the clinical conditions when nasal decongestants are most commonly used.

However, prolonged use of nasal decongestants leads to side effects, e.g. medicamentous rhinitis. Because of this, local application of vasoconstrictor can be carried out only for a short period of time and for no longer than four or five days, due to the risk of damage to the mucociliary epithelium and reverse vasodilatation. Prolonged use of a decongestant leads to a decrease in the sensitivity of the alpha receptor, which leads to the need to increase the dose at shorter intervals to achieve the same effect. As a consequence, patients use excessive, uncontrolled doses of nasal decongestants, which are a public problem and warn of the necessity of identification and the taking of measures to prevent uncontrolled procurement and the use of nasal decongestants [7, 20].

It is recommended that nasal decongestants should not be given to children under the age of six due to the risk of increased mucous membrane edema after cessation of decongestant use. It is advised that the use of a decongestant should not be longer than five days. Nasal decongestants generally act locally, but may have systemic effects, such as hypertension, headache, nausea, insomnia and dizziness. Using decongestant, individuals may develop tachyphylaxis (a rapid reduction in drug response after repeated doses over a short period of time). Therefore, long-term use of decongestants is not recommended because they lose their effectiveness after a few days [4, 7, 20].

## Conclusions to Chapter 1

1. Allergies, also known as allergic diseases, are various conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. These diseases include hay fever, food allergies, drug allergies, atopic dermatitis, allergic asthma, and anaphylaxis.

2. Management of allergies typically involves avoiding the allergy trigger and taking medications to improve the symptoms. These include antihistamines, topical glucocorticoids, topical mast cell stabilizers, and topical sympathomimetics (decongestants) are common symptomatic treatments of allergic diseases.

3. The participation of a pharmacist in the treatment process allows to reduce the risk of complications, optimize therapy and provide patients with the appropriate level of medical care. That is why the role of pharmaceutical care in self-treatment of allergic manifestations is extremely important and requires further development and improvement.

# CHAPTER 2. RESEARCH METHODOLOGY AND ORGANIZATION

The tasks of the practical part of our work were development of questionnaires for surveying pharmaceutical professionals and senior students of specialty 226 Pharmacy and Industrial Pharmacy of the NUPh regarding their awareness of the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies, conducting anonymous survey among the specified contingents and analysis of the respondents' answers.

In accordance with the tasks set, our study included three main stages. The preparatory stage included developing a questionnaire, forming a sample, and setting up a Google form. The data collection stage involved sending invitations, conducting a survey, and monitoring responses to the questionnaire. The analytical stage was devoted to data processing, statistical analysis, and interpretation of survey results.

At the first stage of the study, we developed a questionnaire consisting of 28 questions divided into 2 parts: demographic characteristics of respondents (4 questions) and the main part devoted to studying the awareness of respondents on the topic under study (24 questions). The full text of the questionnaire is presented in Appendix A.

The first part of the questionnaire involved collecting general information about the respondents, namely their demographic data (age, gender), country of residence, and occupation.

The second part of the questionnaire consisted of questions aimed at assessing the respondents' awareness of allergic diseases (causes of allergic reactions, the most typical symptoms and alarming symptoms that require a visit to a doctor), general recommendations for treating allergies, the main groups of drugs used in the treatment of allergies, mechanisms of their action, assortment, features of use, side effects and contraindications to use. Particular attention is paid to antihistamines, mast cell membrane stabilizers, topical nasal glucocorticoids, and sympathomimetics, as the main groups of over-the-counter drugs used for the symptomatic treatment of allergic manifestations. At the end of the questionnaire,

there are questions in which respondents are asked to self-assess their theoretical knowledge of pharmaceutical care when dispensing drugs for the symptomatic treatment of allergies, and their desire to improve their knowledge of pharmaceutical care when dispensing these drugs.

The questionnaire included 8 single-choice questions and 19 multiple-choice questions. One question required respondents to provide their own answer option.

A survey of respondents to study their awareness of the rational use of medications for symptomatic treatment of allergies was conducted in April 2025. The online survey was implemented using the Google Forms platform. The survey involved 46 respondents – senior students of the NUPh and pharmacists. The study involved pharmacists from pharmacies located in the Tilila district of Agadir city (Morocco): Pharmacie Adam, Pharmacie Amrani, Pharmacie Grand Tilila, Pharmacie Tilila.

The study was conducted in compliance with ethical standards. Participation was completely voluntary, respondents were anonymous, and survey data were used exclusively in a generalized form and for scientific purposes. At the same time, we were fully aware of the existing limitations of this survey method, such as the potential impact of the online format on the representativeness of the sample, the subjectivity of respondents' self-assessment of knowledge, and possible technical errors when filling out the questionnaire.

**Conclusions to Chapter 2**

In accordance with the tasks set, we developed a questionnaire consisting of 28 questions, determined a sample of respondents and conducted an anonymous survey using Google Forms. The survey involved 46 respondents – senior students of the NUPh and pharmacists of Agadir city (Morocco).

# CHAPTER 3. ASSESSMENT OF AWARENESS OF STUDENTS AND PHARMACY PROFESSIONALS REGARDING CLINICAL AND PHARMACOLOGICAL ASPECTS OF THE RATIONAL USE OF DRUGS FOR THE SYMPTOMATIC TREATMENT OF ALLERGIES

## 3.1. Demographic characteristics of respondents

Based on the results of the survey, the demographic characteristics of the respondents were analyzed, namely their demographic data (age, gender), country of residence, and occupation.

The age distribution showed that the majority (67.3%) of respondents were aged 20-25, which is typical for higher education applicants of senior years. The share of respondents 26-30 years old was 13%, over 30 years old – 10.9%, under 20 years old – 8.7% (Fig. 3.1).

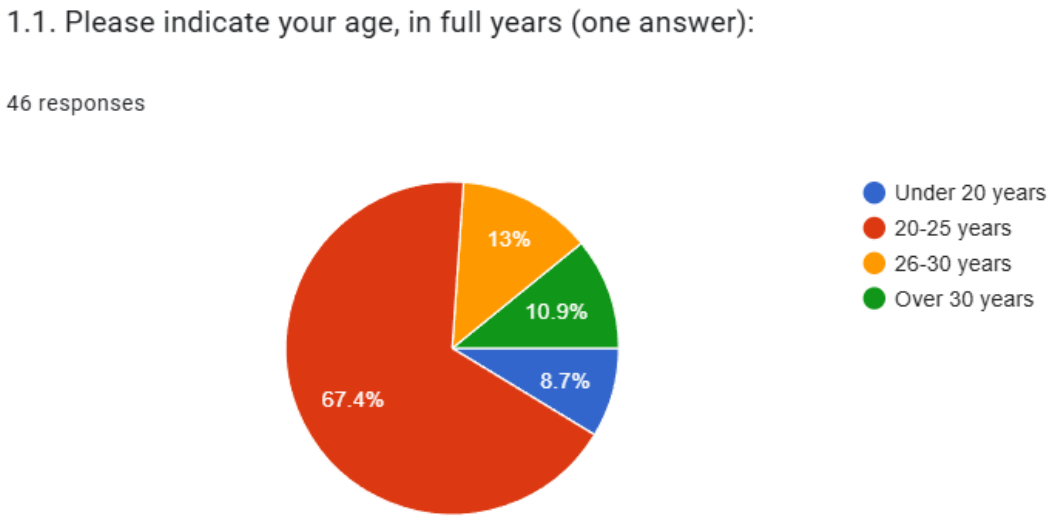


Fig. 3.1. Age distribution of respondents

The next question presents the gender composition of the survey participants (Fig. 3.2). From the diagram, we can see that the research audience is characterized by a slight predominance of men (54.3%) over women (45.7%). This distribution generally reflects the situation in the pharmaceutical labor market in Morocco, where men and women are in relative balance.

The distribution by country of residence indicated a significant preponderance of respondents from Morocco (37 respondents, i.e. 80.4%), which is quite logical given the target audience of our study (Fig. 3.3).

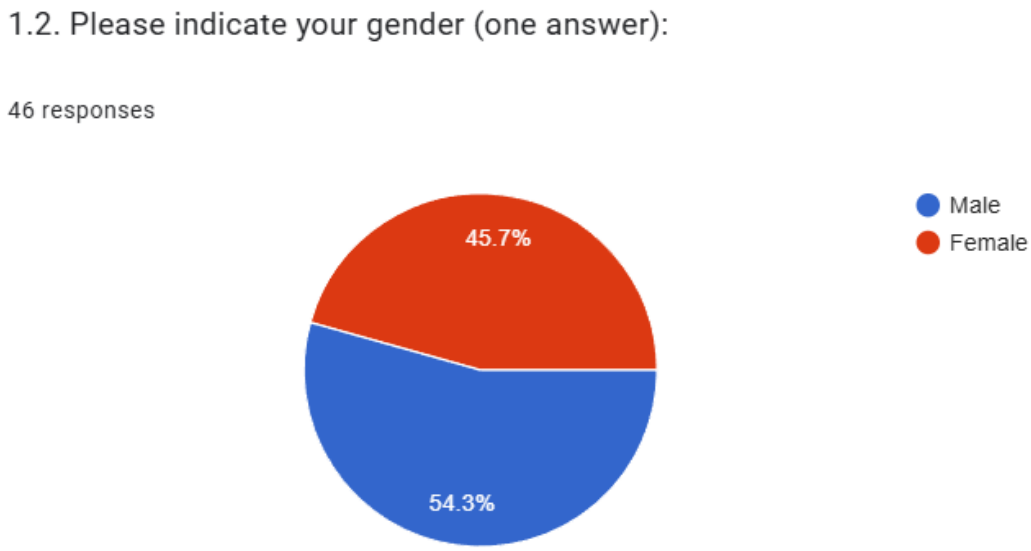


Fig. 3.2. Gender composition of study participants

In addition to residents of Morocco, the survey was attended by NUPh students living in France, Germany, Turkey, Tunisia, Egypt, and the DR Congo.

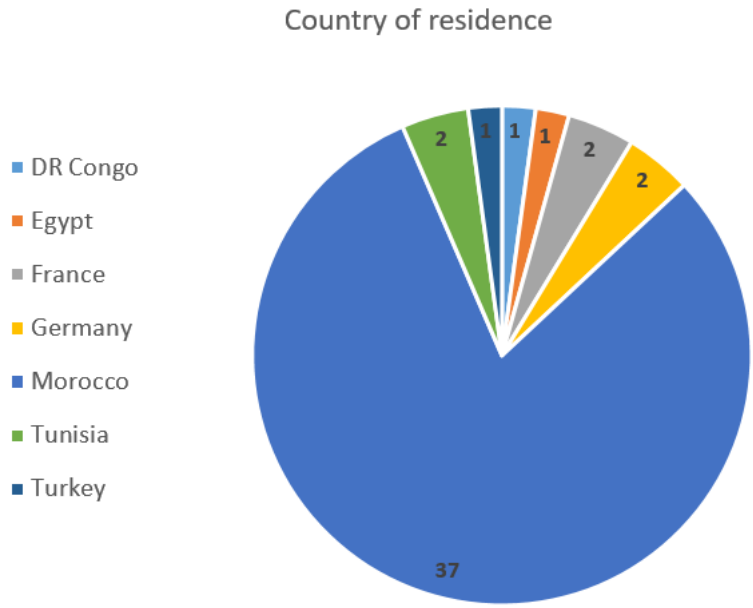


Fig. 3.3. Distribution of respondents by country of residence

The distribution of study participants by occupation showed that 76.1% (35 people) of them were students of the NUPh, and 23.9% (11 people) were practicing pharmacists (Fig. 3.4). Thus, most of the respondents are senior students who have already studied most professionally oriented disciplines, such as pharmacology, pharmacotherapy with pharmacokinetics, and clinical pharmacy with pharmaceutical care, but do not yet have significant experience in practical work.

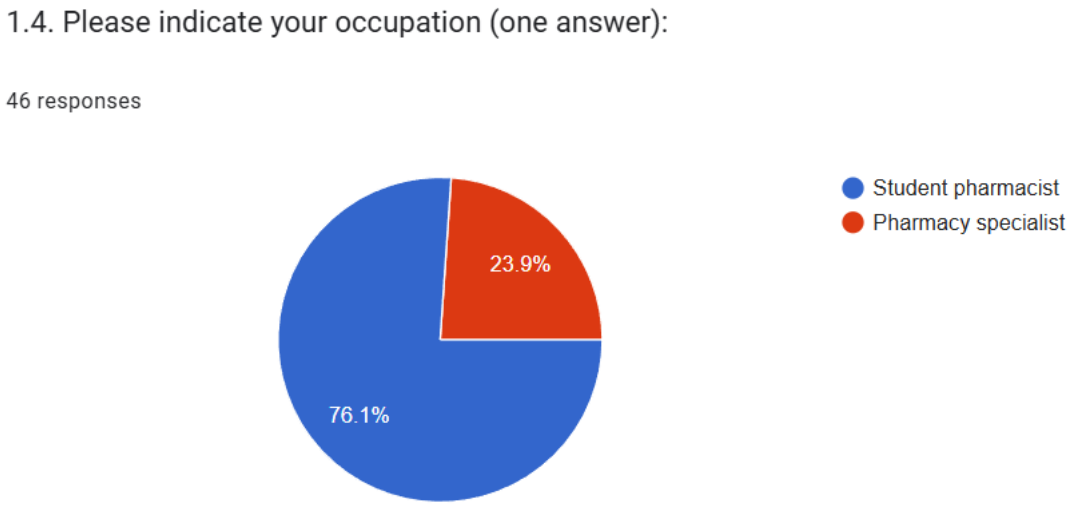


Fig. 3.4. Occupation of respondents

Summarizing the demographic characteristics of the respondents, we can conclude that the sample involved is sufficiently representative to assess the level of awareness of the participants regarding the research topic, which allows us to obtain a comprehensive picture of the formation of professional competencies of future and current pharmacists.

### 3.2. Study of respondents' awareness of the research topic

The second part of the questionnaire consisted of questions aimed at assessing the respondents' awareness of allergic diseases, general recommendations for treating allergies, the main groups of drugs used in the treatment of allergies, mechanisms of their action, assortment, features of use, side effects and contraindications to use.

In the first question of this part, we asked respondents to indicate the most significant causes of allergic diseases in their opinion (Fig. 3.5).

According to the results of the survey on this question, the most popular answer was "Medicines" (89.1%), which indicates that respondents are focused on issues of ADRs, in particular drug-induced allergic reactions. Plant pollen (82.6%), food (69.6%), animal fur and feathers (63%), food additives (56.5%), cosmetics (50%), and insect bites (50%) were also listed by respondents as the most significant causes of allergies. The remaining options received fewer votes. These results indicate a high level of awareness among respondents about the most common causes of allergic reactions, but also indicate opportunities to deepen knowledge about possible triggers and etiological factors for the onset and development of allergies.

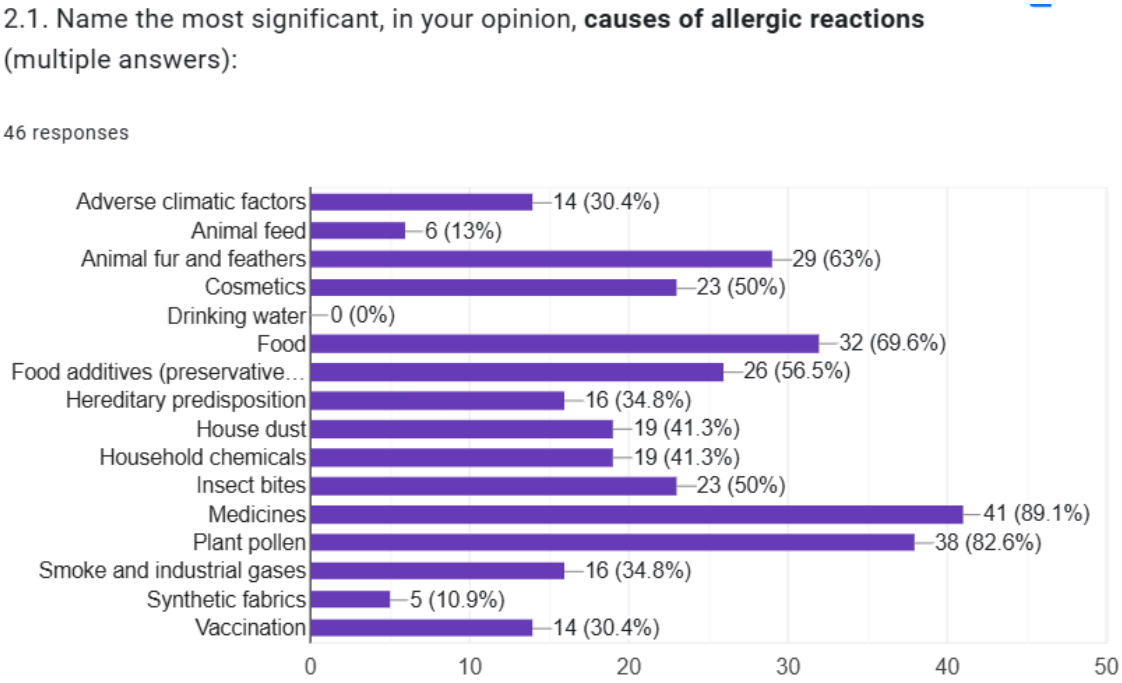


Fig. 3.5. The most significant causes of allergic reactions

The most typical allergy symptoms identified by the survey participants were Itching of the skin or mucous membranes (82.6%), Skin rash (78.3%), Rhinorrhea and rhinitis (78.3%), Swelling of the skin or mucous membranes (69,6%), Sneezing (63%), Cough (58.7%), Hyperemia of the skin or mucous membranes (58.7%), Lacrimation and conjunctivitis (54.3%), Dyspnea (50%), which is generally correct

(Fig. 3.6). However, some important symptoms, in particular, low blood pressure and tachycardia, which may indicate a serious course of the disease, were overlooked.

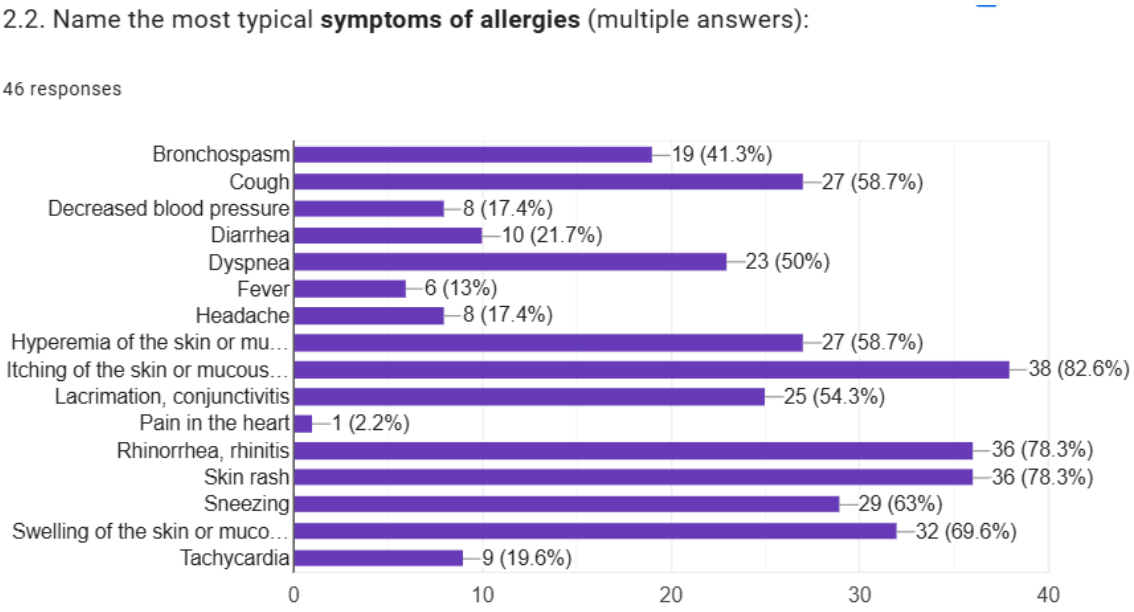


Fig. 3.6. The most typical symptoms of allergies

Respondents demonstrated good awareness of threatening allergy symptoms, choosing correct answers with a high frequency and distractors with a low frequency (Fig. 3.7).

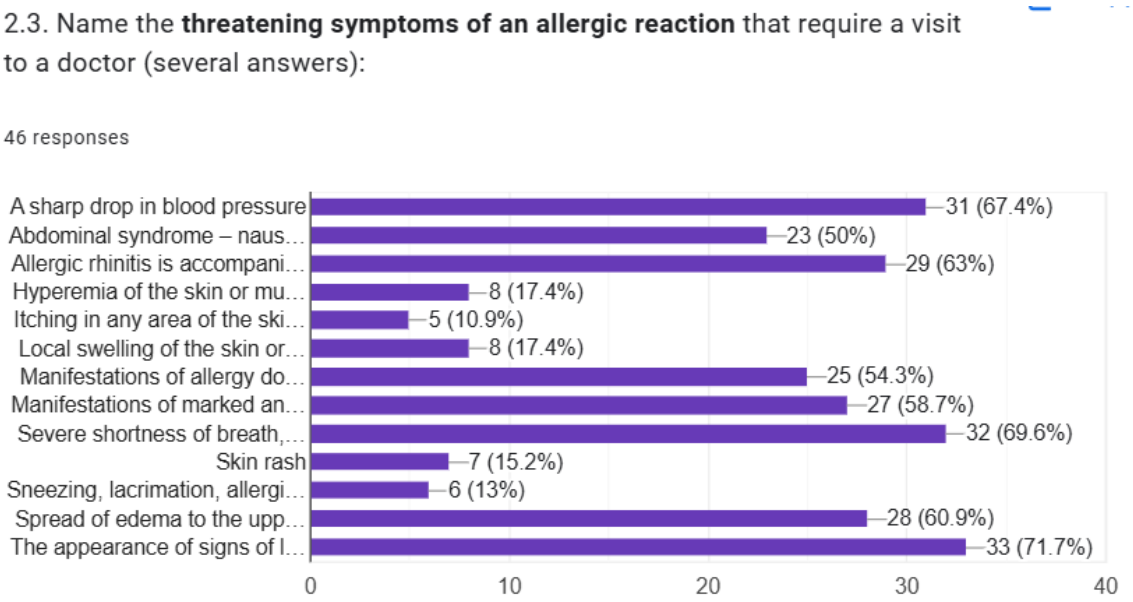


Fig. 3.7. The threatening symptoms of an allergic reaction

Thus, the option "The appearance of signs of laryngeal edema: hoarse voice, "barking" cough, difficulty breathing" was chosen by 71.7% of respondents, “Severe shortness of breath, difficulty breathing, suffocation attacks” – 69.6%, “A sharp drop in blood pressure” – 67.4%, “Allergic rhinitis is accompanied by bloody nasal discharge or fever and purulent nasal discharge” – 63%, “Spread of edema to the upper half of the face” – 60.9%, “Manifestations of marked anxiety, feelings of fear, pronounced weakness, increased motor activity” – 58.7%, “Manifestations of allergy do not disappear against the background of treatment or new manifestations of allergy have appeared” – 54.3%, “Abdominal syndrome – nausea, vomiting, abdominal pain of varying intensity” – 50%. These results indicate that respondents are generally well-versed in allergy symptoms that require medical attention and cannot be treated through responsible self-medication.

Respondents demonstrated a fairly high level of knowledge regarding general recommendations for allergy treatment (Fig. 3.8).

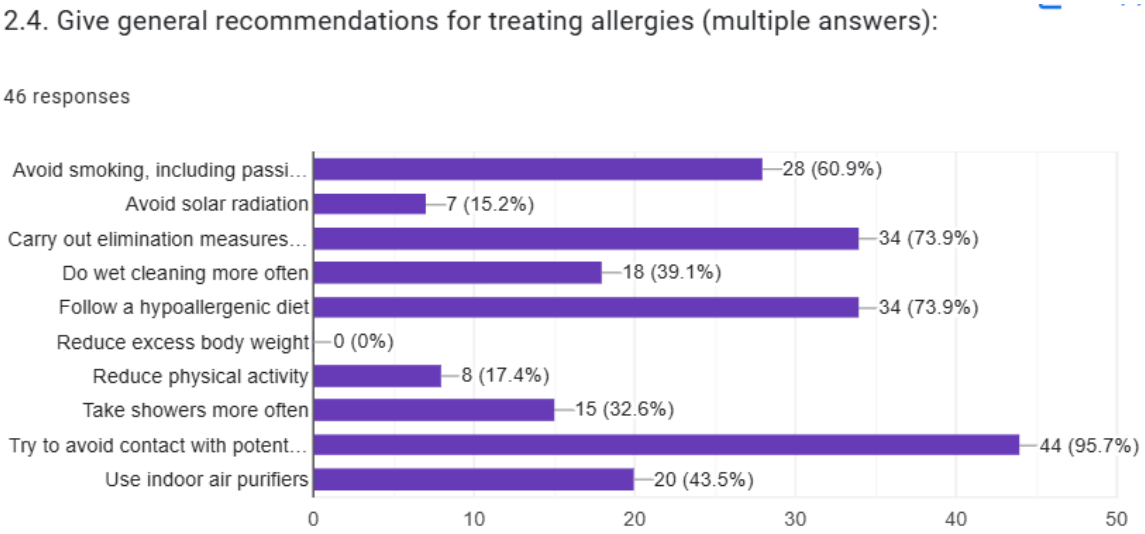


Fig. 3.8. General recommendations for treating allergies

The most obvious options were chosen with high frequency: “Try to avoid contact with potential allergens” – 95.7%, “Carry out elimination measures in relation to external allergens” and “Follow a hypoallergenic diet” – 73.9% each, “Avoid smoking, including passive smoking” – 60,9%. At the same time, the importance of such elimination measures as frequent wet cleaning, frequent

showering and the use of air purifiers is downplayed by respondents. This tells us about the need to deepen the information of students and pharmacists about ways to prevent patient contact with allergens.

Respondents with a high frequency identified the possibility of using systemic (76.1%) and topical (82.6%) antihistamines in self-treatment of allergic manifestations (Fig. 3.9).

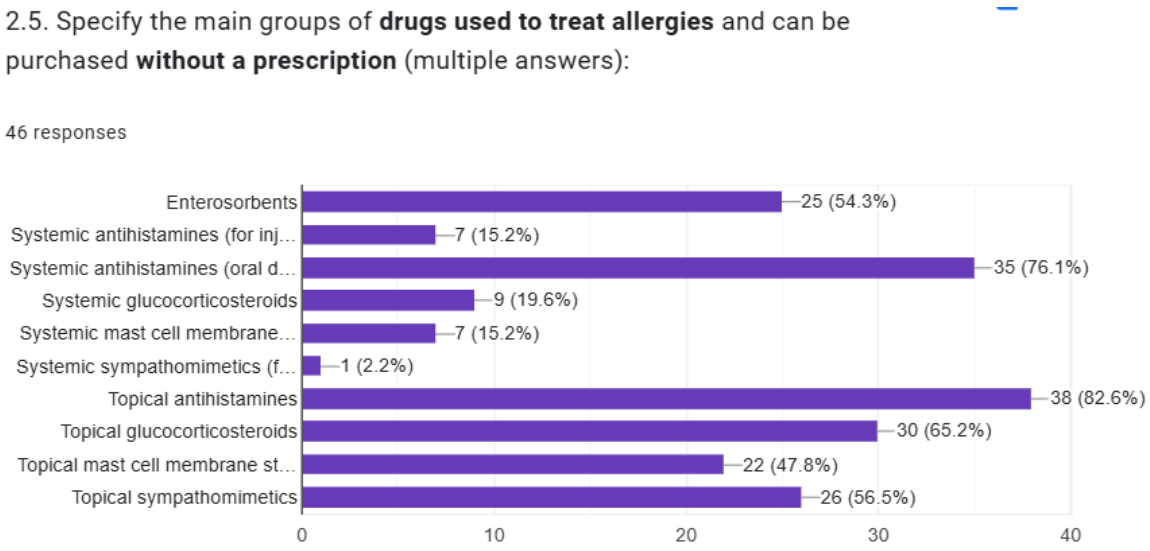


Fig. 3.9. The main groups of OTC-drugs used to treat allergies

Their awareness of the potential for such use of topical glucocorticosteroids (65.2%), topical sympathomimetics (65.5%), enterosorbents (54.3%), and topical mast cell membrane stabilizers (47.8%) was somewhat lower. However, the result for GC may be underestimated because most topical nasal preparations in this group are prescription-only.

The vast majority of respondents (78.3%) correctly indicated the mechanism of antiallergic action of antihistamines (Fig. 3.10). However, some of the respondents still chose distractors, so there is also room for improvement in knowledge of this aspect.

Respondents were well oriented in the classification of antihistamines. Most respondents correctly indicated first-generation drugs: Diphenhydramine (80.4%), Chloropyramine (78.3%), Mebhydrolin (69.6%), Cyproheptadine (58.7%), Clemastine (56.5%), Dimetindene (54.3%), Doxylamine (52.2%) (Fig. 3.11).

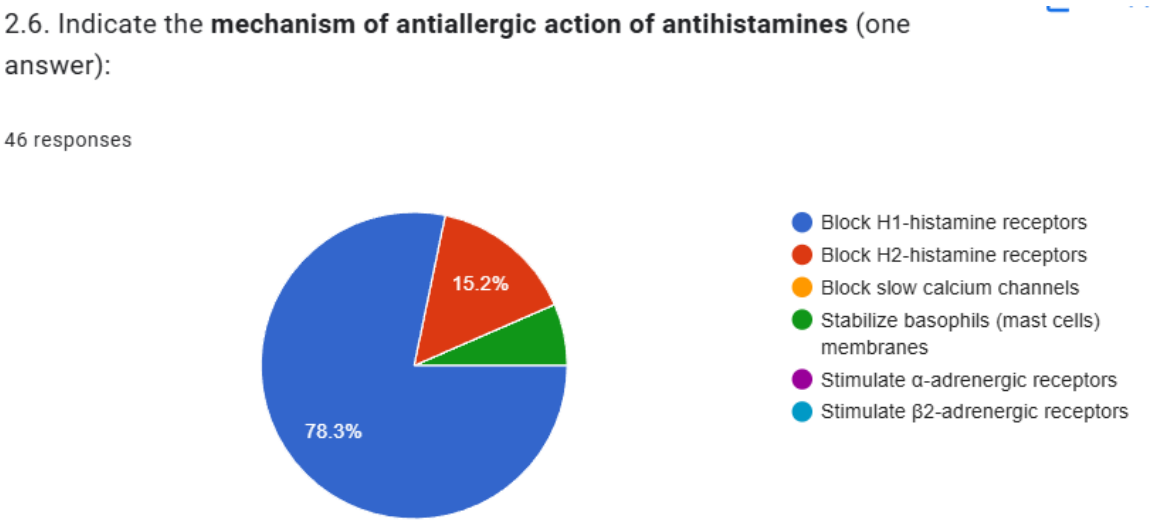


Fig. 3.10. The mechanism of antiallergic action of antihistamines

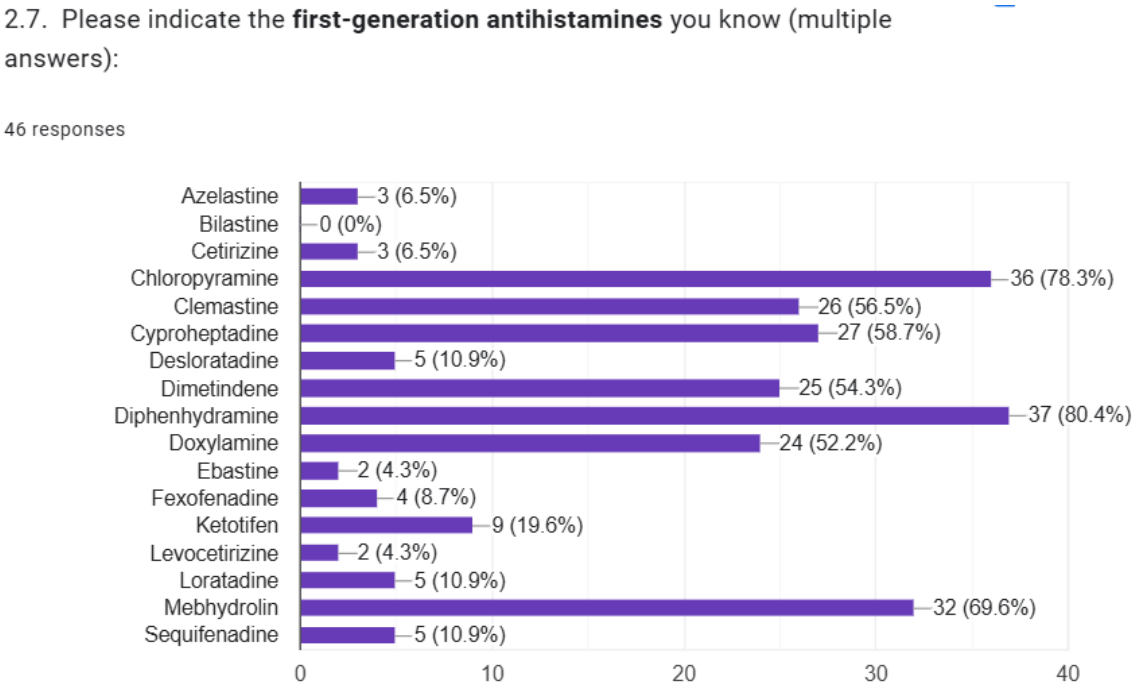


Fig. 3.11. The first-generation antihistamines

We observe a similar picture in the responses regarding second and third generation drugs (Fig. 3.12). Most survey participants correctly identified all drugs of this group: Loratadine (84.8%), Levocetirizine (80.4%), Cetirizine (76.1%), Desloratadine (73.9%), Bilastine (67.4%), Fexofenadine (65.2%), Ebastine (58.7%), Azelastine (54.3%) and Sequifenadine (50%). At the same time, the frequency of choosing distractors in two questions regarding the classification of antihistamines

turned out to be very low. Despite the relatively low recognition of some individual drugs, we must admit that such awareness is very good.

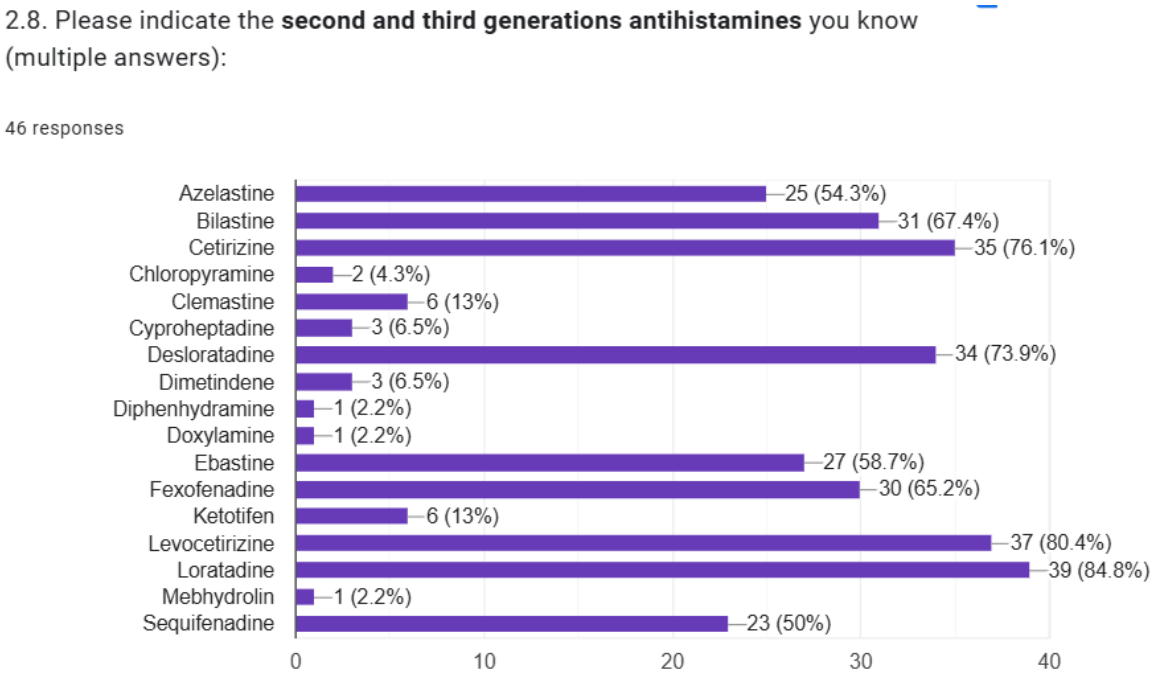


Fig. 3.12. The second and third generations antihistamines

In the next question, we asked respondents to indicate possible side effects of antihistamines, with an emphasis on first-generation drugs (Fig. 3.13).

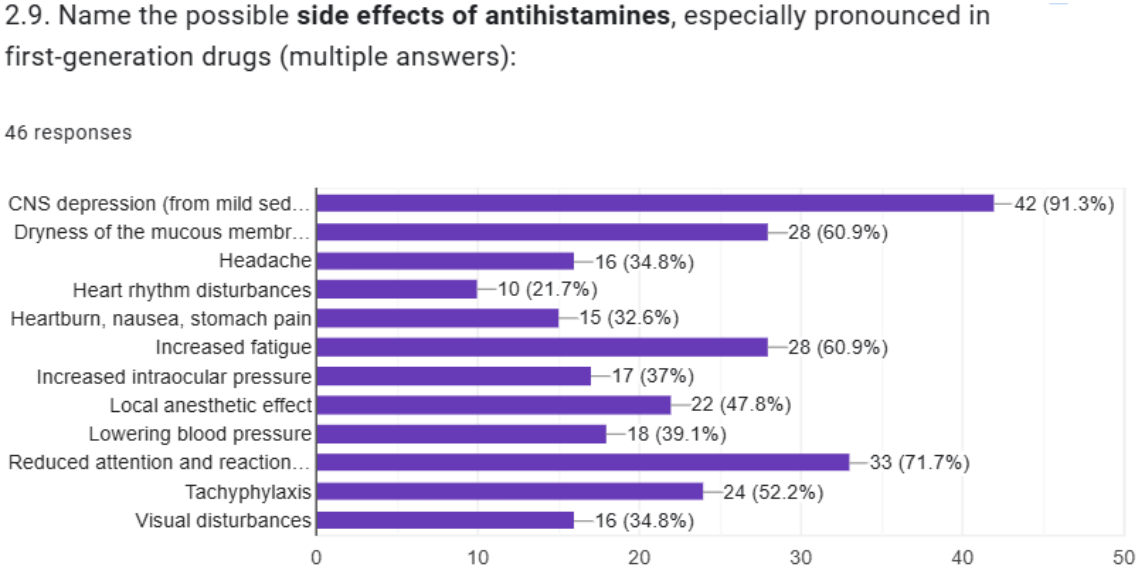


Fig. 3.13. The possible side effects of antihistamines

Respondents demonstrated high awareness of CNS depression with antihistamines: “CNS depression (from mild sedative effect to pronounced hypnotic)” – 91.3%, “Reduced attention and reaction speed” – 71.47%, “Increased fatigue” – 60.9%. Another 60.9% indicated “Dryness of the mucous membranes of the nose and throat” as a result of the atropine-like action of first-generation drugs. Only 52.2% of respondents indicated such an important side effect of antihistamines as tachyphylaxis. Cardiovascular side effects (disruption of heart rhythm, decrease in blood pressure), local anesthetic effect, headache, side effects from the gastrointestinal tract were indicated by less than half of the respondents. Therefore, the awareness of students and pharmacists regarding the side effects of antihistamines is somewhat ambiguous and needs to be improved.

According to the results of the survey on the following question (Fig. 3.14) respondents identified the main advantage of second- and third-generation antihistamines as less severe side effects (80.4%). Most respondents also correctly named the following advantages: absence of sedative effect when used in therapeutic doses (67.4%), longer duration of antihistamine action (63%), high specificity and high affinity for H1 receptors (60.9%), absence of tachyphylaxis (58.7%).

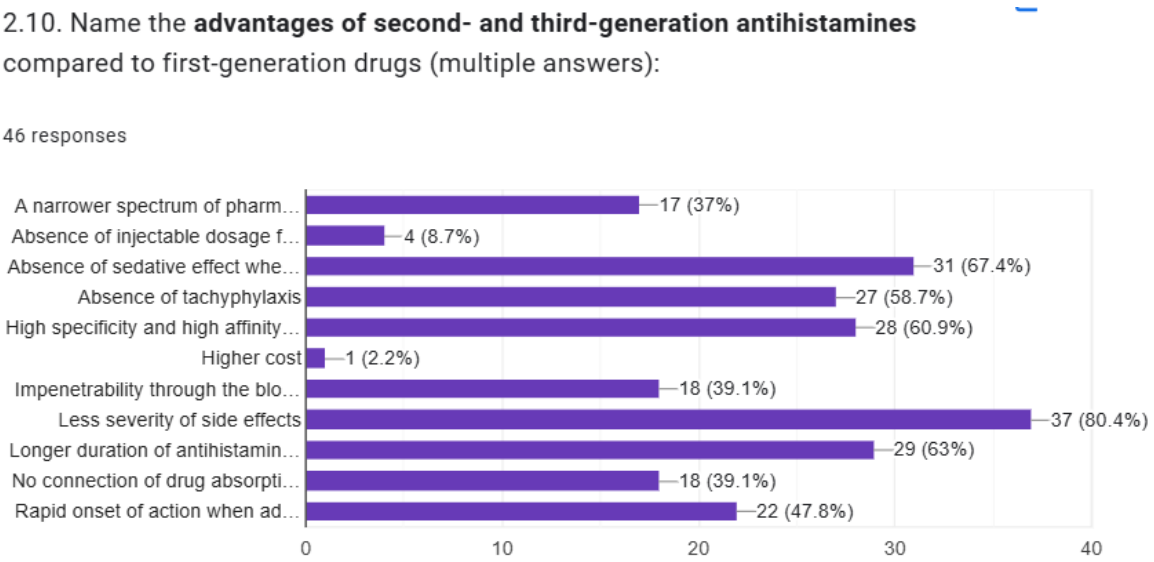


Fig. 3.14. The advantages of second- and third-generations antihistamines

Other advantages of second- and third-generation antihistamines were indicated by less than half of those surveyed: rapid onset of action when administered orally – 47.8%, impenetrability through the blood-brain barrier – 39.1%, no connection of drug absorption with food intake – 39.1%. The survey results indicate that respondents are quite well aware of the differences in the action and side effects of antihistamines of different generations.

The next question was devoted to the features and limitations of the use of antihistamines (Fig. 3.15). It should be noted that all answer options to this question were correct, but respondents were asked to choose the most important ones.

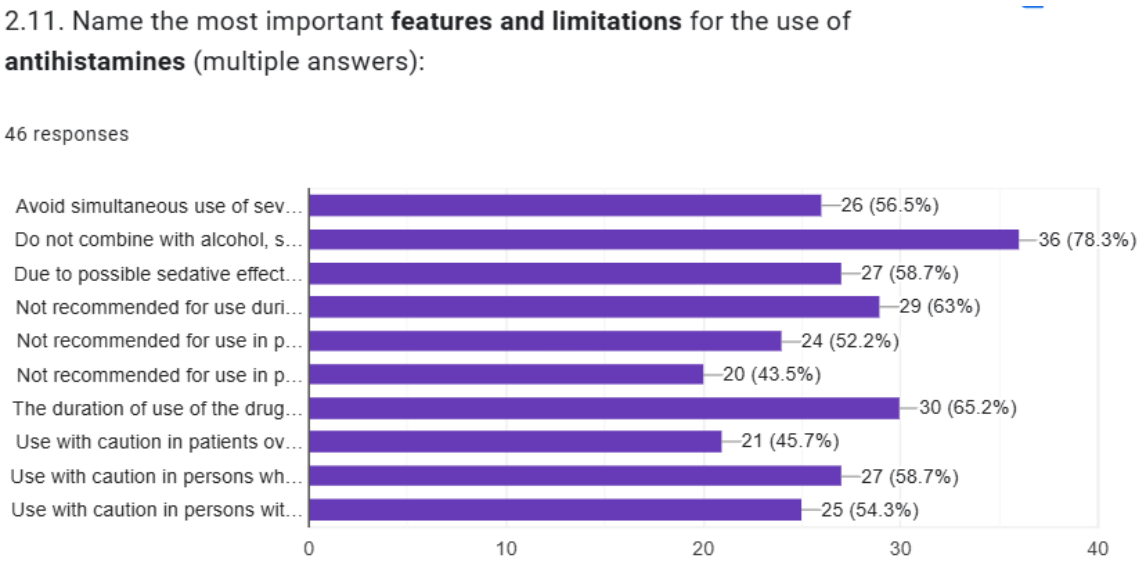


Fig. 3.15. The features and limitations for the use of antihistamines

The vast majority of respondents are aware that antihistamines should not be used with alcohol, sedatives, hypnotics, tranquilizers, neuroleptics, opioid analgesics (78.3%). The frequencies of choosing other options were: “The duration of use of the drug without consulting a doctor should not exceed 14 days” – 65.2%; “Not recommended for use during pregnancy and breastfeeding” – 63%; “Due to possible sedative effects, it is advisable to take in the evening” – 58.7%; “Use with caution in persons whose activities require quick reactions and increased attention” – 58.7%; “Avoid simultaneous use of several antihistamines, including as part of complex medications” – 56.5%; “Use with caution in persons with impaired liver

and kidney function" – 54.3%; "Not recommended for use in patients with astheno-depressive syndrome" – 52.2%; "Use with caution in patients over 60 years of age" – 45,7%; "Not recommended for use in patients with glaucoma" – 43,5%.

According to the answers to the following question, respondents are well aware of drugs from the group of mast cell membrane stabilizers (Fig. 3.16). Cromoglicic acid was chosen by 93.5% of respondents, nedocromil – 80.4%, ketotifen - 56.5%. Some respondents mistakenly chose azelastine (21.7%) and dimethindene (15.2%). The remaining distractors had very low selection frequencies.

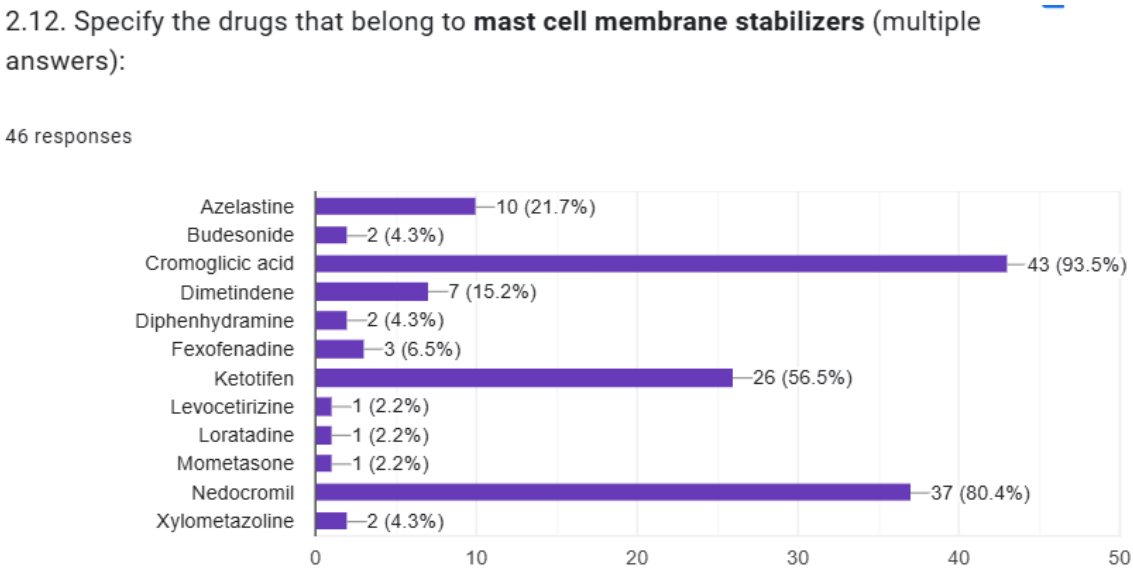


Fig. 3.16. Mast cell membrane stabilizers

Determining the mechanism of action of mast cell membrane stabilizers turned out to be quite obvious (Fig. 3.17). 84.8% of respondents chose the correct answer.

Respondents demonstrated a fairly high level of awareness regarding the specifics of the use of mast cell membrane stabilizers (Fig. 3.18). 82.6% of respondents understand that these drugs are used only to prevent allergy symptoms. 69.6% of respondents know that it is recommended to start taking these medications 3–4 weeks before the probable contact with the allergen; 63% are aware that a

persistent effect develops within 10–12 weeks of continuous administration of mast cell membrane stabilizers.

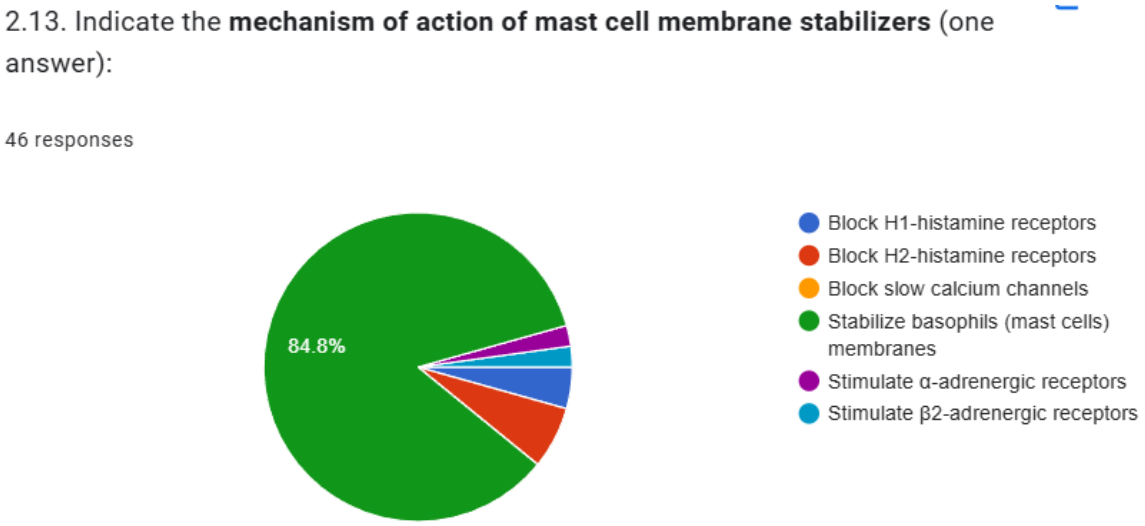


Fig. 3.17. The mechanism of action of mast cell membrane stabilizers

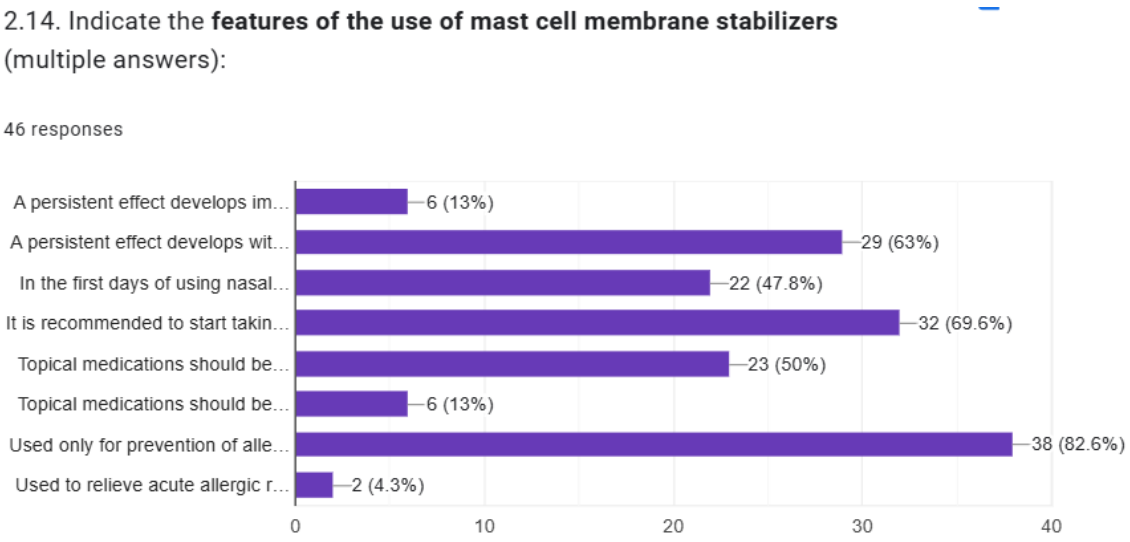


Fig. 3.18. The features of mast cell membrane stabilizers

Only half of respondents know that topical medications should be applied several times a day. 47,8% indicated the correct answer “In the first days of using nasal preparations, irritation of the nasal mucosa is possible, which does not require discontinuation of the drug”.

Most respondents correctly identified the GCs most commonly used in nasal preparations for the treatment of allergic rhinitis (Fig. 3.19): Beclomethasone – 87%,

Mometasone – 73.9%, Fluticasone – 67.4% and Budesonide – 58.7%. Such results indicate a high awareness of the respondents in the nomenclature of this group of medicines.

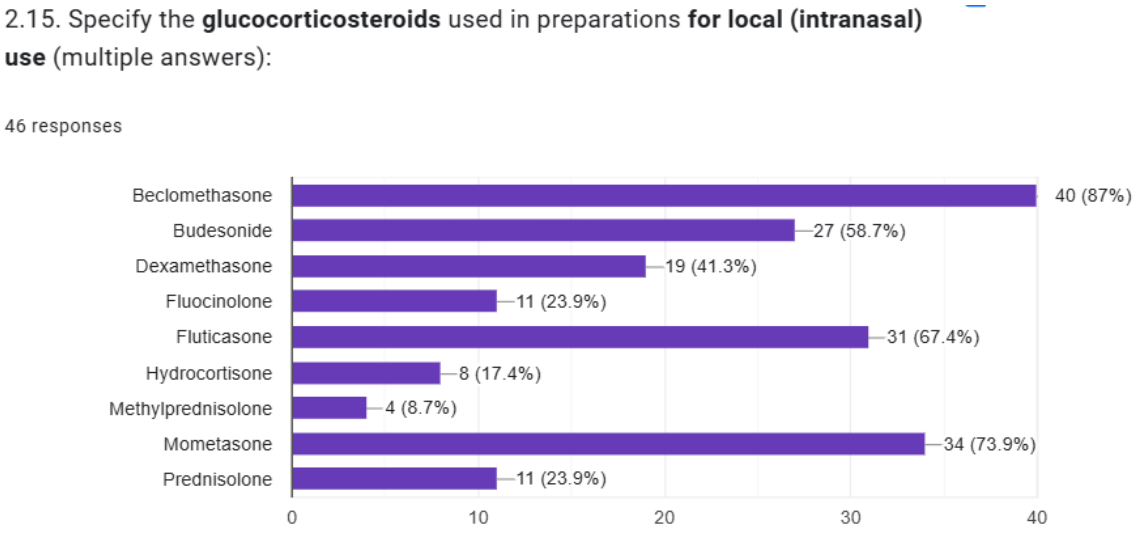


Fig. 3.19. Glucocorticosteroids used in preparations for local (intranasal) use

Respondents are also quite well aware of the differences between topical nasal and systemic GCs (Fig. 3.20): 84.8% noted higher local activity of nasal preparations, 80.4% indicated less severity of systemic side effects, and 69.6% demonstrated awareness of the reduced bioavailability of nasal GCs.

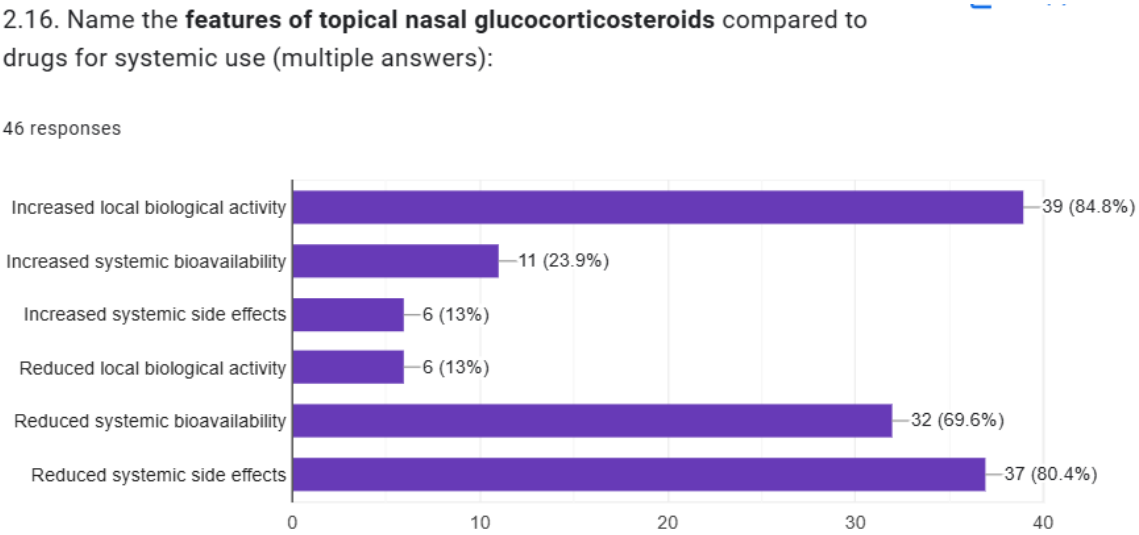


Fig. 3.20. The features of topical nasal glucocorticosteroids

According to the answers to the following question (Fig. 3.21), respondents showed a high level of knowledge about local side effects of nasal GCs. Most respondents are aware of the undesirable effects of using these medications, such as: candidiasis of the nasal mucosa – 73.9%; burning sensation, dryness, irritation of the nasal mucosa – 67.4%; nose bleeding – 67.4%; allergic reaction – 58.7%; atrophy of the nasal mucosa – 54.3%. 47.8% of respondents indicated a decrease in local immunity, and 45.7% – a possible perforation of the nasal septum. A minority of respondents indicated systemic side effects of GCs, such as increased intraocular pressure (45.7%), headache (37%), growth retardation in children (30.4%), increased blood pressure (30.4%), and suppression of the adrenal cortex (26.1%). However, systemic side effects of nasal GCs are rare and may occur with very prolonged or excessive use.

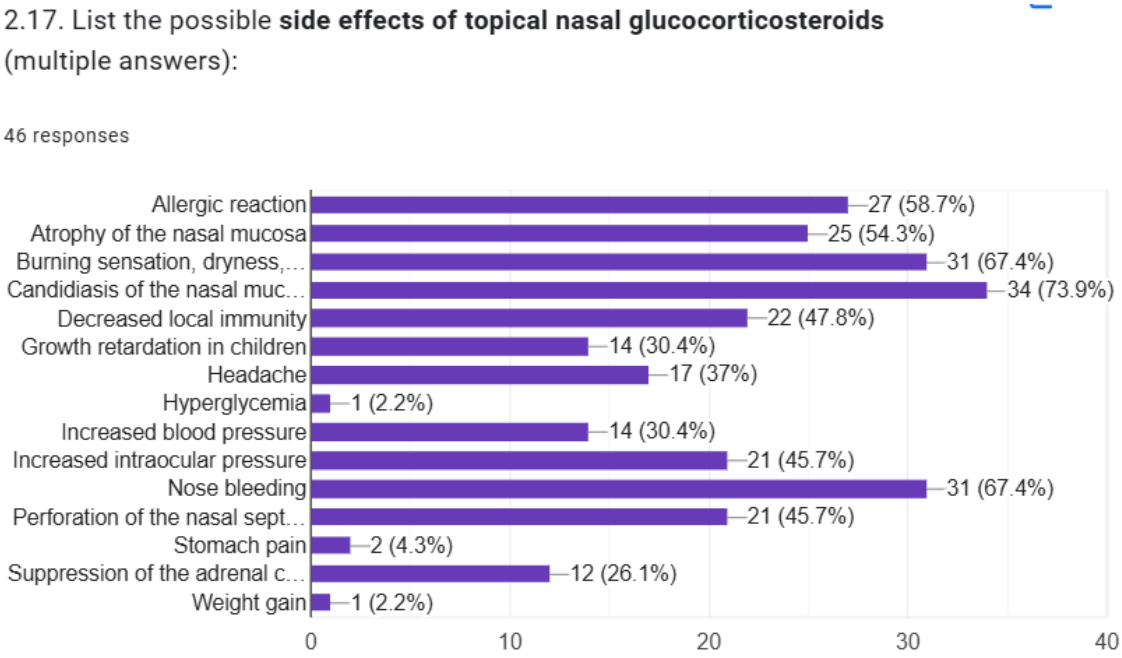


Fig. 3.21. The possible side effects of topical nasal glucocorticosteroids

Respondents also showed a fairly high level of awareness regarding contraindications to the use of nasal GCs (Fig. 3.22). They correctly indicated such states as hypersensitivity to the components of the drug (80.4%), nasal candidiasis (69.6%), presence of ulcers on the nasal mucosa (67.4%), recent injuries and surgeries to the nose (67.4%), untreated local infection of the nasal mucosa (65.2%),

children under 2 years old (65.2%), pregnancy (56.5%), and glaucoma (50%). However, only a minority of respondents indicated such possible contraindications as lactation (37%) and use during vaccination and immunization (32.6%).

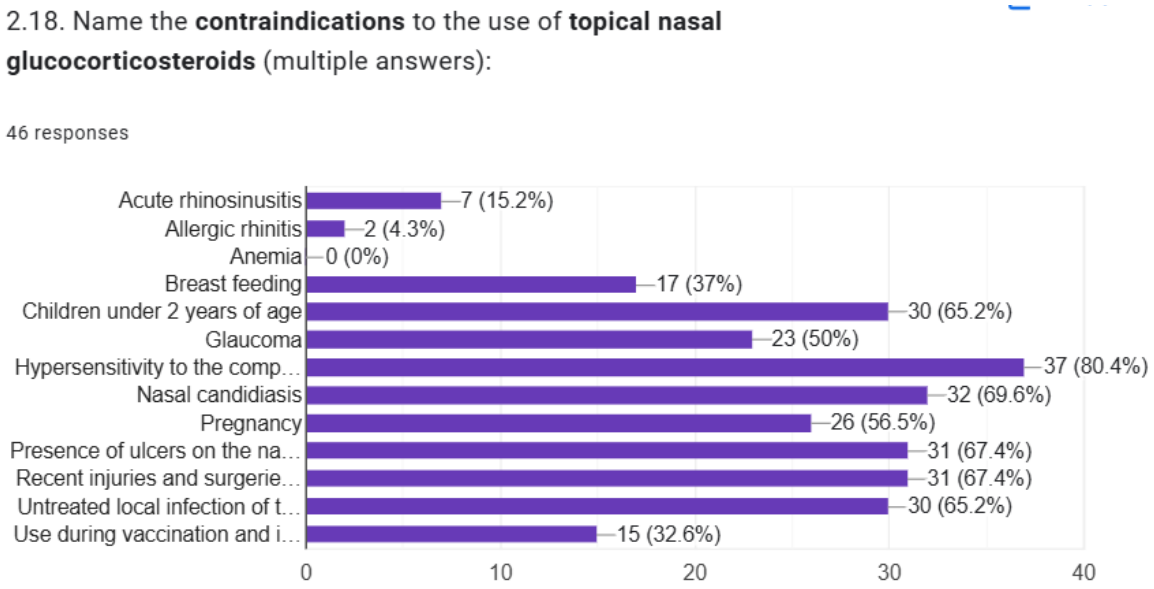


Fig. 3.22. The contraindications to the use of topical nasal glucocorticosteroids

Most respondents accurately identified the mechanism of action of local sympathomimetics (Fig. 3.23) – stimulation of α-adrenoreceptors (63%).

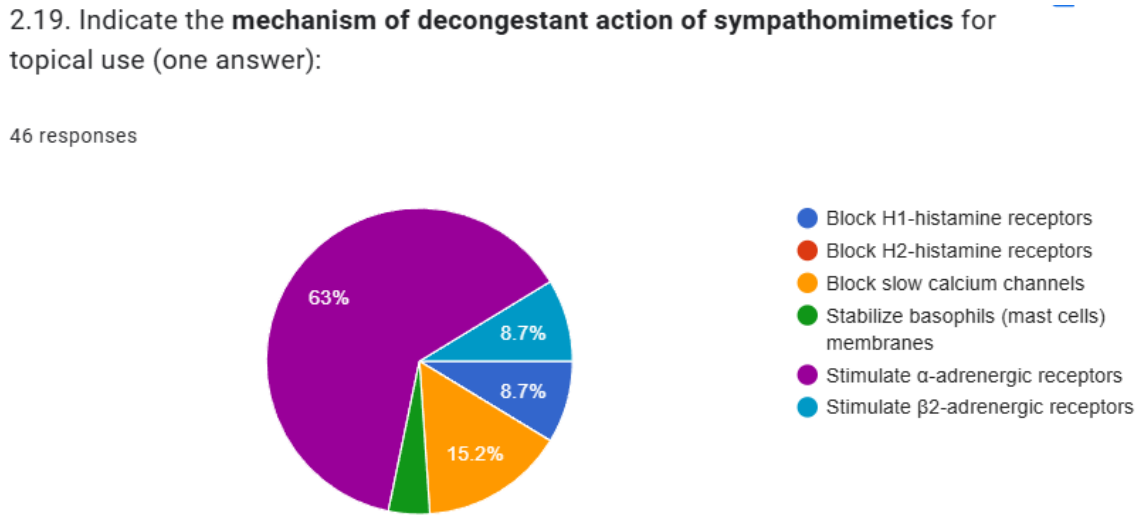


Fig. 3.23. The mechanism of decongestant action of sympathomimetics

However, we find this result surprisingly low, considering the simplicity of the question and the general level of awareness of the respondents. Significant numbers of responses were received by distractors such as “Block slow calcium channels” (15.2%), “Block H1-histamine receptors” and “Stimulate β2-adrenergic receptors” (both 8.7%).

In the answer to the following question, respondents correctly indicated the sympathomimetics most often used in nasal decongestants (Fig. 3.24) – oxymetazoline, xylometazoline (both 80.4%) and naphazoline (73.9%). However, only a minority of respondents mentioned tramazoline (45.7%) and phenylephrine (30.4%), which are also quite widely used for this purpose. We should also note the significant frequency of tetryzoline (23.9%), which is widely used in ophthalmic dosage forms.

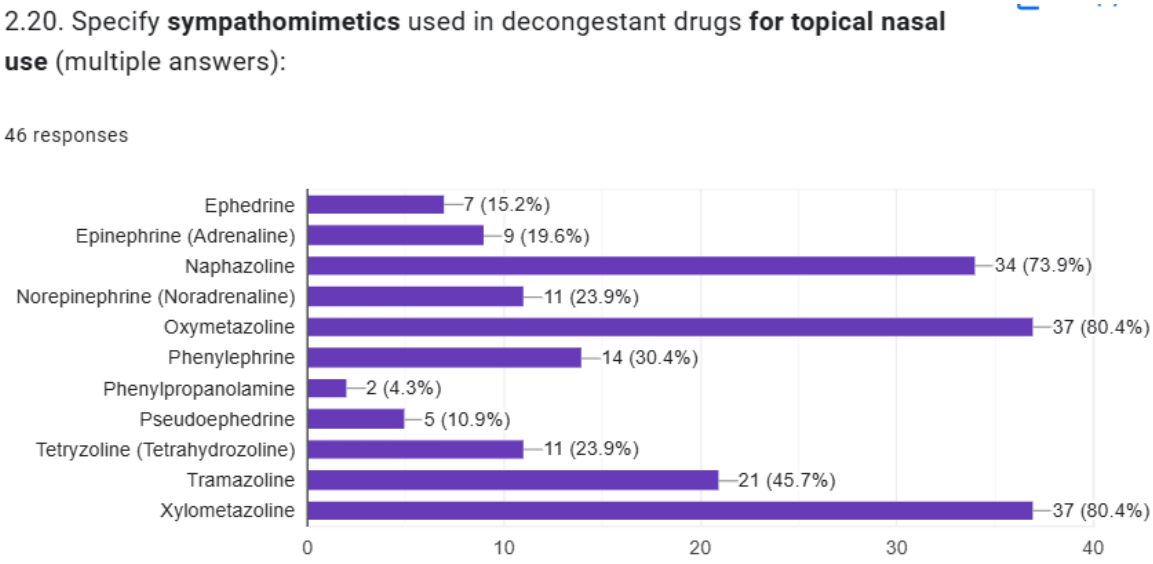


Fig. 3.24. Sympathomimetics used in decongestant drugs for nasal use

In the next question, we investigated the awareness of applicants and pharmacists regarding the side effects of nasal decongestants (Fig. 3.25).

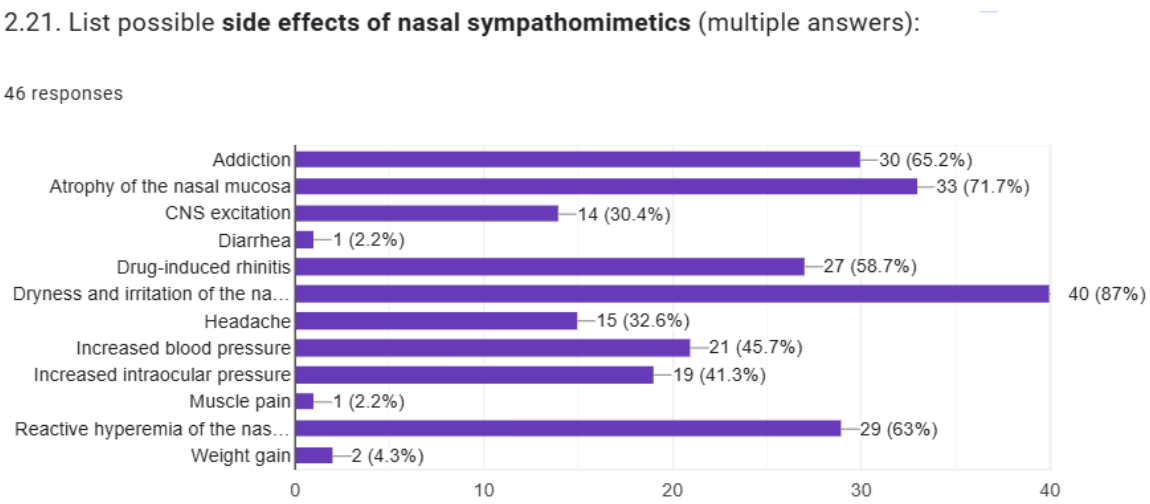


Fig. 3.25. The possible side effects of nasal sympathomimetics

As in the situation with GC, respondents showed a fairly high level of awareness of local adverse reactions to sympathomimetics: dryness and irritation of the nasal mucosa (87%), atrophy of the nasal mucosa (71.7%), addiction (65.2%), reactive hyperemia of the nasal mucosa (63%), and drug-induced rhinitis (58.7%). However, awareness of systemic side effects was significantly lower: only 45.7% of respondents indicated a possible increase in blood pressure, 41.3% – possible increase in intraocular pressure, 32.6% – headache, 30.4% – CNS excitation. Considering that these adverse reactions are quite common, especially in individuals with relevant comorbid conditions and in case of overdoses or use of solutions of too high concentrations of sympathomimetics, we draw attention to the lack of awareness of respondents on this issue.

Regarding the specifics of using nasal decongestants, the responses were also unevenly distributed (Fig. 3.26).

Respondents showed high awareness of aspects such as: “Not recommended for use for more than 5-7 days” – 78.3%; “Before use, it is necessary to clean the nasal cavity” – 71.7%; “Do not use simultaneously with other vasoconstrictors, β-blockers, sedatives, antidepressants, MAO inhibitors” – 71.7%; “For children, it is necessary to use drugs with a reduced concentration of the active substance” – 69.6%.

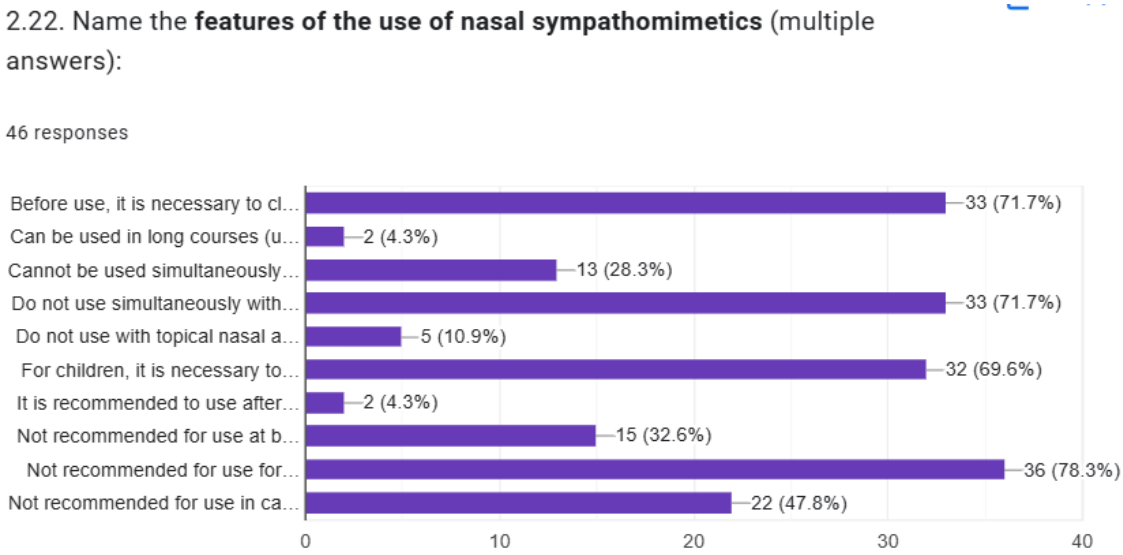


Fig. 3.26. The features of the use of nasal sympathomimetics

However, some important aspects had a much lower frequency of responses: "Not recommended for use in case of arterial hypertension, glaucoma, prostate adenoma" – 47.8%; "Not recommended for use at bedtime" – 32.6%; "Cannot be used simultaneously with other drugs administered through the nasal cavity" – 28.3%. We can conclude that the main features of the use of nasal sympathomimetics are known to the surveyed audience, but certain aspects remain overlooked and require in-depth study in relevant training sessions.

In the last two questions of the questionnaire, we asked respondents to self-assess their theoretical knowledge on pharmaceutical care when dispensing medications used for the symptomatic treatment of allergic manifestations, and their interest in improving their knowledge on this issue (Fig. 3.27 – 3.28).

The results of self-assessment demonstrate adequate perception by respondents of their own level of theoretical knowledge on the issue under study. The predominance of scores of 3-4 points (sufficient and high level of knowledge) indicates awareness of the need for constant improvement of knowledge. Such self-criticism is a positive feature of future and current specialists, as it reflects their desire for continuous professional development.

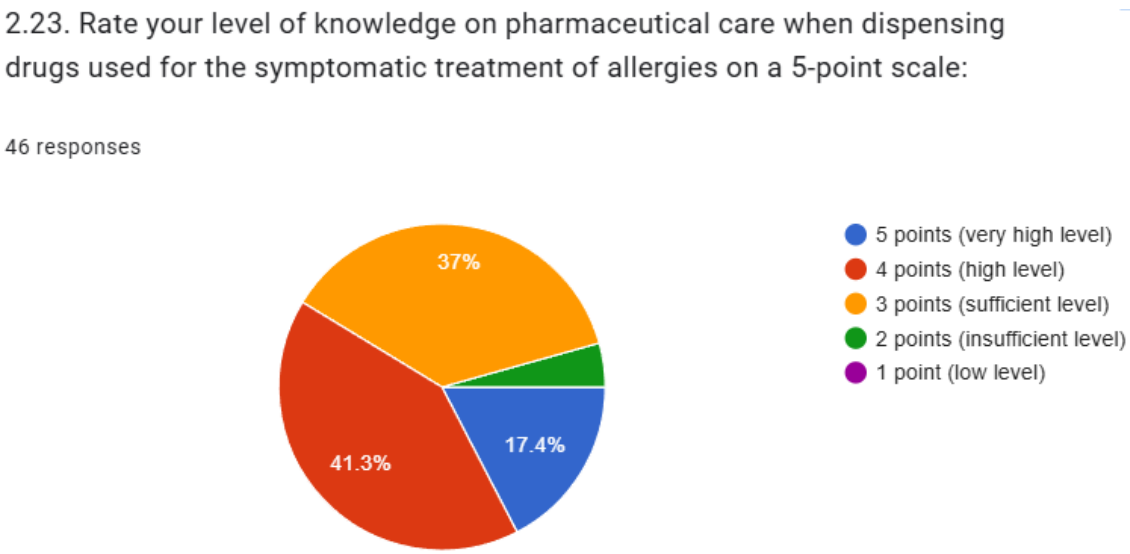


Fig. 3.27. Respondents' self-assessment of their theoretical knowledge on the issues of the pharmaceutical care when dispensing OTC drugs used for the symptomatic treatment of allergies

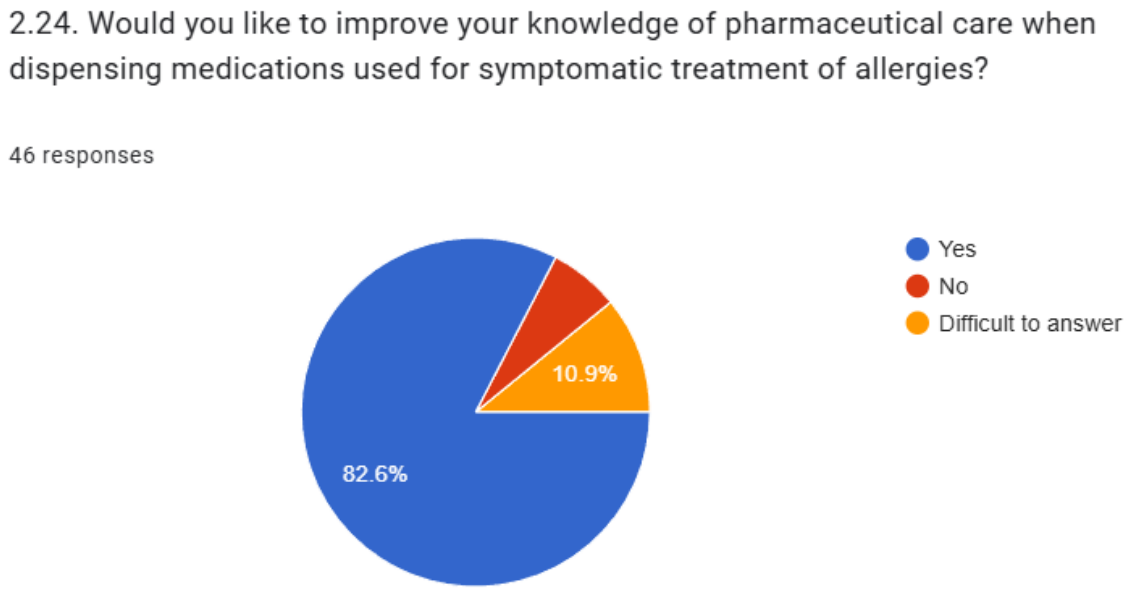


Fig. 3.28. Respondents' interest to improve their knowledge about the pharmaceutical care when dispensing OTC drugs used for the symptomatic treatment of allergies

The absolute majority of respondents (82.6%) expressed interest in deepening their knowledge of pharmaceutical care when dispensing OTC medications used in the symptomatic treatment of allergic diseases. This indicates their high motivation

for professional growth and awareness of the importance of continuous learning. The desire of students and pharmacists to improve their competencies is a guarantee of improving the quality of pharmaceutical care in the future.

Comparing the responses to the questionnaire of higher education applicants and practicing pharmacists, we can note greater accuracy in the responses of pharmacists. In particular, they were significantly better (according to Fisher's exact test) at answering single-answer questions concerning the mechanisms of action of different groups of drugs (Tab. 3.1).

Pharmacists' answers to multiple-choice questions were also more complete and accurate (a greater number of correct answers selected than students). This difference can be explained by the experience of daily work in pharmaceutical care of patients with various diseases, including allergic manifestations.

Table 3.1

**Comparison of student and pharmacist responses to single-answer questions**

| Question | % of correct answers of students | % of correct answers of pharmacists | Statistical significance of differences according to Fisher's exact test |
|---|---|---|---|
| 2.6. Indicate the mechanism of antiallergic action of antihistamines | 71.4 | 100 | φ = 3.263<br>p = 0.0006 |
| 2.13. Indicate the mechanism of action of mast cell membrane stabilizers | 80 | 100 | φ = 2.683<br>p = 0.0037 |
| 2.19. Indicate the mechanism of decongestant action of sympathomimetic | 54.3 | 90.9 | φ = 2.524<br>p = 0.0058 |

In addition, a larger proportion of pharmacists responded positively to the question about their interest in deepening their knowledge of the research topic (90.9% versus 80% of students), which indicates their awareness of the importance of continuous learning and improving their professional knowledge.

**Conclusions to Chapter 3**

1. Based on the results of the study, the demographic characteristics of the respondents were analyzed, namely gender, age, country of residence and occupation. The total number of survey participants was 46 people.

2. Based on the survey results and analysis of its results, we assessed the awareness of students and practicing pharmacists about allergic diseases, general recommendations for the treatment of allergies, the main groups of drugs used in the treatment of allergies, their mechanisms of action, assortment, features of use, side effects and contraindications to use, as well as issues related to pharmaceutical care during the dispensing of these drugs.

3. According to the results of our study, we can conclude that respondents generally have a fairly high level of theoretical training, but they need to deepen their knowledge about the pharmacological properties, features of use, side effects and contraindications of certain groups of drugs used for the symptomatic treatment of allergies, and improve practical skills in pharmaceutical care when dispensing medications to patients with allergic manifestations.

# CONCLUSIONS

1. Allergies, also known as allergic diseases, are various conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. These diseases include hay fever, food allergies, drug allergies, atopic dermatitis, allergic asthma, and anaphylaxis.

2. Management of allergies typically involves avoiding the allergy trigger and taking medications to improve the symptoms. These include antihistamines, topical glucocorticoids, topical mast cell stabilizers, and topical sympathomimetics (decongestants) are common symptomatic treatments of allergic diseases.

3. The participation of a pharmacist in the treatment process allows to reduce the risk of complications, optimize therapy and provide patients with the appropriate level of medical care. That is why the role of pharmaceutical care in self-treatment of allergic manifestations is extremely important and requires further development and improvement.

3. In accordance with the tasks set, we developed a questionnaire consisting of 28 questions, determined a sample of respondents and conducted an anonymous survey using Google Forms. The survey involved 46 respondents – senior students of the NUPh and pharmacists of Agadir city (Morocco).

4. Based on the results of the study, the demographic characteristics of the respondents were analyzed, namely gender, age, country of residence and occupation.

5. Based on the survey results and analysis of its results, we assessed the awareness of students and practicing pharmacists about allergic diseases, general recommendations for the treatment of allergies, the main groups of drugs used in the treatment of allergies, their mechanisms of action, assortment, features of use, side effects and contraindications to use, as well as issues related to pharmaceutical care during the dispensing of these drugs.

6. According to the results of our study, we can conclude that respondents generally have a fairly high level of theoretical training, but they need to deepen

their knowledge about the pharmacological properties, features of use, side effects and contraindications of certain groups of drugs used for the symptomatic treatment of allergies, and improve practical skills in pharmaceutical care when dispensing medications to patients with allergic manifestations.

7. The results obtained as a result of the study have significant practical value. They allow us to assess the current level of knowledge of students and pharmacists, identify problematic aspects of their training, and create a basis for developing recommendations for improving knowledge on the topic under study and creating informational and educational materials to improve the professional competence of future pharmacists.

# REFERENCES

1. Allergic rhinitis and its impact on asthma update: allergen immunotherapy / G. Passalacqua et al. *J Allergy Clin Immunol*. 2008. Vol. 119(4). P. 881 – 891.

2. Allergy management in primary care across European countries – actual status / I. Agache et al. *Allergy*. 2013. Vol. 68. P. 836–843.

3. Baiardini I., Braido F., Brandi S., Canonica G. W. Allergic diseases and their impact on quality of life. *Ann Allergy Asthma Immunol*. 2006. Vol. 97. P. 419–428.

4. BSACI guidelines for the management of allergic and non-allergic rhinitis / R. Mirakian et al. *Clin Exp Allergy.* 2008. Vol. 38. P. 19–42.

5. Church M. K., Church D. S. Pharmacology of antihistamines. *Indian J Dermatol*. 2013. Vol. 58. P. 219-224.

6. deShazo R. D., Kemp S. F. Allergic Reactions to Drugs and Biologic Agents. *JAMA*. 1997. Vol. 278(22). P. 1895-1906.

7. Evaluation of nasal decongestants by literature review / S. Petkovic et al. *Ser J Exp Clin Res.* 2024. Vol. 25(2). P. 181-187.

8. Finn D. F., Walsh J. J. Twenty-first century mast cell stabilizers. *British Journal of Pharmacology*. 2013. Vol. 170. P. 23–37.

9. From Pollinosis to Digestive Allergy / J. Bartra et al. *J Investig Allergol Clin Immunol.* 2009. Vol. 19(1). P. 3-10.

10. Kaliner M. A., Berger W. E., Ratner P. H., Siegel C. J. The efficacy of intranasal antihistamines in the treatment of allergic rhinitis. *Annals of Allergy, Asthma Immunology*. 2011. Vol. 106(2). P. S6-S11.

11. Khan D. A., Solensky R. Drug allergy. *J Allergy Clin Immunol*. 2010. Vol. 125(2). P. S126-S137.

12. Mackay I. R., Rosen F. S. Allergy and Allergic Diseases. *N Engl J Med*. 2001. Vol. 344(1). P. 30-37.

13. Mahdy A. M., Webster N. R. Histamine and Antihistamines. *Anaesthesia And Intensive Care Medicine*. 2011. Vol. 12(7). P. 324-329.

14. Min Y. G. The Pathophysiology, Diagnosis and Treatment of Allergic Rhinitis. *Allergy Asthma Immunol Res*. 2010. Vol. 2(2). P. 65-76.

15. Mortimer K. J., Tattersfield A. E. Benefit Versus Risk for Oral, Inhaled, and Nasal Glucocorticosteroids. *Immunol Allergy Clin N Am*. 2005. Vol. 25(3). P. 523–539.

16. Okano M. Mechanisms and clinical implications of glucocorticosteroids in the treatment of allergic rhinitis. *Clinical and Experimental Immunology.* 2009. Vol. 158(2). P. 164–173.

17. Perry T. T., Pesek R. D. Clinical manifestations of food allergy. *Pediatr.* 2013. Vol. 42. P. 96–101.

18. Primary care: the cornerstone of diagnosis of allergic rhinitis / D. Ryan et al. *Allergy*. 2008. Vol. 63. P. 981–989.

19. Ramsey A., Sheikh A. Innovations in Health Care Delivery: Drug Allergy. *Journal of Allergy and Clinical Immunology: In Practice*. 2019. Vol. 7(7). P. 2143-2150.

20. Rebound congestion and rhinitis medicamentosa: Nasal decongestants in clinical practice. Critical review of the literature by a medical panel / G. Mortuairea et al. *European Annals of Otorhinolaryngology, Head and Neck Diseases*. 2013. Vol. 130(3). P. 137-144.

21. Recommendations for the allergy management in the primary care / M. Jutel et al. *Allergy*. 2014. Vol. 69. P. 708–718.

22. Small P., Keith P. K., Kim H. Allergic rhinitis. *Allergy Asthma Clin Immunol.* 2018. Vol. 14(2). P. 31-41.

23. Spiewak R. Contact dermatitis in atopic individuals. *Curr Opin Allergy Clin Immunol*. 2012. Vol. 12. P. 491–497.

24. Sur D. K., Scandale S. Treatment of allergic rhinitis. *SA Fam Pract*. 2010. Vol. 52(5). P. 398-403.

25. The impact of pharmaceutical care on improving the quality of life in patients with allergic rhinitis / A. Todorova et al. *CBU International Conference on Innovations in Science and Education*. Prague, 22-24 March 2017. Prague, 2017. P. 1022-1027.

26. The role of the pharmacist in achieving therapeutic efficacy and cost effectiveness in the management of allergic rhinitis / A. Tsvetkova et al. *International Journal of Information Research and Review.* 2015. Vol. 2(4). P. 593-596.

27. Trangsrud A. J., Whitaker A. L., Ralph E. Small. Intranasal Corticosteroids for Allergic Rhinitis. *Pharmacotherapy*. 2002. Vol. 22(11). P. 1458–1467.

28. Turnbull J. L., Adams H. N., Gorard D. A. Review article: the diagnosis and management of food allergy and food intolerances. *Aliment Pharmacol Ther*. 2015. Vol. 41. P. 3-25.

29. Wang J., Sampson H. A. Food allergy. *J Clin Invest*. 2011. Vol. 121(3). P. 827-835.

30. Warrington R., Silviu-Dan F., Wong T. Drug allergy. *Allergy Asthma Clin Immunol.* 2018. Vol. 14(2). P. 60.

# APPENDICES

**Appendix A**

**Questionnaire for surveying students and pharmaceutical professionals**

**Topic: Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies**

Dear Respondent!

We ask you to participate in an anonymous study conducted at the Department of Pharmacology and Clinical Pharmacy of the National Pharmaceutical University (Ukraine) as part of the qualification work. The aim of this study is to study the awareness of students and pharmaceutical professionals regarding the rational use of drugs for the symptomatic treatment of allergies.

Your answers will help us to understand the level of knowledge regarding the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies and to identify the need for additional information on this topic.

All data obtained will be used exclusively in aggregate form for scientific purposes.

**1. Demographic characteristics of respondents**

1.1. Please indicate your age, in full years (one answer):

□ Under 20

□ 20-25 years

□ 26-30 years

□ Over 30 years

1.2. Please indicate your gender (one answer):

□ Male

□ Female

1.3. Please indicate the country where you live:

_____

1.4. Please indicate your occupation (one answer):

□ Student pharmacist

□ Pharmacy specialist

**2. Research on awareness of the rational use of drugs for symptomatic treatment of allergies**

2.1. Name the most significant, in your opinion, causes of allergic reactions (multiple answers):

□ Adverse climatic factors

□ Animal feed

□ Animal fur and feathers

□ Cosmetics

□ Drinking water

□ Food

□ Food additives (preservatives, flavors, antioxidants, etc.)

□ Hereditary predisposition

□ House dust

□ Household chemicals

□ Insect bites

□ Medicines

□ Plant pollen

□ Smoke and industrial gases

□ Synthetic fabrics

□ Vaccination

Continuation app. A

2.2. Name the most typical symptoms of allergies (multiple answers):

□ Bronchospasm

□ Cough

□ Decreased blood pressure

□ Diarrhea

□ Dyspnea

□ Fever

□ Headache

□ Hyperemia of the skin or mucous membranes

□ Itching of the skin or mucous membranes

□ Lacrimation, conjunctivitis

□ Pain in the heart

□ Rhinorrhea, rhinitis

□ Skin rash

□ Sneezing

□ Swelling of the skin or mucous membranes

□ Tachycardia

2.3. Name the threatening symptoms of an allergic reaction that require a visit to a doctor (several answers):

□ A sharp drop in blood pressure

□ Abdominal syndrome – nausea, vomiting, abdominal pain of varying intensity

□ Allergic rhinitis is accompanied by bloody nasal discharge or fever and purulent nasal discharge

□ Hyperemia of the skin or mucous membranes

□ Itching in any area of the skin or mucous membrane

□ Local swelling of the skin or mucous membranes

□ Manifestations of allergy do not disappear against the background of treatment or new manifestations of allergy have appeared

□ Manifestations of marked anxiety, feelings of fear, pronounced weakness, increased motor activity

□ Severe shortness of breath, difficulty breathing, suffocation attacks

□ Skin rash

□ Sneezing, lacrimation, allergic rhinitis

□ Spread of edema to the upper half of the face

□ The appearance of signs of laryngeal edema: hoarse voice, "barking" cough, difficulty breathing

2.4. Give general recommendations for treating allergies (multiple answers):

□ Avoid smoking, including passive smoking

□ Avoid solar radiation

□ Carry out elimination measures in relation to external allergens

□ Do wet cleaning more often

□ Follow a hypoallergenic diet

□ Reduce excess body weight

□ Reduce physical activity

□ Take showers more often

□ Try to avoid contact with potential allergens

□ Use indoor air purifiers

2.5. Specify the main groups of drugs used to treat allergies and can be purchased without a prescription (multiple answers):

□ Enterosorbents

□ Systemic antihistamines (for injection)

□ Systemic antihistamines (oral dosage forms)

□ Systemic glucocorticosteroids

□ Systemic mast cell membrane stabilizers

□ Systemic sympathomimetics (for injections)

□ Topical antihistamines

□ Topical glucocorticosteroids

□ Topical mast cell membrane stabilizers

□ Topical sympathomimetics

2.6. Indicate the mechanism of antiallergic action of antihistamines (one answer):

□ Block H1-histamine receptors

□ Block H2-histamine receptors

□ Block slow calcium channels

□ Stabilize basophils (mast cells) membranes

□ Stimulate α-adrenergic receptors

□ Stimulate β2-adrenergic receptors

2.7. List the first-generation antihistamines you know (multiple answers):

□ Azelastine

□ Bilastine

□ Cetirizine

□ Chloropyramine

□ Clemastine

□ Cyproheptadine

□ Desloratadine

□ Dimetindene

□ Diphenhydramine

□ Doxylamine

□ Ebastine

□ Fexofenadine

□ Ketotifen

□ Levocetirizine

□ Loratadine

□ Mebhydrolin

□ Sequifenadine

2.8. Please indicate the second and third generations antihistamines you know (multiple answers):

□ Azelastine

□ Bilastine

□ Cetirizine

□ Chloropyramine

□ Clemastine

□ Cyproheptadine

□ Desloratadine

□ Dimetindene

□ Diphenhydramine

□ Doxylamine

□ Ebastine

□ Fexofenadine

□ Ketotifen

□ Levocetirizine

□ Loratadine

□ Mebhydrolin

□ Sequifenadine

2.9. Name the possible side effects of antihistamines, especially pronounced in first-generation drugs (multiple answers):

□ CNS depression (from mild sedative effect to pronounced hypnotic)

□ Dryness of the mucous membranes of the nose and throat

□ Headache

□ Heart rhythm disturbances

□ Heartburn, nausea, stomach pain

□ Increased fatigue

□ Increased intraocular pressure

□ Local anesthetic effect

□ Lowering blood pressure

□ Reduced attention and reaction speed

□ Tachyphylaxis

□ Visual disturbances

2.10. Name the advantages of second- and third-generation antihistamines compared to first-generation drugs (multiple answers):

□ A narrower spectrum of pharmacological activity

□ Absence of injectable dosage forms

□ Absence of sedative effect when used in therapeutic doses

□ Absence of tachyphylaxis

□ High specificity and high affinity for H1 receptors

□ Higher cost

□ Impenetrability through the blood-brain barrier

□ Less severity of side effects

□ Longer duration of antihistamine action (up to 24 hours)

□ No connection of drug absorption with food intake

□ Rapid onset of action when administered orally

2.11. Name the most important features and limitations for the use of antihistamines (multiple answers):

□ Avoid simultaneous use of several antihistamines, including as part of complex medications

□ Do not combine with alcohol, sedatives, hypnotics, tranquilizers, neuroleptics, opioid analgesics

□ Due to possible sedative effects, it is advisable to take in the evening

□ Not recommended for use during pregnancy and breastfeeding

□ Not recommended for use in patients with astheno-depressive syndrome

□ Not recommended for use in patients with glaucoma

□ The duration of use of the drug without consulting a doctor should not exceed 14 days

□ Use with caution in patients over 60 years of age

□ Use with caution in persons whose activities require quick reactions and increased attention

□ Use with caution in persons with impaired liver and kidney function

2.12. Specify the drugs that belong to mast cell membrane stabilizers (multiple answers):

□ Azelastine

□ Budesonide

□ Cromoglicic acid

□ Dimetindene

□ Diphenhydramine

□ Fexofenadine

□ Ketotifen

□ Levocetirizine

□ Loratadine

□ Mometasone

□ Nedocromil

□ Xylometazoline

2.13. Indicate the mechanism of action of mast cell membrane stabilizers (one answer):

□ Block H1-histamine receptors

□ Block H2-histamine receptors

□ Block slow calcium channels

□ Stabilize basophils (mast cells) membranes

□ Stimulate α-adrenergic receptors

□ Stimulate β2-adrenergic receptors

2.14. Indicate the features of the use of mast cell membrane stabilizers (multiple answers):

□ A persistent effect develops immediately after taking

□ A persistent effect develops within 10–12 weeks of continuous administration

□ In the first days of using nasal preparations, irritation of the nasal mucosa is possible, which does not require discontinuation of the drug

□ It is recommended to start taking the drugs 3–4 weeks before the probable contact with the allergen

□ Topical medications should be applied at least 4 times a day

□ Topical medications should be applied once a day

□ Used only for prevention of allergic reactions

□ Used to relieve acute allergic reactions

2.15. Specify the glucocorticosteroids used in preparations for local (intranasal) use (multiple answers):

□ Beclomethasone

□ Budesonide

□ Dexamethasone

□ Fluocinolone

□ Fluticasone

□ Hydrocortisone

□ Methylprednisolone

□ Mometasone

□ Prednisolone

2.16. Name the features of topical nasal glucocorticosteroids compared to drugs for systemic use (multiple answers):

□ Increased local biological activity

□ Increased systemic bioavailability

□ Increased systemic side effects

□ Reduced local biological activity

□ Reduced systemic bioavailability

□ Reduced systemic side effects

2.17. List the possible side effects of topical nasal glucocorticosteroids (multiple answers):

□ Allergic reaction

□ Atrophy of the nasal mucosa

□ Burning sensation, dryness, irritation of the nasal mucosa

□ Candidiasis of the nasal mucosa

□ Decreased local immunity

□ Growth retardation in children

□ Headache

□ Hyperglycemia

□ Increased blood pressure

□ Increased intraocular pressure

□ Nose bleeding

□ Perforation of the nasal septum

□ Stomach pain

□ Suppression of the adrenal cortex

□ Weight gain

2.18. Name the contraindications to the use of topical nasal glucocorticosteroids (multiple answers):

□ Acute rhinosinusitis

□ Allergic rhinitis

□ Anemia

□ Breast feeding

□ Children under 2 years of age

□ Glaucoma

□ Hypersensitivity to the components of the drug

□ Nasal candidiasis

□ Pregnancy

□ Presence of ulcers on the nasal mucosa

□ Recent injuries and surgeries to the nose

□ Untreated local infection of the nasal mucosa

□ Use during vaccination and immunization

2.19. Indicate the mechanism of decongestant action of sympathomimetics for topical use (one answer):

□ Block H1-histamine receptors

□ Block H2-histamine receptors

□ Block slow calcium channels

□ Stabilize basophils (mast cells) membranes

□ Stimulate α-adrenergic receptors

□ Stimulate β2-adrenergic receptors

2.20. Specify sympathomimetics used in decongestant drugs for topical nasal use (multiple answers):

□ Ephedrine

□ Epinephrine (Adrenaline)

□ Naphazoline

□ Norepinephrine (Noradrenaline)

□ Oxymetazoline

□ Phenylephrine

□ Phenylpropanolamine

□ Pseudoephedrine

□ Tetryzoline (Tetrahydrozoline)

□ Tramazoline

□ Xylometazoline

2.21. List possible side effects of nasal sympathomimetics (multiple answers):

□ Addiction

□ Atrophy of the nasal mucosa

□ CNS excitation

□ Diarrhea

□ Drug-induced rhinitis

□ Dryness and irritation of the nasal mucosa

□ Headache

□ Increased blood pressure

□ Increased intraocular pressure

□ Muscle pain

□ Reactive hyperemia of the nasal mucosa

□ Weight gain

2.22. Name the features of the use of nasal sympathomimetics (multiple answers):

□ Before use, it is necessary to clean the nasal cavity

□ Can be used in long courses (up to a month)

□ Cannot be used simultaneously with other drugs administered through the nasal cavity

□ Do not use simultaneously with other vasoconstrictors, β-blockers, sedatives, antidepressants, MAO inhibitors

□ Do not use with topical nasal antihistamines

□ For children, it is necessary to use drugs with a reduced concentration of the active substance

□ It is recommended to use after meals

□ Not recommended for use at bedtime

□ Not recommended for use for more than 5-7 days

□ Not recommended for use in case of arterial hypertension, glaucoma, prostate adenoma

2.23. Rate your level of knowledge on pharmaceutical care when dispensing OTC drugs used for the symptomatic treatment of allergies on a 5-point scale:

□ 5 points (very high level)

□ 4 points (high level)

□ 3 points (sufficient level)

□ 2 points (insufficient level)

□ 1 point (low level)

2.24. Would you like to improve your knowledge of pharmaceutical care when dispensing medications used for symptomatic treatment of allergies?

□ Yes

□ No

□ Difficult to answer

**Thank you very much for your participation!**

**Your answers are very important to us!**


МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

# СЕРТИФІКАТ УЧАСНИКА

Цим засвідчується, що

**Aslimi M.**

**Scientific supervisor: Ochkur O.V.**

брав(ла) участь у роботі

XXXI Міжнародної науково-практичної конференції молодих вчених та студентів

**«АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ»**

В.о. ректора
Національного фармацевтичного
університету

Міністерство охорони здоров'я України Національний фармацевтичний університет №02010936

Алла КОТВІЦЬКА

23-25 квітня 2025 р, м. Харків

**Appendix B**

МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

# АКТУАЛЬНІ ПИТАННЯ СТВОРЕННЯ НОВИХ ЛІКАРСЬКИХ ЗАСОБІВ

МАТЕРІАЛИ
XXXI МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ
КОНФЕРЕНЦІЇ МОЛОДИХ ВЧЕНИХ ТА СТУДЕНТІВ

23–25 квітня 2025 року
м. Харків

Харків
НФаУ
2025

Continuation app. B

УДК 615.1

**Редакційна колегія**: проф. Котвіцька А. А., проф. Владимирова І. М.
**Укладачі**: Сурікова І. О., Боднар Л. А., Комісаренко М. А., Комісарова Є. Є.

Актуальні питання створення нових лікарських засобів: матеріали XXXI міжнародної науково-практичної конференції молодих вчених та студентів (23-25 квітня 2025 р., м. Харків). – Харків: НФаУ, 2024. – 515 с.

Збірка містить матеріали міжнародної науково-практичної конференції молодих вчених та студентів «Актуальні питання створення нових лікарських засобів, які представлені за пріоритетними напрямами науково-дослідної роботи Національного фармацевтичного університету. Розглянуто теоретичні та практичні аспекти синтезу біологічно активних сполук і створення на їх основі лікарських субстанцій; стандартизації ліків, фармацевтичного та хіміко-технологічного аналізу; вивчення рослинної сировини та створення фітопрепаратів; сучасної технології ліків та екстемпоральної рецептури; біотехнології у фармації; досягнень сучасної фармацевтичної мікробіології та імунології; доклінічних досліджень нових лікарських засобів; фармацевтичної опіки рецептурних та безрецептурних лікарських препаратів; доказової медицини; сучасної фармакотерапії, соціально-економічних досліджень у фармації, маркетингового менеджменту та фармакоекономіки на етапах створення, реалізації та використання лікарських засобів; управління якістю у галузі створення, виробництва й обігу лікарських засобів; суспільствознавства; фундаментальних та мовних наук.

УДК 615.1

Continuation app. B



## CLINICAL AND PHARMACOLOGICAL ASPECTS OF THE RATIONAL USE OF DRUGS FOR THE SYMPTOMATIC TREATMENT OF ALLERGIES

Aslimi M.
Scientific supervisor: Ochkur O.V.
National University of Pharmacy, Kharkiv, Ukraine
alex.o4kur@gmail.com

**Introduction.** Allergies, also known as allergic diseases, are various conditions caused by hypersensitivity of the immune system to typically harmless substances in the environment. These diseases include hay fever, food allergies, drug allergies, atopic dermatitis, allergic asthma, and anaphylaxis. Management of allergies typically involves avoiding the allergy trigger and taking medications to improve the symptoms. Several medications may be used to block the action of allergic mediators, or to prevent activation of cells and degranulation processes. These include antihistamines, glucocorticoids, epinephrine (adrenaline), mast cell stabilizers, and antileukotriene agents are common treatments of allergic diseases.

**Aim.** Research on the range of over-the-counter (OTC) medicines used for the symptomatic treatment of allergic diseases and presented on the pharmaceutical market; development of questionnaires for surveying pharmaceutical workers and senior students of specialty 226 Pharmacy and Industrial Pharmacy of the National University of Pharmacy regarding their awareness of the clinical and pharmacological aspects of the rational use of these medicines; conducting anonymous questionnaires among the specified contingents; analysis of the respondents' answers.

**Materials and methods.** To achieve the research goal, the following methods were used in the work: bibliographic, modern information search method, sociological and system-analytical.

**Results and discussion.** Based on the results of the analysis of data from open information sources, we conducted a study of the range of OTC drugs used in the symptomatic treatment of allergic diseases, created a questionnaire that included questions about the nomenclature, pharmacological properties, side effects, features of use and pharmaceutical care when dispensing anti-allergic OTC drugs, conducted a survey of respondents and analyzed its results.

**Conclusions.** The results of the study allowed us to assess the level of awareness of pharmaceutical professionals and students regarding the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies.

## KEY ASPECTS OF PHARMACOVIGILANCE OF CYTOTOXIC ANTIBIOTICS IN UKRAINE

Chufytskyi Y.O.
Scientific supervisor: Derimedvid L.V.
National University of Pharmacy, Kharkiv, Ukraine
chufitskiy2016@gmail.com

**Introduction.** According to data from the National Cancer Registry of Ukraine, between 2015 and 2024, a total of 1121467 people in Ukraine were diagnosed with cancer, and 451477 patients died from the disease. Thus, cancer ranks second in the overall mortality statistics in Ukraine, highlighting a significant challenge faced by the national healthcare system – one that requires urgent and effective solutions.

Continuation app. B



**СЕКЦІЯ 8. ФАРМАКОЛОГІЯ, ФАРМАКОТЕРАПІЯ, КЛІНІЧНА ФАРМАЦІЯ ТА КЛІНІЧНА КОСМЕТОЛОГІЯ**
**PHARMACOLOGY, PHARMACOTHERAPY, CLINICAL PHARMACY AND CLINICAL COSMETOLOGY**

*Ф А 2.2.1-32-366*

**National University of Pharmacy**

Faculty pharmaceutical
Department pharmacology and clinical pharmacy
Level of higher education master
Specialty 226 Pharmacy, industrial pharmacy
Educational and professional program Pharmacy

**APPROVED**
**The Head of Department**
**pharmacology and clinical pharmacy**

_____
**Sergii SHTRYGOL**
«02» September 2024

**ASSIGNMENT**
**FOR QUALIFICATION WORK**
**OF AN APPLICANT FOR HIGHER EDUCATION**

**Mouhcine ASLIMI**

1. Topic of qualification work: «Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies»
supervisor of qualification work: Oleksandr OCHKUR, cand. of pharm. sc., assoc. prof.
approved by order of NUPh from «27» of September 2024 № 237

2. Deadline for submission of qualification work by the applicant for higher education: May 2025

3. Outgoing data for qualification work: study of the awareness of higher education students and pharmacists regarding the rational use of drugs used for the symptomatic treatment of allergies.

4. Contents of the settlement and explanatory note (list of questions that need to be developed): to conduct a review of the scientific literature on the pathophysiology of allergy, approaches to the treatment of its main clinical forms, as well as the main groups of drugs used to treat allergic manifestations; to develop a questionnaire for surveying pharmaceutical specialists and senior students of specialty 226 Pharmacy and Industrial Pharmacy of the National University of Pharmacy regarding their awareness of the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies; to conduct an anonymous survey among respondents and analyze their responses.

5. List of graphic material (with exact indication of the required drawings):
tables – 2, figures – 32

6. Consultants of chapters of qualification work

| Chapters | Name, SURNAME, position of consultant | Signature, date | |
|---|---|---|---|
| | | assignment was issued | assignment was received |
| 1 | Oleksandr OCHKUR, associate professor of higher education institution of department of pharmacology and clinical pharmacy | 02.09.2024 | 02.09.2024 |
| 2 | Oleksandr OCHKUR, associate professor of higher education institution of department of pharmacology and clinical pharmacy | 08.01.2025 | 08.01.2025 |
| 3 | Oleksandr OCHKUR, associate professor of higher education institution of department of pharmacology and clinical pharmacy | 08.01.2025 | 08.01.2025 |

7. Date of issue of the assignment: «02» September 2024.

**CALENDAR PLAN**

| No. | Name of stages of qualification work | The term of performance of qualification work stages | Notes |
|---|---|---|---|
| 1 | Analysis of scientific sources on the topic of the work | September – December 2024 | **done** |
| 2 | Carrying out own research | January – April 2025 | **done** |
| 3 | Preparation of work and submission to the Examination commission | April - May 2025 | **done** |

**Applicant of higher education** _____ Mouhcine ASLIMI

**Supervisor of qualification work** _____ Oleksandr OCHKUR

**ВИТЯГ З НАКАЗУ № 237**

По Національному фармацевтичному університету

**від 27 вересня 2024 року**

Затвердити теми кваліфікаційних робіт здобувачам вищої освіти 5-го курсу Фм20(4,10д) 2024-2025 навчального року, освітньо-професійної програми – Фармація, другого (магістерського) рівня вищої освіти, спеціальності 226 – Фармація, промислова фармація, галузь знань 22 Охорона здоров'я, денна форма здобуття освіти (термін навчання 4 роки 10 місяців), які навчаються за контрактом (мова навчання англійська та українська) згідно з додатком № 1.

| Прізвище, ім'я здобувача вищої освіти | Тема кваліфікаційної роботи | | Посада, прізвище та ініціали керівника | Рецензент кваліфікаційної роботи |
|---|---|---|---|---|
| **по кафедрі фармакології та клінічної фармації** | | | | |
| Аслімі Мухсін | Клініко-фармакологічні аспекти раціонального застосування препаратів для симптоматичного лікування алергії | Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies | доцент Очкур О.В. | доцент Кононенко А.Г. |

**Ректор** Вірно. Секретар

ФА2.8-03-317

# ВИСНОВОК

**експертної комісії про проведену експертизу**
**щодо академічного плагіату у кваліфікаційній роботі**

**здобувача вищої освіти**

«05» травня 2025 р. № 331123354

Проаналізувавши кваліфікаційну роботу здобувача вищої освіти Аслімі Мухсін, групи Фм20(4,10)англ-02, спеціальності 226 Фармація, промислова фармація, освітньої програми «Фармація» навчання на тему: «Клініко-фармакологічні аспекти раціонального застосування препаратів для симптоматичного лікування алергії / Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies», експертна комісія дійшла висновку, що робота, представлена до Екзаменаційної комісії для захисту, виконана самостійно і не містить елементів академічного плагіату (компіляції).

**Голова комісії,**
**проректор ЗВО з НПР,**
**професор** **Інна ВЛАДИМИРОВА**

*Ф А 2.2.1-32-353*

**REVIEW**

**of supervisor for the qualification work of the master's level of higher education of the specialty 226 Pharmacy, industrial pharmacy**

**Mouhcine ASLIMI**

**on the topic: «Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies».**

**Relevance of the topic.** Drugs used for the symptomatic treatment of allergies include antihistamines, topical glucocorticoids, decongestants, and mast cell stabilizers. Pharmacists' awareness of the clinical and pharmacological aspects of the use of these groups of drugs is relevant and important for ensuring effective and safe self-treatment of allergic manifestations.

**Practical value of conclusions, recommendations and their validity.** A questionnaire was developed, a survey of higher education students of the National University of Pharmacy of the senior years and pharmacists of Agadir (Morocco) on the clinical and pharmacological aspects of the rational use of drugs used in the symptomatic treatment of allergies was conducted, and the obtained data were analyzed. The results of the study can be used in the educational process.

**Assessment of the work.** The material of the qualification work is presented methodically, correctly, consistently, and logically, which indicates the author's ability to analyze scientific primary sources and summarize literary and experimental data.

**General conclusion and recommendations on admission to defense.** The obtained research results in terms of relevance, scientific level and practical significance meet the requirements for qualification works, therefore the presented work can be recommended for public defense to the Examination commission of the National University of Pharmacy.

Supervisor _____ Oleksandr OCHKUR

«12» May 2025

*Ф А 2.2.1-32-356*

**REVIEW**

**for qualification work of the master's level of higher education, specialty 226 Pharmacy, industrial pharmacy**

**Mouhcine ASLIMI**

**on the topic: «Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies».**

**Relevance of the topic.** Treatment of allergic diseases usually involves avoiding contact with the allergen and taking medications to improve symptoms. Such medications include antihistamines, topical glucocorticoids, decongestants, and mast cell stabilizers. Pharmacists' awareness of the clinical and pharmacological aspects of the use of these medications is relevant and important to ensure effective and safe self-treatment.

**Theoretical level of the work.** The higher education applicant has processed a large amount of scientific literature at a sufficiently high theoretical level. The content of the work fully corresponds to the tasks set. 1 report theses have been published on the topic of the work.

**Author's suggestions on the research topic.** The applicant conducted a review of the scientific literature on the pathophysiology of allergy, approaches to the treatment of its main clinical forms, as well as aspects of the rational use of the main groups of drugs used to treat allergic manifestations. A questionnaire for surveying pharmacists and senior students of specialty 226 Pharmacy and Industrial Pharmacy of the National University of Pharmacy regarding their awareness of the clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies was developed. An anonymous questionnaire among respondents was conducted and their responses were analyzed.

**Practical value of conclusions, recommendations and their validity.** The results of the study confirmed the need to improve the practical skills of applicants in providing pharmaceutical care in the symptomatic treatment of allergies and to

deepen their knowledge about the mechanisms of action, pharmacological properties, side effects and contraindications to the use of relevant groups of drugs. The results of the study can be used in the educational process in the training of future pharmacists and in improving the qualifications of pharmaceutical specialists.

**Disadvantages of the work.** Among the shortcomings of the work are inaccurate statements that do not affect the scientific and practical value of the work.

**General conclusion and assessment of the work.** The material of the qualification work is presented consistently and systematically, which indicates the author's ability to apply selective analysis of scientific primary sources and experimental data and critically summarize them. The qualification work meets all requirements and can be submitted for defense to the Examination commission of the National University of Pharmacy.

Reviewer _____ assoc. prof. Alevtina KONONENKO

«14» May 2025

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ**
**НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ**
**ВИТЯГ З ПРОТОКОЛУ № 19**
**засідання кафедри фармакології та клінічної фармації**

15 травня 2025 р. м. Харків

**Голова:** завідувач кафедри, доктор мед. наук, професор Штриголь С. Ю.
**Секретар:** кандидат фарм. наук, доцент Вєтрова К. В.

**ПРИСУТНІ:** зав. каф., проф. Штриголь С.Ю., проф. Деримедвідь Л.В., доц. Бєлік Г.В., доц. Вєтрова К.В., доц. Жаботинська Н.В., доц. Кононенко А. В., доц. Матвійчук А.В., доц. Отрішко І.А., доц. Очкур О.В., доц. Рябова О.О., доц. Савохіна М.В., доц. Степанова С. І., доц. Таран А.В., ас. Верховодова Ю.В., ас. Підгайна В.В. та здобувачі вищої освіти.

**ПОРЯДОК ДЕННИЙ:**
1. Розгляд кваліфікаційних робіт здобувачів вищої освіти для подання робіт до Екзаменаційної комісії.

**СЛУХАЛИ:**
1. Здобувача вищої освіти Аслімі Мухсіна зі звітом про проведену наукову діяльність за темою кваліфікаційної роботи: «Клініко-фармакологічні аспекти раціонального застосування препаратів для симптоматичного лікування алергії» («Clinical and pharmacological aspects of the rational use of drugs for the symptomatic treatment of allergies»).

**УХВАЛИЛИ:**
1. Кваліфікаційну роботу розглянуто. Здобувач вищої освіти Аслімі Мухсін допускається до захисту даної кваліфікаційної роботи в Екзаменаційній комісії.

**Голова**
Завідувач кафедри, проф. _____ Штриголь С. Ю.

**Секретар**, доц. _____ Вєтрова К. В.

*Ф А2.2.1-32-042*

# НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

## ПОДАННЯ
## ГОЛОВІ ЕКЗАМЕНАЦІЙНОЇ КОМІСІЇ
## ЩОДО ЗАХИСТУ КВАЛІФІКАЦІЙНОЇ РОБОТИ

Направляється здобувач вищої освіти Мухсін АСЛІМІ до захисту кваліфікаційної роботи
за галуззю знань 22 Охорона здоров'я
спеціальністю 226 Фармація, промислова фармація
освітньою-професійною програмою Фармація
на тему: «Клініко-фармакологічні аспекти раціонального застосування препаратів для симптоматичного лікування алергії»

Кваліфікаційна робота і рецензія додаються.

Декан факультету _____ / Микола ГОЛІК /

### Висновок керівника кваліфікаційної роботи

Здобувач вищої освіти Мухсін АСЛІМІ успішно виконав поставлені завдання, засвоїв роботу з науковими першоджерелами та методики, які він застосовував у своєму дослідженні. Отримані результати досліджень за актуальністю, науковим та практичним значенням відповідають вимогам, які висуваються до кваліфікаційних робіт, тому представлена робота може бути рекомендована до публічного захисту у Екзаменаційну комісію Національного фармацевтичного університету.

Керівник кваліфікаційної роботи

_____ Олександр ОЧКУР

«12» травня 2025 р.

### Висновок кафедри про кваліфікаційну роботу

Кваліфікаційну роботу розглянуто. Здобувач вищої освіти Мухсін АСЛІМІ допускається до захисту даної кваліфікаційної роботи в Екзаменаційній комісії.

Завідувач кафедри
фармакології та клінічної фармації

_____ Сергій ШТРИГОЛЬ

«15» травня 2025 року

Qualification work was defended

of Examination commission on

«___» of June 2025

With the grade _____

Head of the Examination commission,

D.Pharm.Sc, Professor

_____ /Volodymyr YAKOVENKO/