# MINISTRY OF HEALTH OF UKRAINE NATIONAL UNIVERSITY OF PHARMACY faculty for foreign citizens' education department of social pharmacy

## **QUALIFICATION WORK**

# on the topic: «STUDY ON THE CURRENT APPROACHES OF PHARMACEUTICAL CARE TO PATIENTS WITH SHINGLES »

Performed by: higher education graduate of group Фм20\*(4,10д) англ-01 specialty 226 Pharmacy, industrial pharmacy educational program Pharmacy Ali El MOUSSAWI Supervisor: associates professor of higher education institution of department of social pharmacy, PhD, Iryna SURIKOVA Reviewer: associate professor of higher education institution of department of pharmaceutical management and marketing department, PhD Iryna BONDARIEVA

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### ANNOTATION

The current state of providing pharmaceutical care to shingles patients was investigated in the qualification work. The study analyzed the prevalence of shingles and approaches to the treatment of shingles patients in the world, as well as the availability of pharmaceutical care for shingles patients and the role of the pharmacist in the control and the prevention of shingles.

The qualification work is presented on 43 pages of text, the number of tables is 5, the number of figures is 10, the list of sources used is 52 sources.

*Keywords:* shingles, shingles treatment and prevention, role of pharmacist, vaccination service, cost of drugs

## АНОТАЦІЯ

У кваліфікаційній роботі досліджено сучасний стан надання фармацевтичної допомоги хворим на оперізувальний лишай. У дослідженні проаналізовано поширеність оперізуючого лишаю та підходи до лікування хворих на оперізувальний лишай у світі, а також доступність фармацевтичної допомоги хворим на оперізувальний лишай і роль фармацевта в контролі та профілактиці оперізуючого лишаю.

Кваліфікаційна робота викладена на 43 сторінках тексту, кількість таблиць – 5, кількість рисунків – 10, список використаних джерел – 52 джерело.

*Ключові слова:* оперізувальний лишай, лікування та профілактика оперізувального лишаю, роль провізора, сервіс з вакцинації, вартість препаратів

## CONTENT

LIST OF ABBREVIATIONS	4
INTRODUCTION	5
CHAPTER 1. LITERATURE REVIEW ON THE ISSUE OF SOCIAL	
BURDEN OF SHINGLES	7
1.1. The concept of shingles as a public health issue	7
Conclusions for chapter 1	12
CHAPTER 2. STUDY OF PREVALENCE AND APPROACHES TO	
THE TREATMENT OF PATIENTS WITH SHINGLES	13
2.1 Study of the prevalence of shingles worldwide	13
2.2 Study of approaches to the treatment of shingles in accordance with	
international guidelines	17
Conclusions for Chapter 2	21
CHAPTER 3. RESEARCH ON THE AVAILABILITY OF	F
PHARMACEUTICAL CARE FOR PATIENTS WITH SHINGLE	S
AND THE PHARMACIST'S ROLE IN PREVENTING SHINGLES	23
3.1. Research on the costs and the availability of shingles treatment	23
3.2. Study Shingles Prevention approach	31
3.3. The pharmacit's role in preventing shingles	36
Conclusions to Chapter 3	40
CONCLUSIONS	42
REFERENCES	44

## LIST OF ABBREVIATIONS

- ACIP Advisory Committee on Immunization Practices
- CDC Centers for Disease Control and Prevention
- HZ herpes zoster
- NHS National Health Service
- PHN postherpetic neuralgia
- RZV recombinant zoster vaccine
- VZV Varicella zoster virus
- ZVL zoster vaccine live

#### **INTRODUCTION**

Shingles is a serious infectious disease that affects millions of people worldwide. Understanding the current state of pharmaceutical care for shingles patients can help identify gaps in treatment and improve patient outcomes. Pharmaceutical care plays a crucial role in the treatment of shingles. By studying the current state of pharmaceutical care, researchers can assess the effectiveness of existing treatment protocols and identify areas for improvement.

Shingles is a disease that is becoming increasingly resistant to standard treatment regimens. Research on pharmaceutical care for shingles patients can help identify strategies to prevent drug resistance and improve treatment outcomes. Providing pharmaceutical care to shingles patients involves managing complex drug regimens and monitoring for potential drug interactions and side effects. Research in this area can help ensure patient safety and optimize treatment outcomes.

Research on pharmaceutical care for shingles patients can inform the development of policies and guidelines for healthcare providers. This can help standardize care practices and improve the quality of care for shingles patients.

Overall, studying the current state of providing pharmaceutical care for patients with shingles is crucial for improving treatment outcomes, preventing drug resistance, ensuring patient safety, and informing healthcare policies.

**The purpose of the study:** to analyze current state of providing pharmaceutical care for patients with shingles. This includes studying the prevalence of the disease, the existing prevention and treatment strategies.

*Research objectives.* In accordance with the goal, we set the following tasks:

• to conduct a review of literary sources on social and economic burden of shingles issues;

• to investigate prevalence of shingles worldwide;

• to study the current approaches current approaches of pharmaceutical care to patients with shingles in accordance with international guidelines;

• to analyse of cost for shingles treatment and prevention;

- to analyze on the availability of shingles treatment;
- to study Shingles Prevention approach

• to explore possible role of pharmacists in shingles treatment and prevention.

*The object of research* became literary sources on the development of shingles treatment and prevention, the regulatory and legal framework, research by international public organizations, statistical data.

*The subject of the study* is the identification and assessment of modern aspects of the organization of pharmaceutical care services for patients with shingles.

*Research methods*. During the research, we used such methods as systemic, analytical and comparative, graphic and logical methods, the method of descriptive and abstract modeling and generalization.

*Scientific novelty and practical significance* of the obtained results consists in conducting a comprehensive study on the current state of providing pharmaceutical care for patients with shingles, namely the systematization and summarization of literary and statistical data, the study of the legal framework regulating the organization of pharmaceutical care for patients with shingles, exploring the modern role of pharmacist in shingles treatment and prevention.

**Structure and scope of qualification work.** The qualification work consists of an introduction, three chapters, conclusions, a list of used literary sources, appendices and is presented on 44 pages of printed text. The work is illustrated with 10 figures and 5 tables. The bibliography includes 52 information sources.

#### **CHAPTER 1.**

# LITERATURE REVIEW ON THE ISSUE OF SOCIAL BURDEN OF SHINGLES

## **1.1** The concept of shingles as a public health issue

The herpesvirus family contains several important human viral pathogens. A characteristic property of herpesviruses is their ability to undergo periodic reactivation and to establish lifelong persistent infections in their hosts. An example of such a virus is varicella-zoster virus (VZV) that causes two distinct clinical entities: varicella (chickenpox) and herpes zoster (shingles).

Shingles, also known as zoster or herpes zoster (HZ), is a painful rash that occurs on the skin. It is triggered by the VZV, which is the same virus responsible for chickenpox. In the United States, approximately one in three individuals will experience shingles at some point in their lives. While most will only have a single occurrence, some may suffer from multiple episodes. It is important to note that the virus responsible for shingles is distinct from the herpes simplex virus, which causes oral and genital herpes; however, both viruses belong to the same family [1]..

Shingles is triggered by the VZV, which is the same virus responsible for chickenpox. Once a person has had chickenpox, the virus remains inactive in specific nerve cells within the body. The immune system typically keeps the virus in check. However, as people age, their immune systems may weaken, allowing the virus to reactivate and lead to shingles. This reactivation can occur many years after the initial chickenpox infection. Individuals who have received the chickenpox vaccine are less likely to contract chickenpox and, consequently, have a reduced risk of developing shingles later on. Most shingles cases occur in individuals over the age of 50 or those with compromised immune systems. Certain conditions, such as having cancer, taking immunosuppressive medications, or being diagnosed with HIV or AIDS, can also increase the likelihood of developing shingles [1].

After contracting chickenpox, the causative virus, varicella-zoster, remains dormant in the nerve cells of the body. Years later, this virus can reactivate, leading to the development of shingles. The reactivation of the virus is often triggered by factors such as stress, illness, weakened immune system, advanced age, trauma, and radiation therapy (Fig. 1.1). However, shingles can also occur without a known underlying cause.



Fig. 1.1 Diagram of the development and appearance of shingles in humans

Shingles is characterized by a painful rash that follows the path of a single nerve, called a dermatome. Unlike chickenpox, which is transmitted through coughing and sneezing, shingles is primarily spread through direct contact with the fluid from the blisters on the skin of an infected person or their personal belongings, such as bedding, clothing, or towels [36]. Importantly, individuals who have never had chickenpox or the chickenpox vaccine can contract the virus from someone with shingles, leading to the development of chickenpox. Difference between Chickenpox and Shingles presents on Fig 1.2



Fig. 1.2 Difference between Chickenpox and Shingles

Once the blisters have crusted over, the person with shingles is no longer contagious. Postherpetic neuralgia, a complication of shingles, is a persistent and debilitating pain that can last long after the rash has healed.

Shingles, or herpes zoster, is estimated to affect approximately one-third of the American population at some point during their lifetime. Despite its prevalence, there exists a general lack of awareness regarding the disease and its implications. Given the commonality of shingles and its potential to result in painful complications, it is imperative for individuals to be informed about the fundamental aspects of this viral infection, particularly its close association with chickenpox [35].

Both shingles and chickenpox originate from the same pathogen, the VZV. However, it is essential to recognize the distinct differences between these two conditions. Chickenpox represents the primary manifestation of a varicella-zoster infection, characterized by a widespread vesicular rash and systemic symptoms. This condition predominantly affects children and adolescents and is highly contagious, facilitating its rapid spread among susceptible populations.

In contrast, shingles constitutes a reactivation of the dormant VZV, which remains latent in the sensory nerve ganglia following an initial chickenpox infection. The reactivation typically occurs many years later and is more prevalent among adults, particularly those over the age of 50 or individuals with compromised immune systems. Shingles is characterized by a localized, painful rash that often aligns with the affected nerve pathways [9].

Importantly, it is crucial to note that shingles cannot be transmitted from one individual to another. However, individuals who have not previously contracted chickenpox or received the varicella vaccine may develop chickenpox upon exposure to someone with shingles. Understanding these distinctions is vital for public health awareness and for mitigating the risk of infection within the community.

The immune response elicited by the VZV differs significantly between the initial infection, which manifests as chickenpox (varicella), and the subsequent reactivation of the virus, resulting in shingles (herpes zoster). These divergent immune responses contribute to the distinct clinical presentations, patterns of contagiousness, and treatment strategies associated with each condition [8].

Upon initial exposure to the VZV, individuals typically exhibit a range of symptoms characteristic of chickenpox. These symptoms often include headache, fever, sore throat, and a pruritic, vesicular rash that can cover large areas of the body. The rash is notably itchy, leading to significant discomfort for those affected. Following an average recovery period of approximately two weeks, during which these symptoms resolve, the VZV remains latent within the body, specifically residing in the dorsal root ganglion of the spinal cord. This dormant state can persist indefinitely, allowing for the potential reactivation of the virus later in life.

In certain individuals, the dormant VZV may reactivate, leading to the onset of shingles. The clinical presentation of shingles shares some similarities with chickenpox, including headache, fever, and a blistering rash. However, the rash associated with shingles is typically more localized, often appearing as a painful, dermatomal blistering rash that is smaller in size compared to the chickenpox rash. This rash usually manifests as a unilateral stripe along one side of the body, although it can also occur in various locations, including the face, ear canal, back, buttocks, legs, and arms [14].

In addition to the rash, individuals with shingles may experience a range of other symptoms, including:

- Prodromal Symptoms itching, numbress, or tingling sensations may precede the appearance of the rash, indicating the reactivation of the virus.
- Headache: a common symptom that may accompany the rash.
- Chill: some individuals may experience chills as part of the systemic response to the viral reactivation.

Understanding these differences in symptoms and immune responses is crucial for effective diagnosis and treatment, as well as for public health awareness regarding the implications of VZV infections.

Varicella, commonly known as chickenpox, is characterized by its high transmissibility, particularly in situations of close contact with an infected individual. Prior to the FDA's approval of the varicella vaccine in 1995, chickenpox was a prevalent childhood illness in the United States. Since the implementation of the vaccination program, reported cases of chickenpox have decreased by more than 99%. However, individuals who are unvaccinated and have not previously contracted the virus remain at risk for infection throughout their lifespan.

Patients with chickenpox are most contagious during the vesicular phase of the illness, when characteristic blisters are present. It is imperative that individuals exhibiting these symptoms adhere to isolation protocols to mitigate the risk of transmission to susceptible populations [8].

Shingles, or HZ, primarily affects older adults, particularly those over the age of 50. However, it can also occur in younger individuals who have not received the varicella vaccine but have a history of chickenpox infection. Notably, an individual cannot develop shingles unless they have first contracted chickenpox; VZV must be present in their system.

The contagiousness of shingles differs from that of chickenpox. While the fluid from shingles blisters contains VZV, it is less contagious than the fluid from chickenpox blisters. Nonetheless, direct contact with an individual exhibiting shingles can transmit VZV to someone who has never had chickenpox or the associated vaccine, resulting in chickenpox rather than shingles. Subsequently, the

newly infected individual may later develop shingles as the virus remains dormant within their body.

Dr. Gurland emphasizes the rarity of transmission from shingles blisters, stating, "Catching varicella-zoster from a shingles blister is very unusual," yet he advises patients with shingles to cover their rashes to minimize contagion risk. Although it is uncommon, there are documented cases of individuals experiencing shingles more than once, as noted by Dr. Gurland: "It is uncommon, but I've seen it happen." Fortunately, the majority of individuals will experience shingles only once in their lifetime [3].

The VZV presents significant public health concerns, particularly in unvaccinated populations. Understanding the transmission dynamics and contagiousness of both chickenpox and shingles is essential for effective disease management and prevention strategies. Continued emphasis on vaccination and public awareness is crucial in reducing the incidence of these conditions and protecting vulnerable populations.

## **Conclusions for chapter 1**

Shingles presents a distinct clinical picture, often manifesting as a localized, painful rash aligned with dermatomes. Importantly, shingles cannot be transmitted from one person to another; however, individuals who have not had chickenpox or received the varicella vaccine can contract chickenpox through direct contact with the fluid from shingles blisters. This distinction is critical for public health awareness and prevention strategies.

The implementation of the varicella vaccination program has led to a dramatic decrease in chickenpox incidence, thereby reducing the subsequent risk of shingles in the population. Nonetheless, there remains a significant portion of the population that is unvaccinated and at risk for both chickenpox and shingles. Public health initiatives must continue to promote vaccination to mitigate the impact of VZV infections and their associated complications, such as postherpetic neuralgia.

### **CHAPTER 2**

# STUDY OF PREVALENCE AND APPROACHES TO THE TREATMENT OF PATIENTS WITH SHINGLES

## 2.1 Study of the prevalence of shingles worldwide

Approximately one in three individuals in the United States will experience an episode of shingles during their lifetime. While the majority of affected individuals will have a single occurrence of the disease, there is a possibility of experiencing multiple episodes, including a second or even third episode [18]. The likelihood of developing shingles is notably heightened with advancing age, particularly after the age of 50 (Fig. 2.1).



Fig. 2.1 Shingles and postherpatic neuralgia (PHN) rates by age in the United States per 1,000 person-years

One of the most prevalent complications associated with shingles is postherpetic neuralgia (PHN), characterized by severe pain in the regions where the shingles rash manifested. Studies indicate that approximately 20% of individuals diagnosed with shingles will go on to develop PHN, and the risk of this complication is positively correlated with age. Although children can contract shingles, such occurrences are relatively uncommon. This demographic trend underscores the importance of age as a significant risk factor in the epidemiology of shingles and its associated complications.

The incidence of shingles among adults in the United States has been on the rise, exhibiting a gradual increase over an extended period (fig. 2.2). The underlying reasons for this trend remain unclear. A commonly proposed explanation, although now considered unlikely, is that the rise in shingles cases may be linked to a decrease in chickenpox infections among children due to widespread vaccination efforts. It has been suggested that exposure to the chickenpox virus may enhance an individual's immunity to the VZV, thereby reducing the risk of VZV reactivation, which manifests as shingles. Consequently, diminished exposure to children with chickenpox could theoretically contribute to an increase in shingles cases among adults [36].



Fig 2.2 Shingles (herpes zoster) incidence (new cases) for every 1000 people from 1998–2019.

However, this hypothesis is called into question by two studies conducted by the Centers for Disease Control and Prevention (CDC), which demonstrated that the rates of shingles began to rise prior to the introduction of the chickenpox vaccine in the United States, and that the rate of increase did not accelerate following the implementation of routine chickenpox vaccination programs. Furthermore, other countries that do not have routine chickenpox vaccination programs have reported similar increases in shingles rates, suggesting that factors beyond vaccination practices may be at play.

While shingles is relatively uncommon in children, data indicate that the incidence of shingles among this demographic has been declining since the initiation of the routine varicella vaccination program. It is important to note that both the wild-type (natural) varicella virus and the attenuated (weakened) vaccine virus have the potential to reactivate and cause shingles. Nevertheless, children who receive the chickenpox vaccine appear to have a significantly lower risk of developing shingles compared to those who have been infected with the wild-type chickenpox virus. This is likely due to the fact that vaccinated children are less susceptible to wild-type chickenpox virus infections, which are more prone to reactivation as shingles than the attenuated vaccine virus.

In the United States, approximately 1% to 4% of individuals diagnosed with shingles require hospitalization due to complications associated with the disease. Older adults and individuals with weakened or suppressed immune systems are at a higher risk for severe outcomes, leading to increased hospitalizations.

Notably, around 30% of those hospitalized for shingles have a weakened or suppressed immune system, which may be due to conditions such as HIV/AIDS, cancer treatments, or the use of immunosuppressive medications. While shingles can cause severe pain and other complications, it is important to highlight that fewer than 100 people die from shingles each year in the U.S.

The incidence of shingles has been studied across various regions, including North America, Europe, Asia, South America, and the Middle East. Research indicates that the incidence rate of HZ typically ranges from 3 to 5 cases per 1,000 person-years in North America, Europe, and the Asia-Pacific region (Fig 2.3).



Fig. 2.3 Age-specific incidence rate of herpes zoster in North America, Europe and Asia-Pacific.

A notable trend observed across these studies is the age-specific incidence rate of HZ, which shows a significant increase after the age of 50. This rise in incidence can be attributed to several factors, including age-related decline in immune function, which makes older adults more susceptible to reactivation of the VZV (the virus that causes shingles) [38].

The similarities in age-specific incidence rates across different countries suggest that the underlying epidemiological patterns of shingles are consistent globally, particularly in older populations. This information is crucial for public health planning and emphasizes the importance of vaccination strategies, especially for individuals aged 50 and older, to reduce the incidence of shingles and its associated complications.

In high-income countries, rates of shingles are similar to those observed in the United States. In low- and middle-income countries, shingles data are limited, making it difficult to gauge the burden of disease.

# **2.2** Study of approaches to the treatment of shingles in accordance with international guidelines

Effective management of shingles involves antiviral medications, pain relief strategies and self-care measures (Table 2.1).

Table 2.1

Pharmacotherapy group	Features	Medications
Antiviral Medications	The primary treatment for shingles is antiviral medications. Drugs like can reduce the severity and duration of the illness if taken within 72 hours of the rash's appearance. These medications help to prevent the virus from multiplying and can also reduce the risk of complications.	acyclovir, valacyclovir, famciclovir
	Pain management is crucial in treating shingles. Over-the-counter pain relievers can help manage mild pain.	ibuprofen acetaminophen
Pain Relief	For more severe pain, a doctor may prescribe stronger medications, such as anticonvulsants, antidepressants or opioids.	Duloxetine Amitriptyline Gabapentin Pregabalin
Corticosteroids	In some cases, corticosteroids may be prescribed to reduce inflammation and pain. However, their use is typically reserved for severe cases due to potential side effects.	Prednisone
Topical Treatments	Applying calamine lotion or capsaicin cream can help soothe itching and pain associated with the rash. Prescription topical medications may also be recommended.	Lidocaine Capsaicin

**Medical Treatments approaches for Shingles** 

The main aims of treatment for HZ are to decrease pain, induce quick healing, and avoid complications. Antiviral therapy is used for the treatment of HZ as soon as a diagnosis is made, and it reduces the risk of post-herpetic neuralgia. Corticosteroids can help to control pain and eruptions. Other components of therapy include isolation of patient and local management of skin lesions. Isolation of patient is necessary to prevent nosocomial infections [19].

Antivirals such as acyclovir, famciclovir, and valacyclovir are used to reduce acute HZ. These agents help in reducing pain, promote fast healing, and prevent post-herpetic neuralgia. Treatment with antiviral should be started within 72 hours of rash onset.

Comparing oral antiviral medications for HZ and their treatment regimes presents in Table 2.2.

Table 2.2

Drug	Dose	Frequency	Duration,	Features
			days	
Acyclovir	800 mg	5 times daily	7–10	Dosage adjustment
	ooo mg	(every $4-5$ h)	/ 10	required for patients with
Famciclovir	500 mg	3 times daily	7	renal insufficiency
Valacyclovir	1000 mg	3 times daily	7	Dosage adjustment required for patients with renal insufficiency; thrombotic thrombocytopenic purpura/hemolytic uremic syndrome reported at dosages of 8000 mg daily in immunocompromised
				patients

## Treatment regimes of oral antiviral medication for shingles

Topical antiviral therapy lacks efficacy in patients with HZ and is not recommended.

While antiviral trials have demonstrated statistically and clinically significant reductions in chronic pain, antiviral therapy does not prevent PHN in all patients. Approximately 20% of patients aged 50 or older continue to experience pain 6 months after their rash onset, even when antiviral treatment is initiated within 72

hours. Although the development of more efficacious antivirals may be possible, a complementary strategy for PHN prevention is to supplement antiviral therapy.

Results a systematic review to assess the effects of corticosteroids on preventing PHN following acute HZ infection. We evaluated the certainty of the evidence, considering factors such as study size and methodology. Our analysis included five studies with a total of 787 participants.

The evidence is highly uncertain about the efficacy of oral corticosteroids during the acute phase of zoster infection in preventing PHN at 6 months. Corticosteroids administered orally or intramuscularly may have little to no impact on the risk of adverse events in individuals with acute HZ. Based on the available low-certainty evidence, no firm conclusions can be drawn regarding the use of corticosteroids in acute HZ to prevent PHN.

The limitations of the evidence include the small number of participants in the included studies, as well as unclear reporting of randomization, allocation concealment, and treatment compliance. Overall, we have very limited confidence in the evidence, and further research is needed to investigate the effects of corticosteroids in preventing PHN [35].

While PHN is generally self-limiting, it can persist indefinitely. Treatment focuses on managing pain while the condition resolves. Pain therapy may involve various interventions, including topical medications, over-the-counter analgesics, tricyclic antidepressants, anticonvulsants, and non-pharmacological modalities. Narcotic medications may occasionally be necessary. Dosage recommendations are provided in Table 2.3.

In addition to medical treatments, several home care strategies can be used to help manage shingles symptoms and promote healing. These strategies focus on providing comfort, reducing pain, preventing infection, and supporting overall health.

# 20 *Table 2.3*

# Treatment Options for Postherpetic Neuralgia

Medication	Dosage
Topical agents	L
Capsaicin cream	Apply to affected area three to five times daily.
Lidocaine patch	Apply to affected area every 4 to 12 hours as needed
Tricyclic antidepre	essants
Amitriptyline	10 to 25 mg orally at bedtime; increase dosage by 25 mg
	every 2 to 4 weeks until response is adequate, or to
	maximum dosage of 150 mg per day.
Nortriptyline	10 to 25 mg orally at bedtime; increase dosage by 25 mg
	every 2 to 4 weeks until response is adequate, or to
	maximum dosage of 125 mg per day.
Imipramine	25 mg orally at bedtime; increase dosage by 25 mg every 2
	to 4 weeks until response is adequate, or to maximum
	dosage of 150 mg per day.
Desipramine	25 mg orally at bedtime; increase dosage by 25 mg every 2
	to 4 weeks until response is adequate, or to maximum
	dosage of 150 mg per day.
Anticonvulsants	
Carbamazepine	100 mg orally at bedtime; increase dosage by 100 mg every
	3 days until dosage is 200 mg three times daily, response is
	adequate or blood drug level is 6 to 12 $\mu$ g per mL (25.4 to
	50.8 µmol per L).
Gabapentin	100 to 300 mg orally at bedtime; increase dosage by 100 to
	300 mg every 3 days until dosage is 300 to 900 mg three
	times daily or response is adequate. (Drug levels for
	clinical use are not available.)

Maintaining good hygiene is essential to prevent the rash from becoming infected. Gently wash the affected area with mild soap and water, then pat it dry. Applying cool, wet compresses to the rash can help reduce pain and itching. Use a clean cloth soaked in cool water and apply it to the affected area for a few minutes several times a day [11].

Soaking in a colloidal oatmeal bath can soothe irritated skin and relieve itching. Add oatmeal powder to lukewarm bath water and soak for 15-20 minutes. Wearing loose-fitting, breathable clothing, such as cotton, can help avoid irritating the rash [26].

Scratching the rash can lead to infection and scarring, so it is important to avoid doing so. Keep nails trimmed and consider wearing gloves at night to prevent scratching during sleep.

The morbidity and mortality of HZ could be reduced if a safe and effective preventive treatment were available. It is unusual for a patient to develop HZ more than once, suggesting that the first reactivation of VZV usually provides future immunologic protection. Studies are currently being conducted to evaluate the efficacy of the varicella-zoster vaccine in preventing or modifying HZ in the elderly.

## **Conclusions for Chapter 2**

1. It was determined the likelihood of developing shingles increases notably with advancing age, particularly after the age of 50; postherpetic neuralgia, a severe pain condition, affects approximately 20% of those diagnosed with shingles, and the risk rises with age. Shingles can lead to hospitalization, especially for older adults and those with weakened immune systems, but fewer than 100 people die from shingles each year in the US. The age-specific incidence rate of shingles shows a significant increase after the age of 50, consistent with global epidemiological patterns.

2. Effective management of herpes zoster (shingles) is multifaceted, incorporating antiviral medications, pain relief strategies, and self-care measures.

Antiviral therapy, including medications such as acyclovir, valacyclovir, and famciclovir, is crucial for reducing the severity and duration of the illness.

3. Pain management is a critical component of shingles treatment, with a range of options available from over-the-counter analgesics to prescription medications, including anticonvulsants and antidepressants, for more severe cases. While corticosteroids may be considered in certain situations to alleviate inflammation and pain, the current evidence regarding their effectiveness in preventing PHN remains inconclusive, highlighting the need for further research.

4. Self-care measures, such as maintaining good hygiene, applying cool compresses, and using topical treatments, are essential for minimizing discomfort and preventing secondary infections. Additionally, lifestyle modifications, including wearing loose clothing and avoiding scratching, can further aid in symptom management.

#### **CHAPTER 3.**

# RESEARCH ON THE AVAILABILITY OF PHARMACEUTICAL CARE FOR PATIENTS WITH SHINGLES AND THE PHARMACIST'S ROLE IN PREVENTING SHINGLES

## 3.1 Research on the costs and the availability of shingles treatment

The burden of herpes zoster disease is significant worldwide, with millions affected and an increasing incidence. Increased age and immunosuppression due to disease or drugs have been related to its recurrence.

The economic and social burden of shingles is profound and multifaceted, impacting individuals, families, and entire communities across the globe. Around 30% of the population will experience herpes zoster (HZ), 10% of whom develop PHN. Together, these illnesses produce a significant economic burden to the healthcare system.

Patients with PHN generally utilize more healthcare resources than HZ patients without neurological complications. This results in elevated costs and expenditures, which often escalate with age, but other researchers have not substantiated this conclusion. Yawn et al. estimated that hospital care constituted 13.5%, 39.4%, and 50.9% of the average global cost per HZ case, PHN case, and complex non-PHN HZ case, respectively.

Research indicates that, although expensive, the treatment of hospitalized patients is not the primary cost driver for an average HZ case; rather, general practitioner management and pharmacotherapy incur greater expenses. Insinga et al. determined that hospital care constituted 18% of total spending, but Yawn et al. indicated a figure of 29.3%. Mick et al. reported comparable figures, estimating that hospital care constituted 18% of the global cost of shingles and 23% of the global cost of PHN from the perspective of third-party payers.

In contrast, an Australian study revealed that hospital care accounted for almost 60% of the entire expense. Additionally, a comparable figure was identified

in a study conducted in Italy, which indicated that 50.3% of the total expenditure was attributable to hospitalizations [39].

Pharmaceutical prescriptions constitute the predominant expenses. Specifically, they are indicators of increased expenditure for the National Health Service (NHS). Gauthier et al. determined that pharmaceutical expenses represented 53.6% of overall healthcare costs; Di Legami et al. indicated that medications comprised 65.4% of total expenditures, while Mick et al. assessed that drug treatment costs accounted for 49% of the global expenses related to shingles and 47% of the costs for PHN from the perspective of third-party payers. Insinga et al. estimated that pharmaceutical treatment constituted 32% of total spending. Cebrian-Cuenca et al. reported a value of 33% from the third-party payer perspective, while Sicras-Mainar et al. indicated a proportion of 35.7%. In contrast, Arpinelli et al. estimated that drug prescriptions accounted for merely 15.7% of total healthcare spending; this conclusion can be elucidated by the significantly elevated hospitalization rate in the analyzed sample compared to rates often documented in the literature.

Outpatient expenses: HZ patients engage with a general practitioner and/or specialists (including dermatologists and neurologists), whereas PHN patients experience a greater number of referrals and consultations. Di Legami et al. recorded an average of 2.1 contacts per case, a finding akin to that of Yawn et al., who identified 2.8 consultations per patient. Gialloreti et al. reported a value of 1.9 [18].

Outpatient treatment becomes a primary expense. Insinga et al. determined that outpatient expenses constituted 40% of overall expenditures. Cebrian-Cuenca et al. reported a comparable figure, estimating that visits and consultations constituted 47% of the overall expense from the perspective of third-party payers. Gauthier et al. determined that primary care management accounted for 74% and 86% of the total costs associated with HZ and PHN cases, respectively, at three months. Primary care and secondary care consultations accounted for 40.9% and 2.9% of HZ expenditures, respectively, whereas management absorbed 63.5% of PHN costs at one month. A comparable figure (75.2%) was achieved by Gialloreti

et al. In contrast, the research conducted by Mick et al. indicated that GP consultations and referrals accounted for about 15-18% of expenditures for HZ and 22-23% for PHN.

Indirect expenses include diminished productivity and work absenteeism. These expenses might be directly attributed to the patients or their caregivers [7]

Summarizing economical and social burden of shingles is demonstrated si fig.

3.1.



Fig 3.1 The economic and social burden of HZ in Europe

Herpes zoster is treated with oral guanosine analogues. These medications target VZV by relying on viral kinases for phosphorylation, which promotes incorporation into viral DNA, thereby disrupting replication (Table 3.1).

Acyclovir is less expensive but has lower bioavailability and must be taken five times daily. Valacyclovir, a pro-drug of acyclovir, is taken three times a day, as is famciclovir. Acyclovir is the only approved antiviral medication for treating HZ in children. Patients with severe disease, especially those who are immunocompromised, should receive intravenous acyclovir. Although treating HZ ideally should begin within 72 hours of the rash's appearance, treatment remains warranted outside this window if new skin lesions develop or if ophthalmic or neurological complications arise [38].

Table 3.1

Medication	Dosage (Adult)	Adverse effects	Cost
1	2	3	4
Antivirals			
Acyclovir	800 mg orally 5 times per day for 7 days	Diarrhea, encephalopathy, erythema multiforme, headache, malaise, nausea yomiting	\$20 for 45 800 mg generic tablets
Famciclovir	500 mg orally 3 times per day for 7 days	Confusion, headeache, nausea, Stevens- Jonson syndrome	<ul><li>\$32 for 21</li><li>500 mg generic tablets</li><li>\$522 for brand name</li></ul>
Valacyclovir	Similar to acyclovir	Dyspepsia, nausea, vomiting	<ul> <li>\$24 for 21</li> <li>1.000 mg generic</li> <li>tablets</li> <li>(\$424 for brand name)</li> </ul>
Adjunctive the	apy		
Corticosteroids Prednisolone Prednisone	40 mg orally per 1 day (days 1 to 6), 30 mg per day (days 7 to 10), 20 mg per day (days 15 to 18) 5 mg per day (days 15 to 21) 60 mg orally per	Dyspepsia, nausea, vomiting	Varies
rreamsone	say (days 1 to 7) 30 mg per day (days 8 to 14), 15 mg per day (days 15 to 21)		

Cost for Pharmacologic Therapies for Acute Herpes Zoster

Continuation Table 3.1

1	2	3	4
Analgesis			
Acetaminophen	325 to 1.000 mg	Headache,	\$7 for 100 generic
	orally every 4 to 6	hepatotoxicity,	tablets
	hours as needed	hypertensivity,	
	(maximum: 4.000	nausea, rash	
	mg per day)		
Nonsteroidal	400 mg orally	Abdominal	\$7 for 100 generic
anti-	every 4 to 6 hours	discomfort,	tablets
inflammatory	as needed	dyspepsia,	
grugs (e.g.	(maximum:	gastrointestinal	
ibuprofen)	2.400 mg per day)	bleeding and	
		perforation,	
		myocardial	
		infarction, nausea	

On the next step we made comparative analysis of the availability of antiviral therapy in the treatment of HZ. The ATC/DDD methodology was used to estimate the cost of pharmacotherapy with antiviral drugs.

According to international guidelines based on evidence-based medicine, patients over 60 years of age with HZ require antiviral therapy, as the clinical course of the disease in them is more severe. The drugs of choice for pharmacotherapy of HZ are valacyclovir, famciclovir and acyclovir, which are administered orally [19].

According to the results of the analysis of the state register of medicines, it was found that 8 drugs with the active substance valacyclovir, 8 – famciclovir and 21 -acyclovir are registered on the pharmaceutical market of Ukraine. At the same time, 3 drugs from the valacyclovir group, 3 – from the famciclovir group and 4 – from the acyclovir group are missing from pharmacies (Table 3.2).

## Comparative analysis of the cost of antiviral pharmacotherapy for patients with herpes zoster

Medication	Dose	Producer	County	Average	DDD in the	Cost 1	the cost of
				price	раскаде	DDD	treatment
				Pilee			regimen
1	2	3	4	5	6	7	8
Valacyclovir							
VALAVIR ®	tablets of 500 mg No. 42	JSC " Pharmak "	Ukraine	774.48	7	110.64	774.48
	tablets of 500 mg No. 10			265.52	1.67	158.99	1112.96
VALACICLOVIR	tablets of 500 mg No. 30	Hetero Labs	India	494.44	5	98.89	692.22
- HETERO	tablets of 500 mg No. 10	Limited		290.28	1.67	173.82	1216.74
WALTZ	tablets of 500 mg No. 42	Pharmascience Inc.	Canada	982.06	7	140.29	982.06
	tablets of 500 mg No. 10			295.15	1.67	176.74	1237.16
VALTREX TM	tablets of 500 mg No. 10	Glaxo welcome	Spain	322.13	1.67	192.89	1350.25
	tablets of 500 mg No. 42	S.A.		1105.53	7	157.93	1105.53
VALTROVIR	tablets of 500 mg No. 50	PJSC	Ukraine	657.66	8.33	78.95	552.66
		"Kyivmedpreparat"					
Famciclovir							
VIRAXA	tablets of 250 mg No. 21	Specifar SA	Greece	702.5	7	100.36	702,5
VIRAXA	tablets of 500 mg No. 14	Specifar SA	Greece	789.72	9.33	84.64	789,72
VIROSTAT ®	tablets of 250 mg No. 21	JSC "KYIV	Ukraine	561.24	7	80.18	561,24
VIROSTAT ®	tablets of 500 mg No. 21	VITAMIN "	Ukraine	935.39	14	66,81	623.33

29

Continuation Table 3.2

1	2	3	4	5	6	7	8
Acyclovir							
ACICLOVIR-	tablets of 200 mg No. 20	ASTRAPHARM	Ukraine	51.78	1	51.78	362.46
ASTRAPHARM	_						
Acyclovir is a gift	tablets of 200 mg No. 20	Darnytsia	Ukraine	76.33	1	76.33	534.31
ACICLOVIR-	tablets of 200 mg No. 20	JSC " Pharmak "	Ukraine	59.84	1	59.84	418.88
PHARMAC							
ACICLOVIR 200	tablets of 200 mg No. 25	STADA	Germany	203.64	1.25	162.91	1140,384
STADA®		Artznaimittel AG					
ACICLOVIR 400	tablets of 400 mg No. 35		Germany	354.72	3.5	101.35	709.44
STADA®							
ACICLOVIR 800	tablets of 800 mg No. 35		Germany	483.52	7	69.07	483.52
STADA®							
ACIK ®	tablets of 200 mg No. 25	Salutes Pharma	Germany	327.29	1.25	261.83	1832,824
ACIK ®	tablets of 400 mg No. 35	Ltd		687.2	3.5	196.34	1374.4
GEVIRAN	tablets of 400 mg No. 30	" POLPHARMA "	Poland	536.7	3	178.90	1252.3
GEVIRAN	tablets of 800 mg No. 30	S.A.	Poland	933.52	6	155.59	1089,107
HERPEVIRUS ®	tablets of 200 mg No. 20	PJSC "	Ukraine	69.7	1	69.70	487.9
		Kyivmedpreparat "					
HERPEVIRUS ®	tablets of 400 mg No. 10	PJSC "	Ukraine	75.93	1	75.93	531.51
		Kyivmedpreparat "					
ZOVIRAX TM	tablets of 200 mg No. 25	Glaxo welcome	Spain	219.88	1.25	175.90	1231,328
		S.A.					
LIPSTER ®	tablets of 400 mg No. 20	JSC " Pharmak "	Ukraine	181.07	2	90.54	633,745
LIPSTER ®	tablets of 800 mg No. 20	JSC " Pharmak "	Ukraine	305.03	4	76,26	533.8025

Thus, according to the price characteristics, the most affordable is Acyclovir tab. 0.2 No. 2 manufactured by Astrapharm (Ukraine). However, it should be noted that according to the treatment regimen, the patient needs to take 20 tablets per day, that is, 4 tablets per dose. This may cause difficulties for the patient, given that among the analyzed drugs there are dosages that involve the use of one tablet per dose. In general, there are drugs of different price groups on the domestic pharmaceutical market. Also, according to the results of the analysis, a trend can be observed that in each group of antiviral drugs, the most affordable are drugs of domestic production, and the least affordable are foreign ones [45].

Herpes zoster and PHN are disorders that can be prevented with vaccination. On October 23, 2017, the U.S. Food and Drug Administration sanctioned an adjuvant recombinant VZV vaccination for shingles prevention. This vaccination has shown a 96% decrease in the occurrence of HZ vs to placebo. It is well-tolerated and, due to its age-independent efficacy and lack of risk for producing HZ, it has been endorsed by the Advisory Committee on Immunization Practices as the best approach for preventing HZ and PHN. The vaccine is advised for individuals aged 50 and above, including those who have already received the live VZV vaccine. It is delivered in two doses, with the second dose administered two to six months following the first.

Prior to the advent of the recombinant VZV vaccine, the live VZV vaccine was the advised immunization for adults aged 50 and above. The Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention recommends vaccination for persons aged 60 and older, irrespective of prior spontaneous varicella infection. The live VZV vaccination is contraindicated for immunosuppressed individuals, those with HIV and CD4 lymphocyte counts below 200 per mm3, patients receiving cancer treatment, and individuals with malignancy involving the bones or lymphatic system. The vaccine demonstrates an efficacy of 69% in the initial year, diminishing to 4% by the eighth year; there are no guidelines for revaccination for individuals aged 60 years or older who got the vaccine.

The live VZV vaccination, while efficacious, is underutilized, perhaps due in part to its expense. The cost element may influence the adoption of the new vaccination, particularly as it requires two doses rather than one. In 2013, the vaccination rate for VZV among persons aged 60 and older was at 24.2%. Enhancing patient education can elevate immunization rates by elucidating the advantages of the zoster vaccination.

## 2.2 Study Shingles Prevention approach

Varicella vaccine has been commercially available since 1984; however, individuals who have a history of varicella immunization remain at risk for HZ.

Currently, there are two formulations of the shingles vaccine available globally. One utilizes a live version of the virus, while the other, referred to as the recombinant vaccine, is based on components of the viral protein. As of 2020, the live vaccine was approved for use in approximately 60 countries worldwide. However, the recombinant vaccine has demonstrated superior efficacy in clinical trials. It has been approved for use in more than 30 countries, including the United States, Canada, Japan, Australia, China, and the European Union. Nonetheless, certain barriers impede the widespread global adoption of shingles vaccines. Some nations do not recommend the vaccines, while others fail to promote them through funding or public education initiatives.

The first licensed vaccine for prevention of HZ, Zostavax (zoster vaccine live [ZVL], Merck & Co., Inc., Whitehouse Station, NJ, USA), is a live, attenuated vaccine

ZVL is approved for use as a single dose for adults 50-79 years of age, but contraindicated in individuals with primary or acquired immunodeficiency states due to a theoretical risk of serious disease that can be caused by the attenuated, live virus [9].

The second licensed HZ vaccine, Shingrix (recombinant zoster vaccine [RZV], is an inactivated, recombinant, subunit vaccine. Immunization with a 2 dose

series of RZV is recommended for adults aged 50 years and older or adults aged at least 18 years, who are or will be at increased risk of HZ due to immunodeficiency or immunosuppression caused by known disease or therapy [10].

Zostavax has shown to reduce the incidence of HZ and post-herpetic neuralgia among immunocompetent individuals of  $\geq 60$  years, worldwide. The vaccine boosts the varicella zoster virus-specific cell-mediated immunity, there by controlling the reactivation or replication of the latent varicella zoster virus and prevents HZ infection or reduce its severity.

Both varicella vaccine and herpes vaccine are derived from the Oka varicella zoster virus strain. However, herpes vaccine has a 14-fold higher vaccine virus potency than varicella vaccine. This live attenuated vaccine is not recommended for pregnant women, children, and immunocompromised patients.

Individuals with a prior history of HZ can be vaccinated with herpes vaccine to prevent further episodes. Administration of herpes vaccine in patients receiving biologic agents such as adalimumab, infliximab, and etanercept is contraindicated. However, CDC ACIP allows administration of herpes vaccine in these patients either 14 days before initiation of immunosuppressive therapy or one month after discontinuation of these agents[11].

The vaccine should not be administered if the patient is on antiviral therapy because the antiviral agent can prevent the replication of the vaccine virus leading to vaccine failure. Hence, patients on chronic antiviral therapy must stop medication at least 24 hours prior to vaccination and should not take the medicine for 14 days after vaccination.

The Canadian national advisory committee on immunization reported that patients taking low-dose immunosuppressive therapy can receive HZ vaccination after an opinion from an immunodeficiency specialist depending on patient's case Even though any age group can develop herpes zoster infection, a vaccination recommendation has to be given for at-risk individuals, such as elderly people. Routine vaccination is recommended for all patients above 60 years excluding patients who are severely immunocompromised and allergic to any vaccine forms.

Because the treatment cost of herpes zoster and post-herpetic neuralgia has become a burden for most patients, it is found that vaccination against herpes zoster among the elderly individuals will provide a cost-effective solution in improving their quality of life.

The general population has to be educated regarding the risks and complications of HZ infection so that they can self determine seeking hospital care and getting vaccinated [12].

General comparison of vaccinas presents on Fog 3.2.

Shingrix, an adjuvanted subunit vaccine containing recombinant VZV glycoprotein E, is used in adults aged 50 and older to prevent shingles and postherpetic neuralgia. This vaccine is anticipated to dominate the market due to its high efficacy and fewer associated consequences. Furthermore, increased awareness of the disease's implications and growing regulatory approvals for Shingrix in various countries have contributed to a rise in demand for these vaccines during the forecast period.

Moreover, the widespread adoption of Shingrix in developed regions, such as North America and Europe, has also helped boost the demand for these vaccines. After being licensed in the United Kingdom in September 2021, this vaccine was included in the national shingles immunization program.

Additionally, new approvals and launches of this vaccine in different regions have expanded its global distribution. For instance, in June 2022, Japan's MHLW accepted Shingrix's regulatory submission to prevent shingles in at-risk adults aged 18 and older. Similarly, in January 2022, GSK introduced Shingrix in Singapore for the prevention of shingles across the country. These new initiatives by market players through regulatory approvals and product launches have increased the widespread availability of the vaccine, which is expected to drive market growth over the forecast period.

	Shingrix	Zostavax
Pharmaceutical Factory	GSK	MSD
Suitable for	50 years old or above High-risk individuals aged 18 or over	50 years old or above
Inoculation time	2 injections 2-6 months apart	1 injection
Vaccine types	Recombinant vaccine	Inactivated vaccine
Overall Protection*	>90%	>50%
Post-herpetic	≥ Aged 50: 100%	≥ Aged 60: 66%
neuralgia Protective efficacy	≥ Aged 70: 89%	≥ Aged 70: 67%
Complications of	≥ Aged 50: 94%	
Sningles Prevention efficacy	≥ Aged 70: 92%	no data
	<ul> <li>Anaphylactic shock reaction to vaccine components is not suitable for vaccination</li> </ul>	<ul> <li>Anaphylactic shock reaction</li> <li>to vaccine components is not suitable for vaccination</li> </ul>
Precautions	<ul> <li>Revaccination is recommended for those who have been vaccinated with Zostavax</li> </ul>	<ul> <li>Immunocompromised persons are not suitable for vaccination</li> </ul>

Fig 3.2 Comparison of varicella and zoster vaccines.

North America is expected to maintain a significant share in the shingles vaccines market throughout the forecast period. The government's recommendation of shingles vaccines, the presence of sophisticated healthcare infrastructure, and high patient awareness regarding the importance of these vaccines are key drivers for the growth of the shingles vaccine market in this region.

Given that shingles are caused by the reactivation of the chickenpox virus, the high prevalence of chickenpox is anticipated to increase the demand for shingles vaccines. For instance, in September 2022, Mexican health authorities reported 21,060 chickenpox infections, a much higher figure than the 8,897 infections

registered in 2021, representing a 137% increase. The high incidence of chickenpox raises the risk of shingles occurrence.

Furthermore, the availability of shingles vaccines for immunocompromised adults is expected to boost market growth (Fig 3.3). In October 2021, the CDC panel recommended Shingrix as a shingles vaccine for immunodeficient or immunosuppressed adults. Similarly, in July 2021, the U.S. FDA approved Shingrix for the prevention of shingles in adults aged 18 and older who are or will be at increased risk of shingles due to immunodeficiency or immunosuppression. These factors contribute to the high demand for shingles vaccines in North America and are anticipated to have a significant impact on the market over the forecast period.



Fig 3.3 Shingles vaccine market growth forecast Mordor Intelligence Private Limited

## 3.3 The pharmacist's role in preventing shingles

Achieving excellence in pharmaceutical care necessitates leveraging the strengths of pharmacists, pharmacy technicians, and other pharmacy support personnel. Unlocking their full potential in a structured and incremental manner is the fundamental objective of the priorities outlined in this strategy.

The National Clinical Strategy establishes a high-level vision to guide the development of services over the next 10-15 years. This includes planning robust primary and community health services centered around individuals and their communities, improving access to care, enhancing quality, and ensuring sustainable services for all [46].

The community pharmacy network, with pharmacists and pharmacy technicians collaborating with general practice and performing specialized roles in hospital care, is already making a significant impact on delivering improved health and social care services.

Furthermore, the entire pharmacy team's specific contributions can enhance overall care in remote, rural, and institutional settings, such as care homes or homebased care. This not only unlocks further capacity but also maximizes opportunities to embed the safer use of medicines across all healthcare settings [42].

Care is increasingly provided by multidisciplinary teams, including GPs, consultants, nurses, allied healthcare professionals, pharmacists, pharmacy technicians, social workers, social care staff, the voluntary sector, and other specialists working together. Each team member must understand their own role and how to leverage the strengths and skills of others. Improving the quality of care and achieving better health outcomes, especially for those with multiple and complex long-term conditions, requires integrated, multidisciplinary, preventative, anticipatory, and proactive team-based care. This also necessitates improved access to data and information through better data sharing, as well as the right digital culture, skills, processes, tools, and systems.

The pharmacy team's unique and specialized knowledge of medicines must be leveraged to ensure services are structured so that the appropriate member of the pharmacy team can lead in providing medicines or advice and information about medicines to the public, healthcare professionals, and/or social care organizations. Clearly defining roles will improve multidisciplinary working and outcomes for people and practitioners.

The pharmacy profession plays a key role in empowering people and their caregivers to make the best use of available services, enabling them to take an increased role in decisions about their medicines and care. The success of this also depends on informed and engaged individuals and caregivers developing new relationships with care providers.

Since 1988, the annual Gallup poll has regularly positioned pharmacists among the top three most trusted professionals, indicating that the public has confidence in the information supplied by pharmacists.

Pharmacists are professionally required to significantly contribute to enhancing zoster vaccination rates in older persons by identifying this specific unmet need within this demographic and leveraging it effectively. Pharmacists possess clinical communication skills and vaccination proficiency, enabling them to perform the requisite activities of this profession.

This includes informing patients about the zoster vaccine's availability, enhancing vaccination supply management, and addressing issues arising from shortages. Pharmacists, serving as patient advocates, must formulate and execute an educational strategy for older adult patients concerning VZV and encourage them to receive the required vaccination.

Pharmacists are particularly equipped to recognize the unmet needs of their community and formulate targeted messages that will resonate, influencing both current and underserved patient populations.

The communications must encompass evidence underscoring the significance of vaccination and the effects of the zoster vaccine on the elderly demographic, referencing elevated morbidity and a deterioration in quality of life as repercussions of remaining unvaccinated [26].

Pharmacists can utilize many techniques to enhance zoster immunization rates. These may involve employing standing orders to vaccinate any older adult who satisfies the ACIP/CDC criteria. This may also encompass the following: employing electronic, telephonic, or postal reminders for eligible older adult patrons regarding immunizations; distributing educational materials about the zoster vaccine in conjunction with influenza vaccine initiatives, particularly during annual pharmacy week events; establishing collaborations with nursing or home health care agencies to engage homebound individuals who lack regular access to their pharmacist; and partnering with community health centers and pharmacy schools to convey educational messages at health fairs within their respective communities.

Immunizations must be integrated into the workflow of all pharmacy settings through the utilization of technology and support staff, allowing pharmacists to incorporate these responsibilities into their everyday operations. To achieve the aforementioned goals, pharmacists must delineate and increase the roles and responsibilities of pharmacy technicians; this will facilitate the pharmacists in fulfilling their clinical duties.

Example of promotion material Shingles Vaccination Service by Cobh pharmacy is on Fig. 3.4

The Fig. 3.5 summarizes what is known about shingles prevention and susceptibility:



Fig. 3.4 Shingles Vaccination Service by Cobh pharmacy (Ireland)

	Reported to decrease risk	Reported to increase risk	Does not appear to be associated
Vaccination	$\checkmark$		
Exposure to chickenpox	$\checkmark$		
Aging		$\checkmark$	
Female sex		$\checkmark$	
Psychological stress		$\checkmark$	
Diabetes		$\checkmark$	
Hypertension		$\checkmark$	
Cancer		$\checkmark$	
HIV		$\checkmark$	
Immunosuppression		$\checkmark$	
Alcohol consumption			$\checkmark$
Smoking			$\checkmark$
Physical activity			$\checkmark$
BMI			$\checkmark$

Fig 3.5. Overview of Shingles prevention and Susceptibility

## **Conclusions to Chapter 3**

1. The burden of herpes zoster disease is significant worldwide, affecting millions with an increasing incidence. Increased age and immunosuppression are related factors. The economic and social impact is profound, with around 30% of the population experiencing HZ, 10% of whom develop postherpetic neuralgia. This leads to higher healthcare costs and resource utilization, particularly for hospital care, outpatient management, and drug prescriptions. Indirect costs from lost productivity are also substantial. Overall, the economic and social burden of shingles

is significant and multifaceted, affecting individuals, families, and communities globally

2. The availability of varicella and HZ vaccines marks a significant advancement in the prevention of shingles and its associated complications. Despite these advancements, barriers to vaccination persist, including inconsistent recommendations and lack of public awareness in certain regions.

3. By implementing structured educational plans and utilizing various outreach tools, pharmacists can effectively raise awareness about the importance of the zoster vaccine, thereby improving vaccination rates and health outcomes in their communities. The integration of immunization services into daily pharmacy workflows, supported by technology and well-defined responsibilities for pharmacy technicians, will facilitate the successful delivery of zoster vaccinations. By fostering partnerships with community organizations and utilizing innovative communication strategies, pharmacists can reach underserved populations and ensure that the benefits of vaccination are accessible to all.

### CONCLUSIONS

1. Shingles presents a distinct clinical picture, often manifesting as a localized, painful rash aligned with dermatomes. Importantly, shingles cannot be transmitted from one person to another; however, individuals who have not had chickenpox or received the varicella vaccine can contract chickenpox through direct contact with the fluid from shingles blisters. This distinction is critical for public health awareness and prevention strategies.

2. It was determined the likelihood of developing shingles increases notably with advancing age, particularly after the age of 50; postherpetic neuralgia, a severe pain condition, affects approximately 20% of those diagnosed with shingles, and the risk rises with age. Shingles can lead to hospitalization, especially for older adults and those with weakened immune systems, but fewer than 100 people die from shingles each year in the US. The age-specific incidence rate of shingles shows a significant increase after the age of 50, consistent with global epidemiological patterns.

3. Effective management of herpes zoster (shingles) is multifaceted, incorporating antiviral medications, pain relief strategies, and self-care measures. Antiviral therapy, including medications such as acyclovir, valacyclovir, and famciclovir, is crucial for reducing the severity and duration of the illness.

4. The burden of herpes zoster disease is significant worldwide, affecting millions with an increasing incidence. Increased age and immunosuppression are related factors. The economic and social impact is profound, with around 30% of the population experiencing herpes zoster, 10% of whom develop postherpetic neuralgia. This leads to higher healthcare costs and resource utilization, particularly for hospital care, outpatient management, and drug prescriptions. Indirect costs from lost productivity are also substantial. Overall, the economic and social burden of shingles is significant and multifaceted, affecting individuals, families, and communities globally

5. The availability of varicella and herpes zoster vaccines marks a significant advancement in the prevention of shingles and its associated complications. Despite these advancements, barriers to vaccination persist, including inconsistent recommendations and lack of public awareness in certain regions.

6. By implementing structured educational plans and utilizing various outreach tools, pharmacists can effectively raise awareness about the importance of the zoster vaccine, thereby improving vaccination rates and health outcomes in their communities. The integration of immunization services into daily pharmacy workflows, supported by technology and well-defined responsibilities for pharmacy technicians, will facilitate the successful delivery of zoster vaccinations. By fostering partnerships with community organizations and utilizing innovative communication strategies, pharmacists can reach underserved populations and ensure that the benefits of vaccination are accessible to all.

#### REFERENCES

 Jawetz, Melnick and Adelberg's Medical Microbiology. Chapter33: Herpesviruses / K. C. Carroll et al. URL: http://accesspharmacy.mhmedical.com/book.aspx?bookid=1551 (Date of access: 30.04.2024).

2. Whitley R. J. Varicella–Zoster Virus Infections. Harrison's Principles of Internal Medicine / J. Jameson et al. URL: https://accessmedicine.mhmedical.com/content.aspx?bookid=2129&sectionid=192 024718 (Date of access: 30.04.2024).

3. Herpes zoster: A Review of Clinical Manifestations and Management /A. Patil et al. Viruses. 2022. Vol. 14 (2). P. 192. DOI: 10.3390/v14020192.

4. Janniger C. K. Herpes zoster. 2017. URL: https://emedicine.medscape.com/article/1132465-overview (Date of access: 30.04.2024).

5. Kawai K., Yawn B. P. Risk factors for herpes zoster: a systematic review and meta-analysis. Mayo Clin. Proc. 2017. Vol. 92. P. 1806–1821. DOI: 10.1016/j.mayocp.2017.10.009.

6. O'Connor K. M., Paauw D. S. Herpes zoster. The Medical clinics of North America. 2013. Vol. 97 (4). P. 503–522.

7. Healthcare resource use and costs of varicella and its complications: A Williame al. systematic literature review / I. et Human Vaccines P. Immunotherapeutics. 2023. Vol. 19 (3). 2266225. DOI: 10.1080/21645515.2023.2266225.

8. Herpes zoster guidelines– Medsacpe reference. URL: https://emedicine.medscape.com/article/1132465-guidelines?form=fpf (Date of access: 30.04.2024).

9. ZOSTAVAX: full prescription information (package insert). MERCK&Co; 2018. URL: https://www.fda.gov/media/82524/download (Date of access: 30.04.2024).

10. SHINGRIX: full prescription information (package insert). Rixensart BGB; 2021. URL: https://www.fda.gov/media/108597/download (Date of access: 30.04.2024).

11. Centers for Disease Control and Prevention Government agency. About shingles herpes zoster. URL: https://www.cdc.gov/shingles/index.html (Date of access: 30.04.2024).

12. Prevention of herpes zoster: recommendations of the Advisory Committee on Immunization Practices (ACIP) / R. Harpaz et al. MMWR Recomm. Rep. 2008. Vol. 57 (RR-5). P. 1–30.

13. The efficacy of time-based short-course acyclovir therapy in treatment of post-herpetic pain / A. Rasi et al. J. Infect. Dev. Ctries. 2010. Vol. 4. P. 754–760.

14. Clemmensen O. J., Andersen K. E. ACTH versus prednisone and placebo in herpes zoster treatment. Clin. Exp. Dermatol. 2014. Vol. 9. P. 557–563.

15. Rossi S., Whitfeld M., Berger T. G. The treatment of acyclovir-resistant herpes zoster with trifluorothymidine and interferon alfa. Arch. Dermatol. 2015. Vol. 131. P. 24–26.

16. Prevention of varicella: recommendations of the Advisory Committee on Immunization Practices (ACIP) / M. Marin et al. MMWR. Recommendations and reports. 2007. Vol. 56 (RR-4). P. 1–40.

17. Kurlan J. G., Connelly B. L., Lucky A. W. Herpes zoster in the first year of life following postnatal exposure to varicella-zoster virus: Four case reports and a review of infantile herpes zoster. Arch. Dermatol. 2020. Vol. 140. P. 1268–1272.

18. Epidemiology, treatment and prevention of herpes zoster: A comprehensive review / E. Koshy et al. Indian journal of dermatology, venereology and leprology. 2018. Vol. 84 (3). P. 251–262. DOI: 10.4103/ijdvl.IJDVL\_1021\_16.

19. Topical 5% lidocaine (lignocaine) medicated plaster treatment for postherpetic neuralgia: Results of a double-blind, placebo-controlled, multinational efficacy and safety trial / A. Binder et al. Clin. Drug. Investig. 2019. Vol. 29. P. 393– 408. 20. Comparative study of clinical efficacy of amitriptyline and pregabalin in postherpetic neuralgia / A. Achar et al. Acta Dermatovenerol Croat. 2020. Vol. 20. P. 89–94.

21. Aggregate health and economic burden of herpes zoster in the United States: illustrative example of a pain condition / M. Harvey et al. Pain. 2020. Vol. 161 (2). P. 361–368. DOI: 10.1097/j.pain.00000000001718.

22.Shingles(HerpesZoster).URL:https://www.cdc.gov/shingles/index.html (Date of access: 30.04.2024).

23. Potent and selective inhibition of varicella-zoster virus (VZV) by nucleoside analogues with an unusual bicyclic base / C. McGuigan et al. J. Med. Chem. 2019. Vol. 42. P. 4479–4484. DOI: 10.1021/jm9903460.

24. A realist evaluation of the development of extended pharmacist roles and services in community pharmacies / C. Morris et al. Res. Social. Adm. Pharm. 2024. Vol. 20 (3). P. 321–334.

25. Pharmacist involvement in addressing public health priorities and community needs: the Allegheny County Racial and Ethnic Approaches to Community Health (REACH) Project / J. P. Elliott et al. Prev. Chronic. Dis. 2021. Vol. 18. P. E07.

26. Samancı Tekin Çiğdem. The role of community pharmacists in public health and public health related problems which they encounter. İstanbul Journal of Pharmacy. 2020. Vol. 50 (2). P. 142–148. DOI: 10.26650/IstanbulJPharm.2019.0069.

27. Doherty T. M., Privor–Dumm L. Role of new vaccinators/pharmacists in life-course vaccination. Ann. Med. 2024. Vol. 56 (1). P. 2411603. DOI: 10.1080/07853890.2024.2411603.

28. Valladales–Restrepo L. F., Velasquez–Quimara S., Machado–Alba J.
E. Pharmacological Treatment of Herpes Zoster and Factors Associated with Its Recurrence. Antibiotics (Basel). 2023. Vol. 12 (4). P. 757. DOI: 10.3390/antibiotics12040757.

29. Evaluation of the economic burden of Herpes Zoster (HZ) infection /D. Panatto et al. Hum Vaccin Immunother. 2015. Vol. 11 (1). P. 245–262. DOI: 10.4161/hv.36160.

30. A systematic literature review of the epidemiology and burden of herpes zoster in selected locales in Asia Pacific / J. Chen et al. Human Vaccines Immunotherapeutics. 2024. Vol. 20 (1). P. 2344983. DOI: 10.1080/21645515.2024.2344983.

31. Person-Centred Care Interventions in Pharmaceutical Care / V. Marinkovic et al. Intelligent Systems Reference Library. 2022. Vol. 67. P. 53–68. DOI: 10.1007/978-3-030-79353-1\_4.

32. Mohiuddin A. K. The Excellence of Pharmacy Practice. Innov. Pharm.2020. Vol. 11 (1). P. 234–245. DOI: 10.24926/iip.v11i1.1662.

33. Kang H., Ailshire J., Crimmins E. The prevalence of shingles among older adults in the U.S. Gerontologist. 2015. Vol. 56 (3). P. 48. DOI: 10.1093/geront/gnw162.199.

34. Long-term effectiveness of the live zoster vaccine in preventing shingles: a cohort study / R. Baxter et al. Am. J. Epidemiol. 2018. Vol. 187 (1). P. 161–169. DOI: 10.1093/aje/kwx245.

35. Increasing Incidence of Herpes Zoster Over a 60-year Period From a Population-based Study / K. Kawai et al. Clin. Infect. Dis. 2016. Vol. 63 (2). P. 221–226. DOI: 10.1093/cid/ciw296.

36. Centre for Disease Control and Prevention. Shingles: Cause and Transmission. URL: https://www.cdc.gov/shingles/about/transmission.html (Date of access: 30.04.2024).

37. Prevalence of and factors associated with herpes zoster in England: a cross-sectional analysis of the Health Survey for England / S. L. Cadogan et al. BMC Infect Dis. 2022. Vol. 22. P. 513. DOI: 10.1186/s12879-022-07479-z.

38. The impact of varicella vaccination on paediatric herpes zoster epidemiology: a Canadian population-based retrospective cohort study / E. Rafferty

et al. Eur. J. Clin. Microbiol. Infect. Dis. 2021. Vol. 40. P. 2363–2370. DOI: 10.1007/s10096-021-04298-z.

39. Similar herpes zoster incidence across Europe: results from a systematic literature review / S. Pinchinat et al. BMC Infect Dis. 2013. Vol. 13. P. 170. DOI: 10.1186/1471-2334-13-170.

40. Recommendations of the Advisory Committee on Immunization Practices for Use of Herpes Zoster Vaccines / K. L. Dooling et al. MMWR Morb Mortal Wkly Rep. 2018. Vol. 67 (3). P. 103–108. DOI: 10.15585/mmwr.mm6703a5.

41. Cost of herpes zoster and herpes zoster-related complications among immunocompromised individuals / J. L. Meyers et al. Vaccine. 2018. Vol. 36 (45).
P. 6810–6818. DOI: 10.1016/j.vaccine.2018.08.080.

42. Fashner J., Bell A. L. Herpes zoster and postherpetic neuralgia: prevention and management. American family physician. 2011. Vol. 83 (12). P. 1432–1437.

43. Herpes zoster vaccine awareness and acceptance among adults in Saudi Arabia: a survey-based cross-sectional study / A. l. Muammar et al. Trop Dis Travel Med Vaccines. 2023. Vol. 9 (1). P. 17. DOI: 10.1186/s40794-023-00202-z.

44. Herpes Zoster and Postherpetic Neuralgia: Prevention and Management / Saguil Aaron et al. American family physician. 2017. Vol. 96 (10). P. 656–663.

45. WHO, 2018. Surveillance standards for vaccine-preventable diseases: Varicella. World Health Organization (WHO). URL: https://cdn.who.int/media/docs/default-source/immunization/vpd\_surveillance/vpdsurveillance-standards-publication/who-surveillancevaccinepreventable-22varicella-r2.pdf?sfvrsn=60ab2518\_10&download=true (Date of access: 30.04.2024).

46. Effectiveness of the live zoster vaccine during the 10 years following vaccination: real world cohort study using electronic health records / N. P Kleinet al. BMJ. 2023. Vol. 383. P. e076321. DOI: 10.1136/bmj-2023-076321.

47. Serious and Progressive Neuropathy Presumably Post-Shingrix Vaccination / M. J. Wons et al. Reports. 2024. Vol. 7 (1). P. 5. DOI: 10.3390/reports7010005.

48. Effectiveness and cost-effectiveness of vaccination against herpes zoster in Canada: a modelling study / M. Drolet et al. CMAJ. 2019. Vol. 191 (34).P. E932–E939. DOI: 10.1503/cmaj.190274.

49. Kimberly McKeirnan. A Pharmacist's Guide to Identifying the Signs and Symptoms of Herpes Zoster. URL: https://www.pharmacytimes.com/view/a-pharmacists-guide-to-identifying-the-signs-and-symptoms-of-herpes-zoster (Date of access: 30.04.2024).

50. Impact of pharmacist intervention on completion of recombinant zoster vaccine series in a community pharmacy / Tyler Regan et al. Journal of the American Pharmacists Association. 2021. Vol. 61. (4S). P. S12–S16. DOI: 10.1016/j.japh.2020.09.010.

51. Devraj R., Wilhelm M., Deshpande M. Consumer Perceptions of a Shingles Infograph Intervention and Vaccination Plans in Community Pharmacy Settings. Innovations in pharmacy. 2022. Vol. 13 (3). P. 10.24926. DOI: 10.24926/iip.v13i3.4918.

52. Prevalence and risk factors of herpes zoster infection in patients with rheumatic diseases not receiving biologic or targeted therapies / C. C. Mok et al. Clin. Rheumatol. 2023. Vol. 42 (4). P. 1019–1026. DOI: 10.1007/s10067-022-06450-2.

### **National University of Pharmacy**

Faculty <u>for foreign citizens' education</u> Department <u>of social pharmacy</u>

Level of higher education master

Specialty <u>226 Pharmacy</u>, industrial pharmacy Educational program <u>Pharmacy</u>

> APPROVED The Head of Department of Social Pharmacy

Alina VOLKOVA "15" of April 2024

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

## Ali El MOUSSAWI

1. Topic of qualification work: <u>«Study on the current approaches of pharmaceutical care to patients</u> with shingles»,

supervisor of qualification work: Iryna SURIKOVA, PhD, associated professor, approved by order of NUPh from  $\frac{``6^{th''}}{0}$  of February 2024 <u>No</u> 34

2. Deadline for submission of qualification work by the applicant for higher education: October 2024.

3. Outgoing data for qualification work: data from scientific and periodical literature in accordance with research objectives; reports of international organizations, statistical data.

4. Contents of the settlement and explanatory note (list of questions that need to be developed):

- to conduct a review of literary sources on social and economic burden of shingles issues;
- to investigate prevalence of shingles worldwide;
- to study the current approaches current approaches of pharmaceutical care to patients with shingles in accordance with international guidelines;
- to analyse of cost for shingles treatment and prevention;
- to analyze on the availability of shingles treatment;
- to study Shingles Prevention approach
- to explore possible role of pharmacists in shingles treatment and prevention

5. List of graphic material (with exact indication of the required drawings): Figures -10, Tables -5

## 6. Consultants of chapters of qualification work

Chapters	Name, SURNAME, position of consultant	Signature, date	
		assignment was issued	assignment was received
1	Iryna SURIKOVA, associated professor of higher	19.04.2024	19.04.2024
	education institution of department Social Pharmacy		
2	Iryna SURIKOVA, associated professor of higher	15.05.2024	15.05.2023
	education institution of department Social Pharmacy		
3	Iryna SURIKOVA, associated professor of higher	17.06.2024	17.06.2024
	education institution of department Social Pharmacy		

7. Date of issue of the assignment: <u>«15» of April 2024.</u>

Nº	Name of stages of qualification work	Deadline for the stages of qualification work	Notes
1	Analysis of scientific, periodic literature on the topic of qualification work	April 2024	done
2	Study of the prevalence of shingles worldwide and modern approaches to pharmacotherapy	May – June 2024	done
3	Analysis of cost for shingles treatment	September 2024	done
4	Explore role of pharmacist in shingle prevention	September 2024	done
5	Summary of the results of the study	October 2024	done
6	Finalizing the work, preparing the report	October 2024	done

An applicant of higher education

Ali El MOUSSAWI

Supervisor of qualification work

Iryna SURIKOVA

#### ВИТЯГ З НАКАЗУ № 34 По Національному фармацевтичному університету від 06 лютого 2024 року

1. Затвердити теми кваліфікаційних робіт здобувачам вищої освіти 5-го курсу 2 циклу Фм20\*(4,10д) 2024-2025 навчального року, ступінь вищої освіти «магістр», галузь знань 22 Охорона здоров'я, спеціальність 226 – Фармація, промислова фармація, освітньо-професійна програма – Фармація, денна форма здобуття освіти (термін навчання 4 роки 10 місяців). Мова навчання англійська.

№ 3/п	Прізвище, ім'я здобувача вищої освіти	Тема кваліфікаційної роботи		Посада, прізвище та ініціали керівника	Рецензент кваліфікаційної роботи
	по кафедрі	соціальної фарман	<b>tii</b>		
16.	Альмуссаві Алі мацевляния акультет цаготовки	Дослідження сучасних підходів до надання фармацевтичної допомоги хворим на оперізуючий лишай	Study on the current approaches of pharmaceutical care to patients with shingles	доцент Сурікова І.О.	доцент Бондарєва І. В.
Рек	громадян	ndeepe			

Вірно. Секретар

ΦA2.8-03-317

#### висновок

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

здобувача вищої освіти

«22» листопада 2024 р. № 329650060

Проаналізувавши кваліфікаційну роботу здобувача вищої освіти Альмуссаві Алі, Фм20\*(4,10д)-англ-01, спеціальності 226 Фармація, промислова фармація, освітньої програми «Фармація» навчання на тему: «Дослідження сучасних підходів до надання фармацевтичної допомоги хворим на оперізуючий лишай / Study on the current approaches of pharmaceutical care to patients with shingles», 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

Bm

Інна ВЛАДИМИРОВА

## **REVIEW**

## of scientific supervisor for the qualification work of the master's level of higher education of the specialty 226 Pharmacy, industrial pharmacy Ali El MOUSSAWI

# on the topic: «STUDY ON THE CURRENT APPROACHES OF PHARMACEUTICAL CARE TO PATIENTS WITH SHINGLES»

**Relevance of the topic.** Shingles is a common condition, particularly among older adults and individuals with weakened immune systems. The incidence of shingles has been increasing, making it essential for healthcare providers to understand effective care strategies. Studying pharmaceutical care approaches to shingles has broader public health implications, particularly in understanding disease transmission, prevention strategies, and resource allocation.

**Practical value of conclusions, recommendations and their validity.** The results of the research can be used as the basis for a set of measures to improve approaches to providing pharmaceutical care to patients with shingles.

**Assessment of work**. During the research the student showed a creative approach to the solution of the tasks, diligently conducted research work, summarized and presented the results properly, which indicates the awareness of the problem and the proper level of its development. The work is carried out at a sufficient scientific level. **General conclusion and recommendations on admission to defend.** In general, the qualification work of Ali El MOUSSAWI on the topic «Study on the current approaches of pharmaceutical care to patients with shingles» is performed at the proper level, meets the requirements of the "Regulations on the preparation and protection of qualification works at the National University of Pharmacy" and can be recommended for defense in the Examination commission.

Scientific supervisor

Iryna SURIKOVA

«7<sup>th</sup>» of November 2024

#### **REVIEW**

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

## Ali El MOUSSAWI

## on the topic: «STUDY ON THE CURRENT APPROACHES OF PHARMACEUTICAL CARE TO PATIENTS WITH SHINGLES»

**Relevance of the topic.** The relevance of studying current approaches to pharmaceutical care for patients with herpes zoster is multifaceted, encompassing clinical, educational, and public health aspects. As the incidence of herpes zoster continues to increase, understanding and improving pharmaceutical practices will be essential to improve patient outcomes, reduce disease burden, and optimize health care resources. Also Pharmacists play a vital role in the healthcare team, particularly in managing medications, providing patient education, and monitoring for drug interactions. Studying pharmaceutical care approaches highlights the pharmacist's role in the comprehensive management of shingles.

**Theoretical level of work.** The qualification work was carried out based on the study of scientific literary sources, processing and analysis of data on the stated topic. It should be noted that the work is presented logically, scientific and methodological developments and the results do not raise doubts about their validity and reliability. The selected methods and scope of research meet the goals and main objectives. The applicant conducted an analysis of publications by domestic and foreign authors on the subject under study. The generalized results of this analysis are systematized and reflected in the work.

Author's suggestions on the research topic. A comprehensive study was conducted to assess the current state of pharmaceutical care for patients with shingles. This study involved the systematic review and summarization of literary and statistical data, as well as an examination of the legal framework governing the provision of pharmaceutical care for shingles patients. The research also focused on exploring the evolving role of pharmacists in the treatment and prevention of shingles. **Practical value of conclusions, recommendations and their validity.** Acquaintance with the qualification work gives reasons to affirm the expediency of the conducted research and the practical value of the recommendations.

Disadvantages of work. Minor typos and grammatical errors are present in the text.

**General conclusion and assessment of the work.** According to the relevance and the results of the research qualification work of Ali El MOUSSAWI on the topic «Study on the current approaches of pharmaceutical care to patients with shingles» meets the requirements for master's works and can be recommended for official defense in the Examination commission.

Reviewer

Associate professor Iryna BONDARIEVA

«8<sup>th</sup>» of November 2024

## ВИТЯГ

## з протоколу засідання кафедри соціальної фармації № 5 від «08» листопада 2024 року

**ПРИСУТНІ:** зав. каф. доц. Аліна ВОЛКОВА, проф. Ганна ПАНФІЛОВА, проф. Вікторія НАЗАРКІНА, доц. Галина БОЛДАРЬ, доц. Наталія ГАВРИШ, доц. Тетяна ДЯДЮН, доц. Юлія КОРЖ, асист. Альміра НОЗДРІНА, доц. Вікторія МІЩЕНКО, доц. Ірина ПОПОВА, доц. Олександр СЕВРЮКОВ, доц. Ірина СУРІКОВА, доц. Любов ТЕРЕЩЕНКО, доц. Наталія ТЕТЕРИЧ.

## порядок денний:

Про представлення до захисту в Екзаменаційній комісії кваліфікаційних робіт.

СЛУХАЛИ: завідувачку кафедри доц. Аліну ВОЛКОВУ з рекомендацією представити до захисту в Екзаменаційній комісії кваліфікаційну роботу здобувача вищої освіти спеціальності 226 Фармація, промислова фармація Альмуссаві Алі на тему: «Дослідження сучасних підходів до надання фармацевтичної допомоги хворим на оперізуючий лишай».

Науковий керівник к. фарм. н., доцент кафедри СФ Ірина СУРІКОВА.

Рецензент к. фарм. н., доцент кафедри ММЗЯФ Ірина БОНДАРЄВА.

**УХВАЛИЛИ:** Рекомендувати до захисту в Екзаменаційній комісії кваліфікаційну роботу здобувача вищої освіти Альмуссаві Алі на тему: «Дослідження сучасних підходів до надання фармацевтичної допомоги хворим на оперізуючий лишай».

Завідувачка каф. СФ, доцент

Аліна ВОЛКОВА

Секретар, доцент

Наталія ТЕТЕРИЧ

## НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

### ПОДАННЯ ГОЛОВІ ЕКЗАМЕНАЦІЙНОЇ КОМІСІЇ ЩОДО ЗАХИСТУ КВАЛІФІКАЦІЙНОЇ РОБОТИ

Направляється здобувач вищої освіти Алі Альмуссаві до захисту кваліфікаційної роботи за галуззю знань <u>22 Охорона здоров'я</u> спеціальністю 226<u>Фармація, промислова фармація</u> освітньою програмою <u>Фармація</u> на тему: <u>«Дослідження сучасних підходів до надання фармацевтичної допомоги хворим на</u> оперізуючий лишай».

Кваліфікаційна робота і рецензія додаються.

Декан факультету \_\_\_\_\_ / Світлана КАЛАЙЧЕВА /

## Висновок керівника кваліфікаційної роботи

Здобувач вищої освіти Алі АЛЬМУССАВІ під час виконання кваліфікаційної роботи продемонструвала уміння працювати з науковими даними, проводити їх узагальнення, аналізувати та узагальнювати результати дослідження. Усі поставлені завдання відповідно до мети роботи було виконано у повному обсязі. Результати дослідження належним чином оброблені і представлені.

Таким чином, кваліфікаційна робота може бути рекомендована до офіційного захисту в Екзаменаційній комісії Національного фармацевтичного університету.

Керівник кваліфікаційної роботи

Ірина СУРІКОВА

«07» листопада 2024 р.

## Висновок кафедри про кваліфікаційну роботу

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

Завідувачка кафедри соціальної фармації

Аліна ВОЛКОВА

«08» листопада 2024 р.

Qualification work was defended

of Examination commission on

« 28 » November 2024

With the grade \_\_\_\_\_

Head of the State Examination commission,

DPharmSc, Professor

\_\_\_\_\_/ Oleh SHPYCHAK /