# SOME FACTORS RELATED TO THE DURATION OF INPATIENTS TREATMENT OF HERPES ZOSTER BY HE-NE LASER THERAPY AT CAN THO DERMATO-VENEREOLOGY HOSPITAL

***Ha Thi Thao Mai[2], Pham Qui Ngoc[1], Huynh Van Ba[2], Dang Dinh Hoa Quy[3], Nguyen Hong Ngan[2*], Trang Gia Vinh[2], Nguyen Lam Duy[2]***

*1. Public health station of Phung Hiep district, Hau Giang province*

*2. Can Tho University of Medicine and Pharmacy*

*3. Nam Binh Thuan General Hospital*

*[*]Corresponding author: nhngan.dongthap@gmail.com*

## *ABSTRACT*

***Background:*** *Shingles is caused by the Varicella-Zoster virus. The duration of hospitalization prolong will increase the risk of superinfection, costs for treatment, and quality of life.* ***Objectives****: (1) To describe clinical manifestations of herpes zoster inpatients at Can Tho Dermato-Venereology Hospital. (2) To survey some related factors related to the duration of hospitalization of herpes zoster by He-Ne laser therapy at Can Tho Dermato-Venereology Hospital.* ***Materials and methods:*** *the cross-sectional study on all shingles patients admitted to Can Tho Dermato-Venereology Hospital during the study period.* ***Results****: The proportion of group patients >60 years old was 54.9% higher than the group of patients ≤60 with 45.1%. Most shingles patients had secondary school degrees with 69%. The rate of patients admitted to the hospital early ≤5 days after symptom onset was 72.6%. Patients hospitalized for ≤7 days accounted for 77%. Patients with mild illness had the highest rate with 58.4%, and the rate of medium and severe illness with 36.3% and 5.3% respectively. Most patients had superinfection with 72.6%. The group of patients admitted to the hospital early ≤5 days had a shorter duration of hospitalization than the group of patients admitted to the hospital late after 5 days. In the patient's group with superinfection and more severe disease, the duration of hospitalization was longer than in the patient's group without superinfection and the severity of the disease was milder. All differences were statistically significant, p<0.05.* ***Conclusion****: Early treatment with He-Ne laser therapy helps to improve the severity of the disease and the state of superinfection and shorten the patient's hospital stay.*

***Keywords:*** *duration of hospitalization, herpes zoster, He-Ne laser, related factors.*

## I. INTRODUCTION

*Herpes zoster* is also known as "shingles". Shingles is an infection of a nerve and the skin around it. It is caused by the varicella-zoster virus, which remains in the ganglia after the first infection [5]. This disease causes pain and unilateral vesicular rash skin that grows along the peripheral nerves. It is self-limiting but can cause complications on the skin, eyes, nervous system, and internal organs if the disease is not treated properly. Therefore, the disease affects the work and quality of patients' life [6]. The disease occurs everywhere, all subjects with different levels of education and ages. But it usually increases with age, especially >50 years old [11].

Studies have shown that the length of the duration of hospitalization and treatment outcomes depend on factors such as pre-existing disease, days that the patients suffer from the disease before submission, wound care, superinfection, and severity in patients [8]. The prolonged duration of hospitalization can increase the superinfection, which has a worse effect on the treatment results of the Herpes zoster patient. Moreover, it causes costly hospitalization. The work and the quality of life of patients are affected. Therefore, finding out the factors that affect the length of stay in the hospital for inpatient treatment reduces the number of days in the hospital for treatment. It can help improve treatment outcomes and reduce hospitalization costs.

**Objectives:**

(1) To describe clinical manifestations of herpes zoster inpatients at Can Tho Dermato-Venereology Hospital.

(2) To survey some factors related to days of hospitalization of herpes zoster by He-Ne laser therapy at Can Tho Dermato-Venereology Hospital.

## II. MATERIALS AND METHODS

### 2.1. Subjects

All of the patients were diagnosed with shingles at Can Tho Dermato-Venereology Hospital.

#### 2.1.1. Standards for the selection

Based on the clinical and clinical features of the patient: vesicles arranged in clusters, interconnected streaks on an erythematous background scattered along the path of the peripheral nerves and on one side of the body [9].

Burning pain is before and after skin lesions.

#### 2.1.2. Standards for elimination

The disease does not cooperate with research or carries a mental illness.

#### 2.1.3. Place and time of the study

This research was conducted at Can Tho Dermato-Venereology Hospital from 5/2020 to 4/2021.

### 2.2. Methods

**2.2.1. Study design:** The cross-sectional descriptive study.

**2.2.2. Sample size:** The sample size was calculated with the following equation:

$$n = (z_{1-\alpha/2})^2 \times p(1- p)/d^2$$

According to research by author Nguyen Quy Thai. The percentage of severe illness at admission to the hospital was 39.4%. Substitute in to calculate n = 113 [12]. We collected 113 patients.

**2.2.3. Study contents:**

- General characteristics of research subjects: gender, age group, education level, and days that the patients suffer from the disease before submission.
- Clinical characteristics of patients with shingles during hospitalization: length of hospitalization, superinfection status, severity.
- Some factors related to the duration of hospitalization: days that the patients suffer from the disease before submission, superinfection status, and severity.

**2.2.4. Statistical analysis:** analyzing data with Excel 2016 and SPSS 20.0

## III. RESULTS

### 3.1. General features

**Table 1.** The distribution of patients by sex

| Sex | Frequency (n) | Percentage (%) |
|---|---|---|
| **Male** | 43 | 38.1 |
| **Female** | 70 | 61.9 |
| **Total** | 113 | 100 |

Comment: Most patients were female with 61.9%.

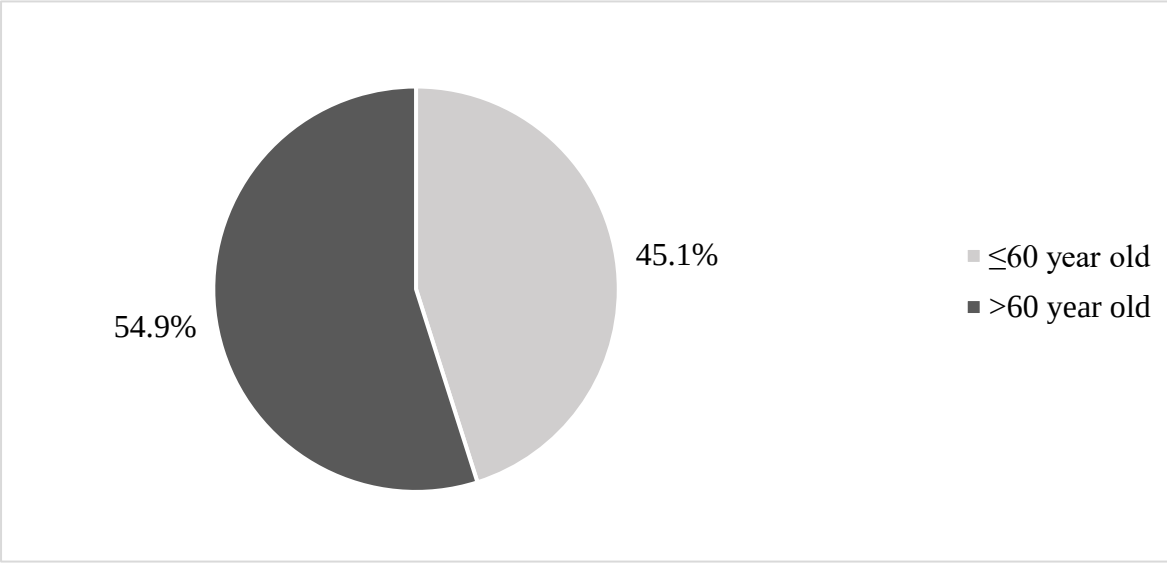


**Figure 1.** The age group distribution of the study subjects

Comment: The prevalence of patients in the age group >60 years old was 54.9% higher than the age group ≤60 with 45.1%.

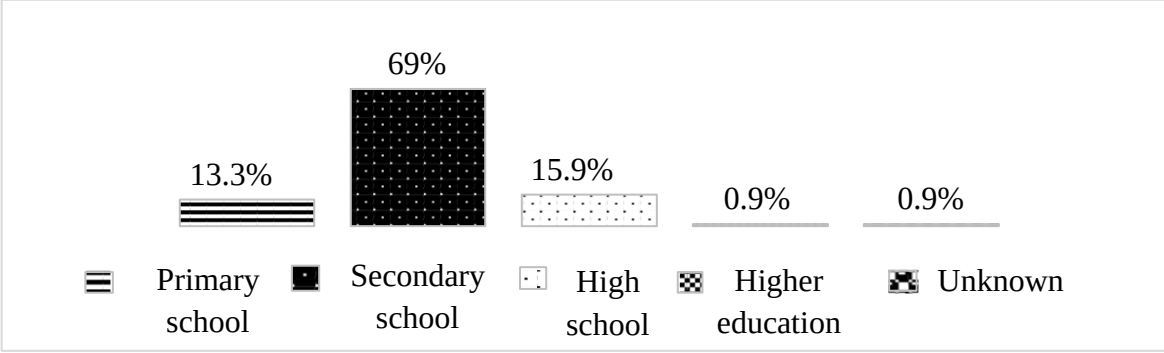


**Figure 2.** The distribution of education level of the study subjects

Comment: The rate of secondary school was the highest percentage (69%).

**Table 2.** The distribution of patients by days that the patients suffer from the disease before submission

| Days that the patients suffer from the disease before submission | Frequency (n) | Percentage (%) |
|---|---|---|
| **≤5 days** | 82 | 72.6 |
| **>5 days** | 31 | 27.4 |
| **Total** | 113 | 100 |

Comment: The rate of patients admitted to the hospital ≤5 days after symptoms onset with 72.6%, higher than the group of patients admitted to the hospital >5 days.

### 3.2. Characteristics of patients with shingles during hospitalization

**Table 3.** The distribution of patient groups by the length of hospitalization

| Duration of hospitalization | Frequency (n) | Percentage (%) |
|---|---|---|
| **≤7 days** | 87 | 77% |
| **>7 days** | 26 | 23% |
| **Total** | 113 | 100 |

Comment: Most patients were hospitalized for ≤7 days accounting for 77% compared with the group of patients who were hospitalized for >7 days (23%).

**Table 4.** The distribution of patients by superinfection status

| Superinfection | Frequency (n) | Percentage (%) |
|---|---|---|
| **Yes** | 82 | 72.6 |
| **No** | 31 | 27.4 |
| **Total** | 113 | 100 |

Comment: Most patients had superinfection accounting for 72.6%.

**Table 5.** The distribution of patients according to disease the severity

| Severity of the disease | Frequency (n) | Percentage (%) |
|---|---|---|
| **Mild** | 66 | 58.4 |
| **Moderate** | 41 | 36.3 |
| **Severe** | 6 | 5.3 |

Comments: Patients with the mild level had the highest rate with 58.4%; followed by moderate level with 36.3% and patient with severe disease made up of the lowest proportion with 5.3%.

### 3.3. Some factors related to the duration of hospitalization

**Table 6.** Relationship between the severity of the disease and duration of hospitalization

| Severity of the disease | Duration of hospitalization | | | | Total | Kendall |
|---|---|---|---|---|---|---|
| | ≤7 days | | >7 days | | | |
| | n | % | n | % | | |
| **Mild** | 55 | 63.2 | 11 | 42.3 | 66 | p=0.04 |
| **Moderate** | 30 | 34.5 | 11 | 42.3 | 41 | |
| **Severe** | 2 | 2.3 | 4 | 15.4 | 6 | |
| **Total** | 87 | 100 | 26 | 100 | 113 | |

Comment: The group of patients with more severe diseases had the duration of hospitalization than the group of patients with milder diseases. This difference was statistically significant ($p<0.05$).

**Table 7.** Relationship between days that the patients suffer from the disease before submission and the duration of hospitalization

| Days that the patients suffer from the disease before submission | Duration of hospitalization | | | | Total | | Chi-square |
|---|---|---|---|---|---|---|---|
| | ≤7 days | | >7 days | | | | |
| | n | % | n | % | n | % | |
| **≤5 days** | 70 | 85.4 | 12 | 14.6 | 82 | 100 | p<0.0001 |
| **>5 days** | 17 | 54.8 | 14 | 45.2 | 31 | 100 | |
| **Total** | 87 | 77 | 26 | 23 | 113 | 100 | |

Comment: The group of patients admitted to the hospital ≤5 days after the lesion was detected had a shorter duration of hospitalization than the group of patients who were admitted to the hospital late after 5 days. This difference was statistically significant ($p<0.05$).

**Table 8.** Relationship between superinfection condition and duration of hospitalization

| 1 | Duration of hospitalization | | | | Total | | Chi-square |
|---|---|---|---|---|---|---|---|
| | ≤7 days | | >7 days | | | | |
| | n | % | n | % | n | % | |
| **No** | 71 | 86.6 | 11 | 13.4 | 82 | 100 | p<0.03 |
| **Yes** | 16 | 51.6 | 15 | 48.4 | 31 | 100 | |
| **Total** | 87 | 77 | 26 | 23 | 113 | 100 | |

Comment: The group of patients with superinfection had a longer duration of hospitalization than the group without superinfection. This difference was statistically significant ($p<0.05$).

## IV. DISCUSSION

### 4.1. General features of study subjects

#### 4.1.1. Sex

In our study, the highest rate of shingles patients was female with 61.9% (70 patients). The rate of male patients accounted for 38.1% (43 patients). In the study of Dang Quy Thai, the prevalence of men and women was 51.5% and 48.5% respectively. The cause of this difference may be the differences in sample size and study population. Female patients tend to be more concerned with skin problems than male patients [11].

#### 4.1.2. Age group

In our study, the group of patients >60 years old accounted for 54.9% higher than the group of patients ≤60 years old (45.1%). The results are similar to the research of Dang Van Em with the percentage of elderly people (>70) being 68.33% [13]. Similarly, the study results of Nguyen Thi Thu Hoai recorded the rate of patients over 50 years old was 70.41% [13]. This result is consistent with the medical literature, the disease tends to predominate in the elderly group [11]. The studies of the author Fawziah Marra et al, as well as author Kosuke Kawai et al, both studies recognized advanced age as one of the risk factors for the disease [8].

#### 4.1.3. Education level

In our study, the percentage of patients in secondary school accounted for the highest rate at 69%, high school, primary school, and higher education levels accounted for 15.9%, 13.3%, and 0.9% respectively. The cause of this distribution may be due to the age distribution, the age subjects in the period mainly studied until secondary school.

#### 4.1.4. Days that the patients suffer from the disease before submission

The proportion of the patients' time suffers from the disease before submission ≤5 days accounted for the majority with 72.6%. This result is similar to the study of Vu Ngoc Vuong et al, the prevalence of patients who had illness time before being admitted to the hospital <5 days with 79.17% [13]. Similarly, Nguyen Lan Anh's research, the time of illness before admission <5 days with 71% [1]. The time for the patient at home from the onset of symptoms until hospitalization is late. It may be due to some subjective and objective factors. The most common factor is inadequate awareness of the illness, until the symptoms become severe, the patient will go to the doctor. Most patients have applied folk remedies, which prolongs the time to receive scientifically correct treatment methods. The objective factor is geographical distance because most of the patients in the provinces of the Mekong Delta come for examination and treatment at **Can Tho Dermato-Venereology Hospital**.

### 4.2. Characteristics clinical of patients with shingles during hospitalization

#### 4.2.1. Duration of hospitalization

Most of the patients were hospitalized for ≤7 days, accounting for 77%, higher than the group of patients who were hospitalized for >7 days (23%). This result is clinically relevant, most patients stay in hospital for 7 days, some patients ask to go home earlier for personal reasons and patients stay in hospital for a long time for medical reasons. The reason for the patient's long duration of hospitalization may be because the patient came to the hospital late for treatment after the onset and self-treatment of the wound with folklore,

causing the wound to become infected and spread, leading to a longer treatment time. In addition, underlying disease such as diabetes is one of the factors affecting the healing rate of the disease [10].

**4.2.2. Superinfection status**

In our study, the majority of patients had superinfection with 72.6% and patients without superinfection accounted for a lower rate with 27.4%. Because the majority of patients apply folk remedies, nonscience and incorrect treatment regimens, it is easy to lead to superinfection conditions. Many patients are admitted to the hospital with erosion and ulcer lesions that still have leaves or products of unknown origin [7]. As noted by author Farhang Babasmahmoodi, after a follow-up period of 3 months, 21 cases (15.9%) had superinfection [4].

**4.2.3. Severity of the disease**

In this study, patients with mild, moderate, severe level disease accounted for 58.4%, 36.3%, 5.3%, respectively. The cause of the difference may be due to the difference in the sample size of the study population, and the distribution of age and underlying diseases.

**4.3. Factors related to the duration of hospitalization**

**4.3.1. The relationship between days that the patients suffer from the disease before submission and the length of hospitalization**

In our study, the statistical analysis of two quantitative variables by Pearson correlation, if days that the patients suffer from the disease before submission is lengthen, duration of hospitalization is prolonged. The relation was statistically significant ($p<0.05$). Specifically, in the group of patients with illness before admission in the hospital ≤5 days, duration of hospitalization ≤7 days was 85.4% and duration of hospitalization >7 days was 14.6%. In the group of patients with illness before admission in the hospital >5 days and duration of hospitalization ≤7 days was 54.8%, duration of hospitalization >7 days was 45.2%. Thus, the group of patients admitted to the hospital ≤5 days after the lesion was detected had a shorter duration of hospitalization than the group of patients who were admitted to the hospital late after 5 days. This difference was statistically significant ($p<0.05$). Therefore, it can be concluded that early treatment with the right regimen is important in reducing the severity of injury and shortening the duration of hospitalization [2].

**4.3.2. The relationship between superinfection status and duration of hospitalization**

In our study, the group of patients with superinfection had a longer duration of hospitalization than the group without superinfection. In contrast, the group of patients without superinfection had a shorter of duration of hospitalization than the group with superinfection. The difference was statistically significant with $p<0.05$. Included in the group of patients without superinfection, duration of hospitalization ≤7 days was 86.6% and duration of hospitalization >7 days was 13.4%. In the group of patients with superinfection and duration of hospitalization ≤7 days was 51.6%, duration of hospitalization >7 days was 48.4%. The average of duration of hospitalization is approximately 7 days, in cases of superinfection on skin lesions, longer treatment time is required with the right treatment regimen to get effective and respond to antibiotics in therapy.

**4.3.3. The relationship between the severity of the disease and the length of hospitalization**

In our study, the group of patients with more severe diseases had longer of the duration of hospitalization than the group of patients with milder diseases, this difference was statistically significant ($p<0.05$). Included in the group of patients with a hospital stay of ≤7 days, the proportion of patients with mild, severe, moderate disease levels was 63.2%, 34.5% and 2.3% respectively. In the group of patients with duration of hospitalization >7 days, the proportion of patients with the mild, severe, moderate disease was 42.3%, 42.3% and 15.4% respectively. So that patients with the severe diseases need to stay in the hospital for longer treatment. Factors affecting the length of duration of hospitalization can be mentioned as the correct treatment regimen, especially combined with laser projection, including the He-Ne laser. Laser He-Ne helps to reduce the severity of the disease, wound heal faster that leading to shorten duration of hospitalization [3].

## V. CONCLUSIONS

Most Herpes zoster patients were female with 61.9%, male with 38.1%. The rate of patients in the age group >60 years old accounted for 54.9% and the age group ≤60 with 45.1%. Secondary school accounted for the highest percentage (69%). Patients with time from symptom onset to hospital admission ≤5 days accounted for the majority (72.6%).

Most of the patients were hospitalized for ≤7 days with 77%. Patients with the mild disease had the highest rate with 58.4%, moderate with 36.3% and severe with 5.3%. Patients had superinfection with 72.6%.

Days that the patients suffer from the disease before submission, the severity of the disease, and the state of superinfection are factors that correlate with the length of duration of hospitalization. Patients with more severe diseases have longer of duration of hospitalization. Early hospitalization time is a crucial factor to reduce the duration of hospitalization. Scientific treatment method, especially combined with He-Ne laser treatment, helps to reduce the severity and avoid factors causing superinfection. This reduces duration of hospitalization as well as costs for the patient.

## REFERENCES

1. Nguyen Lan Anh, Dang Van Em (2018), "Study on some immune changes in Zona", *Journal of Clinical Medicine 108,* 13(9), pp. 264-268.
2. Boris Ehrenstein et al (2019), "Diagnosis, treatment and prophylaxis of herpes zoster", *Z Rheumatol*, 79(10), pp. 1009-1017.
3. Désirée van Oorschot et al (2021), "A systematic literature review of herpes zoster incidence worldwide", *Human Vaccines & Immunotherapeutics,* https://doi.org/10.1080/21645515.2020.1847582.
4. Farhang Babamahmoodi et al (2015), "Clinical Manifestations of Herpes Zoster, Its Comorbidities, and Its Complications in North of Iran from 2007 to 2013", *Neurol Res Int,* 2015: 896098.
5. Folusakin Ayoade et al (2020), *Varicella Zoster*, StatPearls.
6. To Thi Thuy Hang, Vo Hong Khoi (2018), "Study on characteristic of pain in Zona according to Visual analogue scale (VAS)", *Vietnam Medical Journal*, 1(467), pp. 100-103.

7. Ho Chi Minh city Hospital of Dermato-Venereology (2019), *Guidelines for the diagnosis and treatment of Dermatological Diseases*, Medical Publisher, Ho Chi Minh.
8. Kosuke Kawai, Barbara P.Yawn (2017), "Risk Factors for Herpes Zoster: A Systematic Review and Meta-analysis", *Mayo Clinic Proceedings*, 92 (12), pp. 1806-1821.
9. National Hospital of Dermatology-Venereology & Hanoi Medical University (2019), *Clinical image, diagnosis & treatment in Dermatology*, Medical Publisher, Ha Noi.
10. Peter G. E. Kennedy et al (2018), "Clinical Features of Varicella-Zoster Virus Infection", *Viruses*, 10(11), pp. 609.
11. Pragya A. Nair et al (2020), *Herpes Zoster*, StatPearls.
12. Nguyen Quy Thai (2011), "Evaluation of combined treatment results with laser Hene therapy for Zona at Dermatology Department in Thai Nguyen Central General Hospital", *Journal of Science and Technology*, 81(5), pp. 147-152.
13. Vu Ngoc Vuong et al (2019), "Clinical efficacy of electroacupuncture combined with acyclovir in the treatment of Zona", *Vietnam Medical Journal*, 2(479), pp. 30-33.

(Received: 05/10/2022 – Accepted: 04/12/2022)