



Evaluation of the Knowledge of Nursing Student for Burn Care

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Abstract. Introduction: Burn injuries are of great medical, social, and economic importance, as they have a severe impact on the life of the victim, his family, and society. They are accompanied by severe pain at the site, skin damage of varying degrees and areas leading to impaired function in the affected body area, a state of shock directly threatening life, and late effects including gross cicatrices and keloids causing disfigurement and disability. The treatment of burns and their consequences is long-term and requires specialized health care, as well as the use of expensive medical devices.

All of the above makes burn care education an essential part of the curriculum for the students majoring in “Nursing” at the Medical University - Pleven. Burn care is partially covered in 4 disciplines - Surgery, Anesthesiology and resuscitation, Operative and dressing techniques, and Nursing care for patients with surgical diseases. Each allocates one hour of lectures and at least two hours of exercises on this subject. Discovering theoretical and practical gaps in the training of students in the “Nursing” specialty related to the provision of timely and adequate care for burns will help to supplement and improve the knowledge and skills within the regular training of the students.

Purpose: To evaluate knowledge about burn disease and the readiness of nursing students to participate in care for these patients.

Methods: A survey with 19 questions for burn management was performed with 112 nursing students from Medical University-Pleven, Bulgaria, in February 2023. Statistical analysis was performed with IBM SPSS v26 using descriptive and nonparametric methods. План – проектът на научното изследване и анкетната карта за студентите са одобрени от Комисията по етика на научно-изследователската работа при МУ – Плевен.

Results: First to fourth-year students correctly define burn as a disease. All students know the medications used to treat burns. Second- and third-year students are more informed about the preferred medications in treating severe burns than first- and fourth-year students, which is a statistically significant difference. 80% of the respondents correctly indicated the critical hours in treating patients with extensive burns.

Conclusion: The burns are relatively well covered in our current curriculum. Still, some reinforcement is needed in practical aspects, especially in the fourth year of nursing education.

Keywords: Nursing education · Burn care

1 Introduction

Burns are a daily occurrence in modern society's domestic, professional, and school environments. They are an essential part of emergencies, leading to severe consequences for the health and life of the victims [1, 2]. Regardless of the etiological factor (flame, scald, chemical, electricity), the local pathophysiological mechanisms of damage are similar and manifest in extensive tissue destruction combined with increased capillary permeability [17]. Local burn damage negatively affects all organs and systems of the body and can cause a severe general illness called "Burn Disease," which can directly threaten life. Treatment is a complex and lengthy process. It begins at the site of the accident and ends months and even years later and includes three stages - pre-hospital behavior, treatment of the trauma in a hospital facility, and treatment of the consequences [4]. The pre-hospital behavior and the provision of adequate first aid at the accident scene are essential both for saving the victim's life and for the success of his subsequent treatment, and for preventing the late consequences of the trauma. First aid principles for extensive burns are subject to the general rules for resuscitation actions at the accident scene [12]. These include immediate removal from the environment, ensuring a clear airway and adequate breathing, and maintaining the functioning of the cardiovascular system. At least two venous sources must be provided for subsequent infusion therapy [13, 17]. The management of local injuries at the accident scene consists of removing burning clothing, cleaning the area thoroughly, and wrapping it in sterile clothing. The treatment continues in the ER of the relevant hospital and is expressed in the maintenance of essential vital functions and adequate replacement therapy and analgesia [9].

From there, the patient is transferred to the Department of Plastic, Restorative, Reconstructive and Aesthetic Surgery, where urgent, local treatment of burns is carried out, connected with mechanical cleaning of the surfaces, washing them with an antiseptic solution and subsequent dressing with antiseptic silver creams (Dermazin) and ointments (Iodacept, Betadine). Early necrosectomies and skin transplants can be performed in case of deeper burns. Resuscitation with a Ringer Lactate solution (Hartman) in amounts calculated by Parcland's formula must be started in case of shock [14, 15]. An infusion of fresh frozen plasma (FFP) can be added at a slightly later stage in these cases. Subsequent local treatment, in addition to dressings, may also include late skin grafts [10]. After receiving local and systemic treatment, the patient undergoes many rehabilitation procedures. If local consequences of the burn (keloids, contractures) occur in the coming months and years, plastic surgery should be performed in specialized medical facilities [5, 7]. Burns is a severe medical and social problem. It requires the synchronized actions of a multidisciplinary team, including doctors and healthcare specialists from all health system structures [8]. The attention of specialists and institutions dealing with it should be directed to public awareness, health education of adolescents, and prevention campaigns in order to reduce the frequency (primary prevention), the severity (secondary prevention), and the complications of this insidious Disease (tertiary prevention) [17, 18].

2 Objective

To evaluate knowledge about burn disease and the readiness of nursing students to participate in care for these patients.

3 Method

Documentary, sociological - direct anonymous survey containing 19 questions. The results were processed with IBM SPSS v.26 statistical programs using descriptive statistics, Chi-Squared test, and correlations. The questionnaire and survey were approved by the Committee on Ethics of Scientific Research at the Medical University - Pleven.

4 Results and Discussion

The study was conducted in the period January - February 2023. One hundred twelve Medical University - Pleven students studying in the "Nursing" specialty were covered. The average age of the individuals in the sample was $25 \pm 8,711$ years. The sample included 6 (5.4%) men and 106 (94.6%) women (Fig. 1).

The distribution of the students according to the course of study is as follows: 29 (25.9%) in the I course, 37 (33.3%) in the II course, 24 (21.4%) in the III course and 22 (19.6%) in the IV course (Fig. 2).

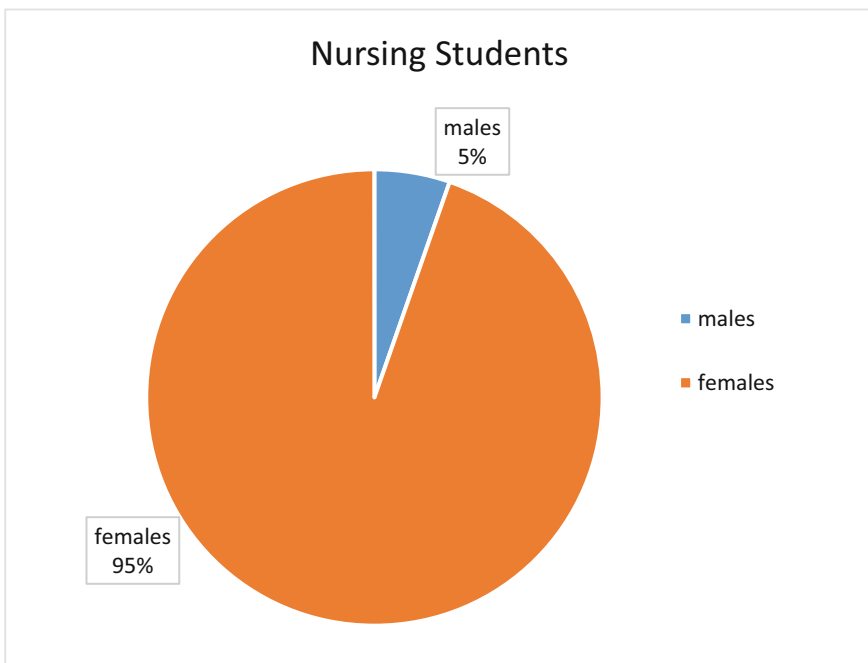


Fig. 1. Distribution of students by gender

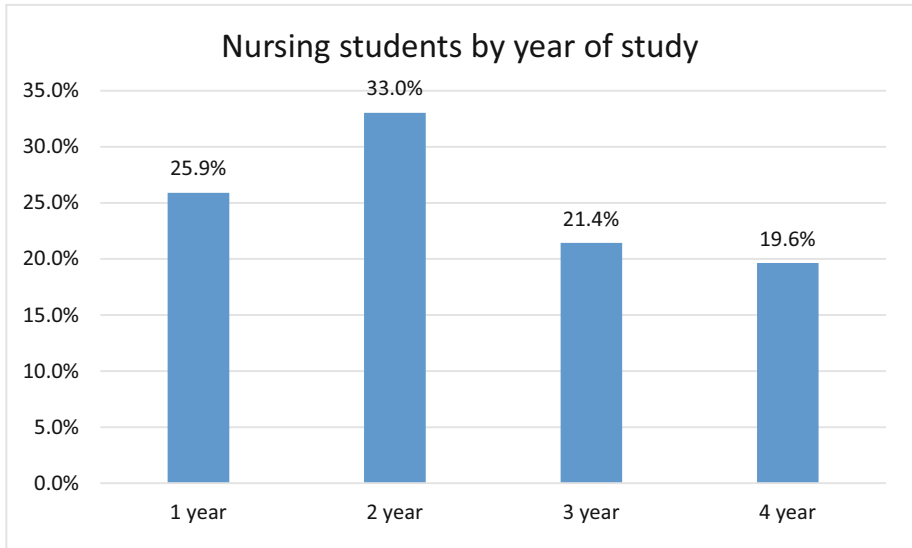


Fig. 2. Distribution of respondents according to course of study

When asked What is burning? One-third of the students - 34 (30.4%) gave a correct answer, 46 (41.1%) - an incomplete answer, 24 (21.4%) - did not correct, and 8 (7.1%) did not answer (Fig. 3).

There was a statistically significant relationship between respondents' answers for a definition of burn and their year of study ($\chi^2 = 37.852$, $df = 9$, Cramer's $V = 0.336$, p

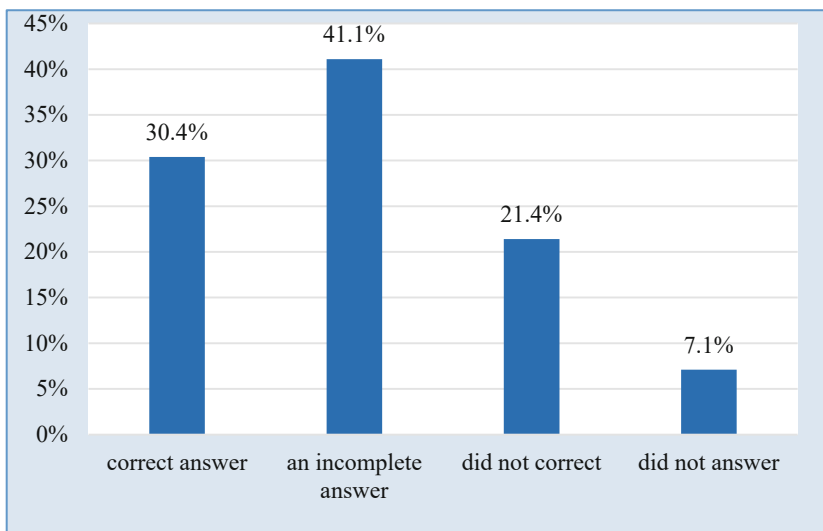


Fig. 3. Distribution of answers to the question: "What is burning?"

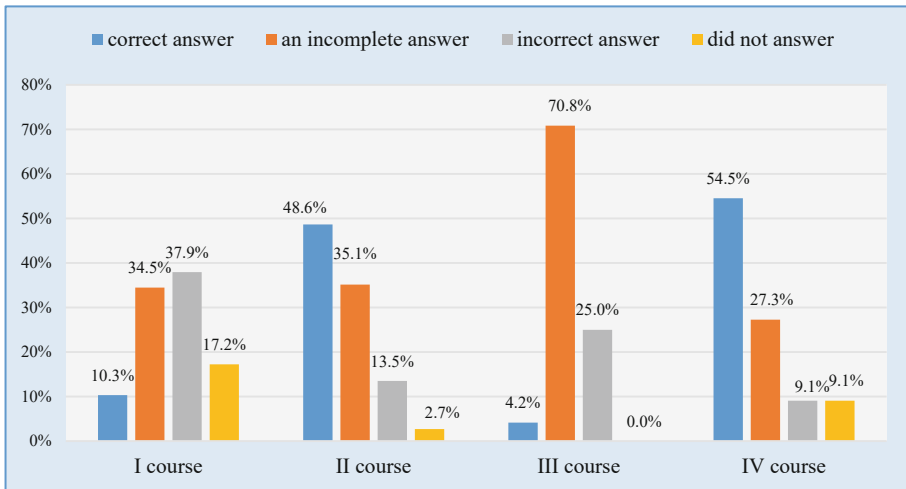


Fig. 4. Distribution of answers for a definition of burn and students year of study

= 0.000). 34 (30.4%) gave the correct answer: 3 (10.3%) from the I course, 18 (48.6%) from the II course, 1 (4.2%) from the III course and 12 (54.5%) from the IV course. 46 (41.1%) gave an incomplete answer: 10 (34.5%) from the I course, 13 (35.1%) from the II course, 17 (70.8%) from the III course, and 6 (27.3%) from the IV course (Fig. 4).

The distribution of students' answers to the question about the types of burns shows that 87 (77.7%) know all types of burns, but 17 (15.2%) - mainly recognize thermal burns, 6 (5.4%) - electrical, and 2 (1.8%) - chemical. No statistically significant relationship was found between respondents' answers about the types of burns they know and the training course ($\chi^2 = 10.591$, $df = 9$, Cramer's $V = 0.178$, $p = 0$) (Fig. 5).

Electrical burns can cause serious injuries that do not are obvious. Often, electric current entry and exit points may not be easily identified; therefore, only 6 (5.4%) recognize them. Students also know burns can occur when the skin comes into contact with certain chemicals. They correctly state that chemical burns can be classified by their pH or acidity and are seen primarily on the household. The respondents are aware that the burn can occupy a different area, and the engaged thickness of the skin is determined by several degrees. The answers to the question about the measurements of burns according to the degree of severity show that students distinguish first, second, and third degrees, and 101 (90.2%) know all three degrees in detail.

A statistically significant relationship was found between respondents' answers to the third question and the course of the study ($\chi^2 = 9.982$, $df = 3$, Cramer's $V = 0.299$, $p = 0$). Care for burn patients involves a series of medications and care that are used as the effects of the burn progress. When asked, "Does burning weaken the body's immune system?" the distribution of answers is as follows: 95 (84.8%) gave a correct answer - "Yes," 12 (10.7%) - did not know, and 5 (4.5%) - not true (Fig. 6).

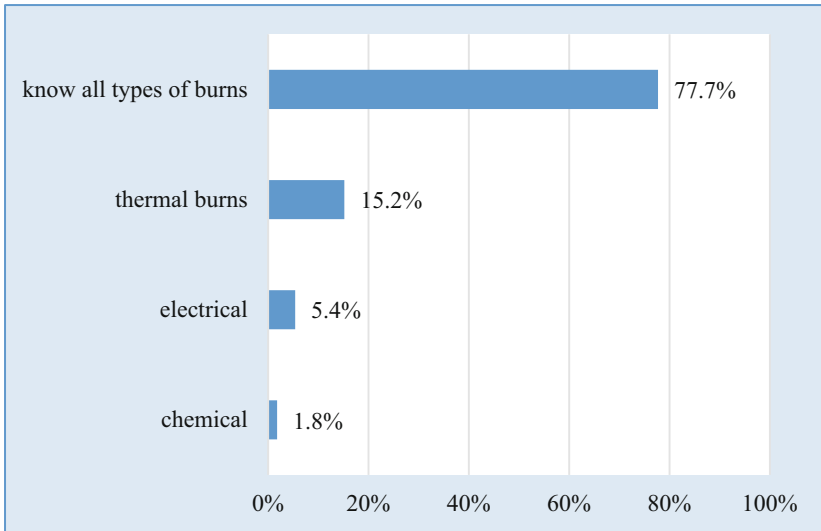


Fig. 5. Distribution of answers to the question: “What types of burns you know?”

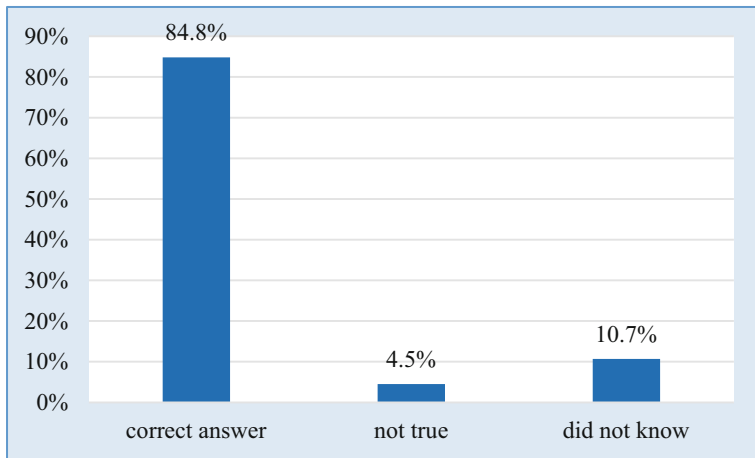


Fig. 6. Distribution of answers to the statement: “Does burning weaken the body’s immune system?”

Furthermore, a statistically significant relationship was found for this question between the respondents’ answers and the training course ($\chi^2 = 14.322$, $df = 6$, Cramer’s $V = 0.253$, $p = 0.026$). In medical practice, it is known that adequate measures in providing first aid to these patients are of great importance for the further favorable course of the disease. They can be divided chronologically into different stages from the moment of the accident until the patient reaches the hospital [4–6, 15]. The answers to the question about the phases of a deep burn were analyzed. We found that 73 (65.2%) of the

respondents know all the phases of the burn disease. Only 26 (23.2%) - indicate only the phase of shock, 5 (4.5%) - toxic infection, and 8 (7.1%) - recovery as the last stage (Fig. 7).

A statistically significant relationship was found between respondents' knowledge of burn phases and the course of the study ($\chi^2 = 27.161$, $df = 9$, Cramer's $V = 0.284$, $p = 0.001$). The second-year students give complete answers to this question (Fig. 8).

The curriculum, which includes burn care in the second course, can explain this. Respondents were also asked about the purpose of treatment and care. To this question, we received the following distribution of answers: 3 (2.7%) - formation of soft, elastic scars, 12 (10.7%) - prevention of local infection, 21 (18.8%) - improvement of tissue viability and activation of the body's defenses, 76- (67.9%) – all of the above answers (Fig. 9).

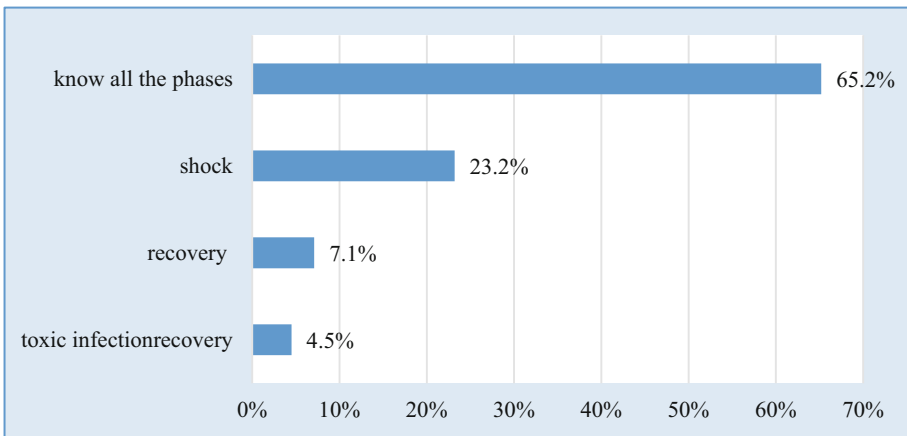


Fig. 7. Distribution of answers to the question: “What are the phases of the burn?”

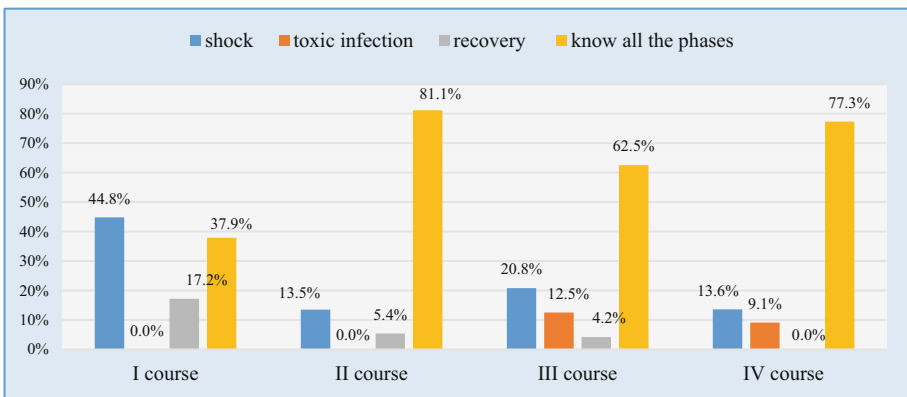


Fig. 8. Distribution of students by year of study and definition of the phases of the burn

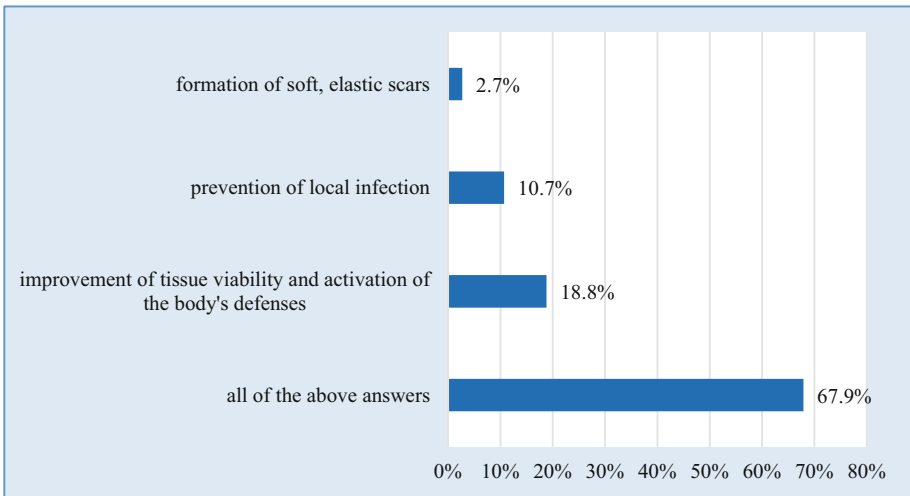


Fig. 9. Distribution of answers to the question: “What are the purpose of treatment and care?”

All surveyed students know that the degree of damage a burn can cause depends on the type of burn, its location, depth, and area. The latter is measured as a percentage of the total affected body area. The “rule of nines” (of Wallace) is often used for this, where the calculation is based on the fact that the surface of the body is divided into 11 parts of 9% + 1% for the perineum, or the rule that the patient’s palm represents 1% of his body surface. Thirty-eight (33.9%) of the surveyed students know both rules; 23 (20.5%) know the rule that the patient’s palm represents 1.5% of his body surface, and 51 (45.5%) the Wallace rule [3, 7, 8, 10, 11] (Fig. 10).

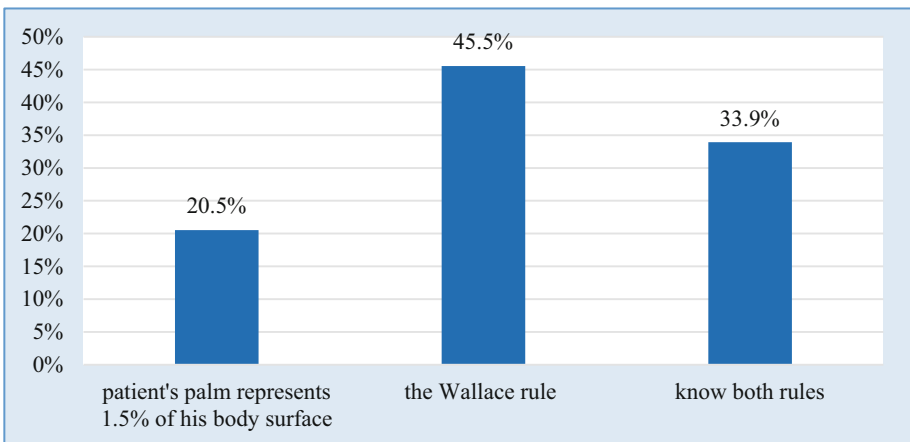


Fig. 10. Distribution of answers to the question: “What are the rules for determining the burn area?”

A statistically significant relationship was found between respondents' answers to the rules for determining the burn area and the training course ($\chi^2 = 27.397$, $df = 6$, Cramer's $V = 0.350$, $p = 0.000$). The respondents are well aware of the role of antibiotics in the treatment of burns, and to this question, we received the following answers: 70 (62.5%) of the students answered that they are used to treat a bacterial infection, 2 (1.8%) that they have no role in the treatment of the disease and 40 (35.7%) that they are administered prophylactically (Fig. 11).

The distribution of the student's responses to the most common burn complications is illustrated in the Table 1.

It is again seen that second-year students give complete answers. Table 2 illustrates the answers to the question: "What measures do you take to prevent burn complications?". The answer - Quick response and adequate treatment measures take precedence, followed by strict hygiene and early specific treatment.

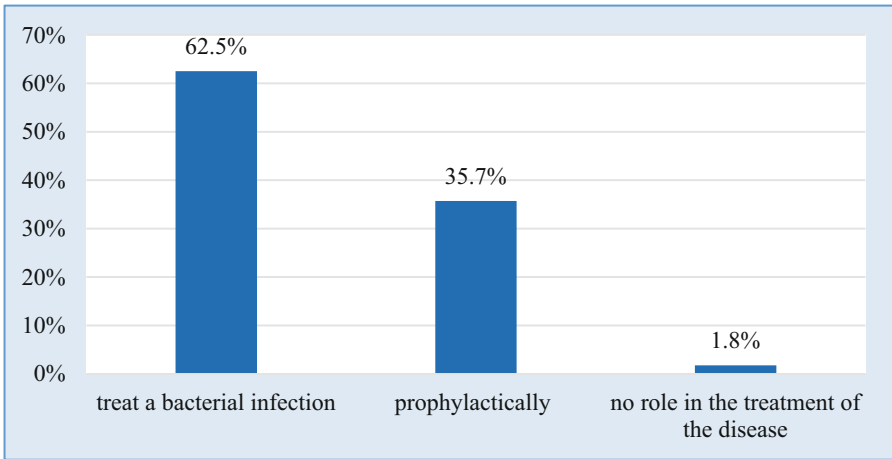


Fig. 11. Distribution of answers to the question: "What is the role of antibiotics in the treatment of burns?"

Table 1. Distribution of respondents' answers by training course to the question: What are the most common complications of burns?

Complications	Year of Study				Total
	I	II	III	IV	
Infection	17 (7.9%)	23 (10.6%)	15 (6.9%)	15 (6.9%)	70 (32.4%)
Sepsis	13 (6.0%)	21 (9.7%)	10 (4.6%)	13 (6.0%)	57 (26.4%)
Shock	19 (8.8%)	26 (12.0%)	12 (5.6%)	15 (6.9%)	72 (33.3%)
Inhalation injury	4 (1.9%)	7 (3.2%)	3 (1.4%)	3 (1.4%)	17 (7.9%)
Total	53 (24.5%)	77 (35.6%)	40 (18.5%)	46 (21.3%)	216 (100.0%)

Table 2. Distribution of answers to the question: What measures do you take to prevent complications from burns? by course of study

Measures to prevent Complications	Year of Study				Total
	I	II	III	IV	
Avoiding unnecessary contacts	1 (0.5%)	6 (2.9%)	2 (1.0%)	0 (0.0%)	9 (4.4%)
Early specific treatment	12 (5.9%)	22 (10.7%)	7 (3.4%)	10 (4.9%)	51 (24.9%)
Strict Hygiene	10 (4.9%)	28 (13.7%)	7 (3.4%)	10 (4.9%)	55 (26.8%)
Fast reaction and proper management	22 (10.7%)	32 (15.6%)	22 (10.7%)	14 (6.8%)	90 (43.9%)
Total	45 (22.0%)	88 (42.9%)	38 (18.5%)	34 (16.6%)	205 (100.0%)

5 Conclusions

1. First to fourth-year students correctly define burn as a disease. In addition all students know the medications used to treat burns. A statistically significant relationship was found between the answers of the respondents for the preferred medications in the treatment of severe burn and the year of study. Finally, 80% of the respondents correctly indicated the critical hours in treating patients with extensive burns. Our current curriculum covers burns care relatively well. Still, some reinforcement is needed in practical aspects, especially in the fourth year of nursing education.

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