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Original Article

Nursing training and pre-hospital care: what do future professionals know?

Formação em enfermagem e atendimento pré-hospitalar: o que sabem os futuros profissionais?

Formación en enfermería y atención prehospitalaria: ¿qué saben los futuros profesionales?

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ABSTRACT

Objective: To assess the knowledge of final-year undergraduate nursing students regarding pre-hospital care, focusing on the practical application of updated protocols, such as XABCDE, and to identify potential gaps in their academic training. **Methodology:** This is a descriptive, exploratory, and quantitative study conducted with students from a private higher education institution in Curitiba, Paraná. Data were collected using a structured questionnaire with sociodemographic variables and technical questions based on the Prehospital Trauma Life Support (10th edition, 2024) and analyzed using descriptive statistics. **Results:** Twenty-nine students participated, mostly women, single, and self-identified as White, with a mean age of 25.3 years. Overall performance was satisfactory, with a mean score of 67.6% and a median score of 81.0%. **Conclusion:** The findings indicate consistent theoretical knowledge in the main pillars of Prehospital Trauma Care, but also highlight gaps in critical areas. This reinforces the importance of active methodologies and realistic simulations to consolidate learning, integrate theory and practice, and strengthen safety in care.

DESCRIPTORS:
Nursing Students; Nurses; Emergency Nursing; Prehospital Care; Professional Competence.

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RESUMO

Objetivo: Avaliar o conhecimento de estudantes do último período do Curso de Bacharelado em Enfermagem sobre o Atendimento Pré-hospitalar, com foco na aplicação prática de protocolos atualizados, como o XABCDE, e identificar possíveis lacunas na formação acadêmica. **Metodologia:** Estudo descritivo, exploratório e quantitativo, realizado com acadêmicos de uma instituição privada de ensino superior em Curitiba-PR. Os dados foram coletados por meio de questionário estruturado, com variáveis sociodemográficas e questões técnicas baseadas no PHTLS (10ª edição, 2024), e analisados por estatística descritiva. **Resultados:** Participaram 29 estudantes, majoritariamente mulheres, solteiras e autodeclaradas brancas, com média de idade de 25,3 anos. O desempenho geral foi satisfatório, com média de acertos de 67,6% e mediana de 81,0%. **Conclusão:** Os achados indicam conhecimento teórico consistente nos principais pilares do Atendimento Pré-Hospitalar em trauma, mas também evidenciam lacunas em áreas críticas. Reforça-se, assim, a importância de metodologias ativas e simulações realísticas para consolidar o aprendizado, integrar teoria e prática e fortalecer a segurança na assistência.

DESCRITORES:

Estudantes de Enfermagem; Enfermeiros; Enfermagem em Emergência; Atendimento Pré-Hospitalar; Competência Profissional.

RESUMEN

Objetivo: Evaluar los conocimientos de los estudiantes de último año de enfermería sobre la atención prehospitalaria, con foco en la aplicación práctica de protocolos actualizados, como el XABCDE, e identificar posibles vacíos en su formación académica. **Metodología:** Se trata de un estudio descriptivo, exploratorio y cuantitativo realizado con estudiantes de una institución privada de educación superior en Curitiba, Paraná. Los datos se recolectaron mediante un cuestionario estructurado con variables sociodemográficas y preguntas técnicas basadas en el PHTLS (10.ª edición, 2024) y se analizaron mediante estadística descriptiva. **Resultados:** Participaron veintinueve estudiantes, en su mayoría mujeres, solteros y autoidentificados como blancos, con una edad media de 25,3 años. El desempeño general fue satisfactorio, con una puntuación media del 67,6% y una mediana del 81,0%. **Conclusión:** Los hallazgos indican un conocimiento teórico consistente en los principales pilares de la Atención Prehospitalaria del Trauma, pero también destacan lagunas en áreas críticas. Esto refuerza la importancia de las metodologías activas y simulaciones realistas para consolidar el aprendizaje, integrar la teoría y la práctica y fortalecer la seguridad en la atención.

DESCRIPTORES:

Estudiantes de Enfermería; Enfermeros; Enfermería de Urgencias; Atención Prehospitalaria; Competencia Profesional.

INTRODUCTION

Pre-hospital care (PHC) is defined as the initial and immediate assistance provided to victims in urgent or emergency situations, at the scene of the incident, with the aim of ensuring basic or advanced life support and promoting safe transport to the referral unit. This type of care represents a fundamental link in the chain of survival, contributing significantly to the reduction of morbidity and mortality associated with critical events[1].

The organization of PHC in Brazil was regulated by Ordinance GM/MS No. 2,048/2002, which establishes the technical, operational and logistical guidelines within the scope of the Unified Health System (SUS), promoting the integration of health services with pre-hospital emergency actions[2]. An

emblematic example of this operationalization is the Mobile Emergency Care Service (SAMU), established by Ordinance No. 1,864/2003, which operates with multidisciplinary teams specialized in rapid interventions, expanding access to health in situations of imminent risk[3].

The origins of prehospital care (PHC) date back to the battlefields, where the need for immediate care for wounded soldiers arose. From the 1960s onwards, the model was systematized in the United States with the creation of Emergency Medical Services (EMS), culminating in the publication, in 1971, of the "Orange Book" by the American Academy of Orthopaedic Surgeons (AAOS), considered the first technical-educational manual for prehospital trauma support[4]. Since then, PHC has incorporated evidence-based guidelines and standardized protocols, such as XABCDE, which prioritizes the control of severe hemorrhages, airway assessment, ventilation, circulation, neurological status, and complete patient exposure.

The XABCDE protocol, widely disseminated by institutions such as Prehospital Trauma Life Support (PHTLS), stands out as an essential tool for making quick and accurate decisions in hostile environments. Its application requires not only technical mastery, but also agile and integrated clinical reasoning, indispensable attributes for safe and efficient performance in highly complex contexts[5].

In this scenario, the role of the nurse stands out, a professional with legally attributed competence to act in pre-hospital care, according to COFEN Resolution No. 375/2011. Their role encompasses both direct assistance and leadership of teams and management of care in critical situations, making it essential that their training includes technical-scientific skills, critical thinking, and protocol-based practice[6].

Given the growing demand for professionals prepared to intervene in emergency situations, it becomes fundamental to investigate the level of knowledge of Nursing students about pre-hospital care. This analysis allows reflection on the quality of the academic training offered and to identify possible gaps that may compromise the safety and effectiveness of the care provided to the population.

Pre-hospital care constitutes a critical stage of health care in urgent and emergency situations, being decisive for the survival and prognosis of victims. In this context, nursing professionals play a fundamental role, both in direct care and in making quick and safe decisions. Assessing the level of knowledge of nursing students about pre-hospital care is essential, since these future professionals may work in pre-hospital emergency services, such as the Mobile Emergency Care Service (SAMU), soon after entering the job market.

Identifying gaps in theoretical and practical training can support improvements in the teaching-learning process, contributing to the quality of care provided and patient safety. Adequate training in pre-hospital care requires not only technical mastery, but also clinical skills, critical thinking, and the ability to act in complex and high-risk contexts[7].

According to data from the Ministry of Health, external causes—including traffic accidents, falls, drownings, and violence—remain among the leading causes of mortality in Brazil, especially among the young population, making rapid and efficient care essential for reducing morbidity and mortality[8]. Therefore, it is essential that professionals are properly prepared to act based on recognized protocols, such as XABCDE, and on updated life support practices in the pre-hospital environment.

Therefore, this study is justified by the need to investigate the preparedness of Nursing students in relation to pre-hospital care, contributing to the strengthening of academic training, the updating of curricula, and the continuous improvement of care in urgent and emergency situations within the Brazilian Unified Health System (SUS).

OBJECTIVE

To assess the knowledge of final-year undergraduate nursing students regarding pre-hospital care, focusing on the practical application of updated protocols, such as XABCDE, and to identify potential gaps in their academic training.

METHODOLY

Study Type

This is a descriptive, exploratory study with a quantitative approach. Data collection was carried out through the application of a structured questionnaire, specifically designed to assess the participants' level of knowledge about acting in urgent and emergency situations in the context of pre-hospital care.

Sample

The sample was defined by convenience, considering the researchers' accessibility to the Educational Institution, and the availability and acceptance of students regularly enrolled in the 8th semester of the Bachelor's Degree in Nursing.

Inclusion and Exclusion Criteria

The inclusion criteria were: being duly enrolled in the indicated semesters and shifts, being 18 years of age or older, having time to participate in the study, and signing the Informed Consent Form. Students who were not enrolled in the mentioned semesters and who were under 18 years of age were excluded.

Study Protocol

Potential participants were contacted through a class messaging group on the WhatsApp® application, where an explanatory invitation was shared along with a link to the electronic research form, created on the Google Forms® platform. Interested students could access the questionnaire after reading

and agreeing to the digital Informed Consent Form, available on the first page of the form.

The data collection instrument included questions related to knowledge about pre-hospital care (PHC), as well as sociodemographic characterization questions, such as sex, age, and prior training in the health field, with the aim of contextualizing the participants' profile. Before applying the instrument, a pilot test was conducted with five randomly selected 8th-semester students, who demonstrated good understanding and applicability of the instrument, making it unnecessary to make adjustments to the questionnaire.

The guiding question of the research was: What is the knowledge of undergraduate nursing students regarding their role in pre-hospital care?

Data Analysis

The data obtained through the questionnaires were organized and tabulated in Microsoft Excel® spreadsheets, used for descriptive statistical analysis. Initially, the completeness of the data was verified, and incomplete or inconsistent forms were excluded.

Sociodemographic variables (such as age, sex, and prior education) were described in terms of absolute and relative frequencies (percentages). Responses regarding knowledge about pre-hospital care (PHC) were analyzed using frequency distribution to identify the percentage of correct answers and the pattern of responses from participants.

The data were presented in tables and graphs, facilitating the interpretation of the results. The analysis aimed to highlight the students' level of knowledge regarding appropriate conduct in the context of PHC, according to the content covered in the data collection instrument.

Ethical Aspects

Data collection took place from August 1st to 14th, 2025, after authorization from the Nursing Course Coordination and approval of the project by the Research Ethics Committee (CEP), in accordance with Resolution No. 466/2012 of the National Health Council. The research was approved under CAEE opinion no. 89382925.4.0000.5539. All collected data were kept confidential and used exclusively for scientific purposes. Participants were not identified at any stage of the research or in its dissemination. The form was anonymous, and the data were stored in a secure digital environment with access restricted to researchers. Participation was voluntary, and students could withdraw at any time without academic or personal prejudice.

RESULTS

The study included students regularly enrolled in the 8th semester of the Bachelor's Degree in Nursing, totaling 30 respondents. After verifying the completeness of the forms, 29 valid questionnaires were included in the analysis, with 1 questionnaire excluded due to incompleteness.

Sociodemographic Characterization

The sample consisted of 29 students, with a mean age of 25.3 years (SD = ±3.9). The majority were female (75.9%), followed by male (20.7%), and only 3.4% did not declare their gender. Regarding marital status, 79.3% were single, 17.2% married, and 3.4% divorced. As for race/color, the predominant self-declaration was white (79.3%), followed by mixed-race (17.2%) and black (3.4%).

Regarding monthly family income, 44.8% reported an income of two to three minimum wages, 24.1% three to four minimum wages, 17.2% above five minimum wages, and 13.8% up to one minimum wage. The majority of participants were enrolled in the 8th semester (82.8%), while 17.2% were in the 7th semester. Regarding their region of residence in Curitiba, 37.9% lived in the South region, 24.1% in the Central region, 20.7% in the North region, 17.2% in the East region, and no participant resided in the West region. This distribution highlights spatial heterogeneity, encompassing both peripheral neighborhoods and regions closer to the urban center.

Table 1. Characterization of the sample of students responding to the survey, Curitiba, 2025.

Variable	Average(DP)	n	%
Age (years)			
20-25	25,3 (±3,9)	15	51,7
25-30		11	37,9
30-35		3	10,3
Gender			
Female	–	22	75,9
Male	–	6	20,7
Not declared	–	1	3,4
Marital Status			
Single	–	23	79,3
Married	–	5	17,2
Divorced	–	1	3,4
Race/Color			
White	–	23	79,3
Brown	–	5	17,2
Black	–	1	3,4

House Income			
Up to 1 minumum salary	–	4	13,8
2 to 3 minumum salaries	–	13	44,8
3 to 4 minumum salaries	–	7	24,1
Over 5 minumum salaries	–	5	17,2
Curitiba´regions			
North	–	6	20,7
South	–	11	37,9
Central	–	7	24,1
East	–	5	17,2
West	–	0	0,0

Regarding prior training in the health field, 24 (82.8%) stated they had no prior technical training or courses, while 5 (17.2%) reported prior experience or training, such as a Nursing Technician or First Responder course.

Knowledge about Pre-Hospital Care

In the overall analysis of participant performance, the average number of correct answers was 79.6%, with a median of 82.8%.

In question 1, which investigated the priority in the primary assessment of a polytrauma victim according to the XABCDE protocol, the majority of participants (79.3%) correctly indicated "control of severe external bleeding," while 17.2% opted for "guarantee of a patent airway with cervical spine control," 3.4% indicated "identification of hidden injuries," and none answered "verification of vital signs."

In question 2, which asked about the meaning of the letter “C” in the mnemonic XABCDE, 86.2% of participants correctly marked “circulation with hemorrhage control”. The remaining answers were “consciousness” (13.8%) and no response for “spine” or “respiratory capacity”.

Question 3 addressed the most appropriate course of action in the pre-hospital care of a victim with a penetrating wound to the right hemithorax, presenting with dyspnea and decreased breath sounds. The majority (89.7%) correctly answered “apply a chest seal or three-sided dressing”, while 6.9% opted for “monitoring until arrival at the hospital”, 3.4% for “initiate CPR”, and none chose “perform chest drainage”.

In question 4, concerning the care of an unconscious victim with bleeding in the oral cavity and no verbal response, 79.3% indicated "perform mandibular traction and airway suction" as the indicated course of action. Other responses included "semi-Fowler's position" (17.2%) and "oxygen via non-rebreather mask" (3.4%), with no response for "immediate chest compressions".

Question 5 investigated why the XABCDE protocol prioritized "X" over ABCDE. The majority (96.6%) correctly recognized that this is due to the imminent risk of death from external hemorrhage. Only

3.4% marked "reduction of environmental exposure time", while no response indicated "cervical spine stabilization" or "difficulty assessing breathing in multiple victims".

In question 6, which presented the scenario of multiple victims with one of them presenting active bleeding in the femoral region, 86.2% correctly indicated "immediate application of a tourniquet". The remaining responses were “checking the level of consciousness” (10.3%) and “administering oxygen” (3.4%), with no response for “manual stabilization of the cervical spine”.

Question 7 addressed the initial approach to an unconscious motorcyclist with signs of shock, with 62.1% correctly answering “control of severe external bleeding”. The remaining responses were “fracture assessment” (24.1%), “initiating intravenous hydration” (10.3%), and “checking complete vital signs” (3.4%).

In question 8, regarding the triage criteria guided by PHTLS in situations with multiple victims, 62.1% correctly indicated “breathing, perfusion, and mental status”. Others marked “detailed assessment of all before removal” (31%), “time of exposure to trauma” (6.9%), and none answered “order of arrival”. Question 9, regarding the priority in closed abdominal trauma with hypoperfusion, showed that 72.4% correctly identified "rapid transport to the trauma center." The remaining answers were "blood pressure monitoring" (20.6%) and "deep palpation" (6.9%), with no selection for "ice pack on the abdomen."

Question 10, which addressed the use of a cervical collar, showed that 89.6% correctly answered that it is indicated "whenever there is a mechanism with a risk of spinal cord injury." Others selected "all cases of traumatic brain injury" (10.3%), and no one chose "only with radiological confirmation" or "only in unconscious patients."

Question 11 sought to identify the first clinical sign of hypovolemic shock. The correct answer, "tachycardia with cold extremities," was selected by 82.8%. The remaining responses included “severe hypotension” (10.3%) and “bradycardia” (6.9%), while “central cyanosis” was not chosen.

In question 12, which investigated the correct time to remove a helmet in trauma victims, 48.3% correctly marked “only if necessary to secure the airway.” Other responses were “after hemodynamic stabilization” (34.5%) and “never in pre-hospital care” (17.2%), with no selection for “immediately at the scene.”

Question 13 assessed the appropriate time to perform a secondary physical examination, with 79.3% correctly marking “after the primary assessment, if the victim is stable.” The remaining responses were “only in the hospital” (13.9%), “as the first assessment” (3.4%), and “in substitution for the primary assessment” (3.4%).

In question 14, regarding the management of closed chest trauma with hypoventilation, 58.6% correctly answered "ventilation with bag-valve-mask". The remaining answers included "nasal cannula" (17.2%), "passive oxygen therapy" (13.8%), and "use of bronchodilators" (3.4%).

Question 15 investigated the characteristics of tension pneumothorax. The correct alternative, "tracheal deviation, distended jugular veins, and absence of breath sounds," was chosen by 86.2%. The remaining answers were "normal respiratory sounds" (6.9%), "mild subcutaneous emphysema" (3.4%), and "skin lesion with mild bleeding" (3.4%).

In question 16, which addressed the priority in fire risk scenarios, the majority (96.6%) correctly answered "ensure the safety of the team before providing care". Only 3.4% chose to “attend to the victim regardless of risk,” and no response was given to the options “isolate the victim” or “await medical support.”

Question 17 addressed the recommended technique for opening the airway in cases of suspected cervical trauma. The majority (82.8%) correctly indicated “jaw thrust.” The other responses were “hyperextension of the neck” (10.3%) and “chin lift with head tilt” (3.4%), with no selection for “lateral positioning the victim.”

In question 18, which dealt with triage according to the START protocol, 69% correctly answered “ability to walk, breathing, and pulse.” The remaining responses were “level of consciousness” (24.1%) and “vital signs” (6.9%), with no indication for “age and medical history.” Question 19 addressed the priority in cases of traumatic brain injury (TBI) with signs of brain herniation, and there was consensus among the participants: 100% correctly indicated "ensure adequate oxygenation and ventilation".

Finally, in question 20, regarding the movement of victims with suspected spinal cord injury, 86.2% of participants correctly marked "longboard with cervical collar". The remaining answers were "lateral rolling technique" (6.9%), "standard rigid stretcher" (3.4%), and "wheelchair" (3.4%). Table 2 presents the respective success rates per question.

Table 2. Distribution of correct and incorrect answers in the survey questions on pre-hospital trauma care. Curitiba, Brazil, 2025.

Q	Brief description	Rights (n)	Rights (%)	Mistakes (n)	Mistakes (%)
1	Priority in primary assessment (XABCDE)	23	79.3	6	20.7
2	Letter C in the mnemonic XABCDE	25	86.2	4	13.8
3	Management of a penetrating wound to the right hemithorax	26	89.7	3	10.3
4	Conduct in the care of an unconscious victim with blood in the oral cavity.	23	79.3	6	20.7
5	Priority of 'X' before ABCDE	28	96.6	1	3.4
6	Management of active bleeding in the femoral region	25	86.2	4	13.8
7	Initial approach to an unconscious motorcyclist	18	62.1	11	37.9
8	Screening in situations with multiple casualties (PHTLS)	18	62.1	11	37.9
9	Closed abdominal trauma with hypoperfusion	21	72.4	8	27.5
10	Indications for the use of a cervical collar.	26	89.6	3	10.3
11	First clinical sign of hypovolemic shock.	24	82.8	5	17.2
12	Helmet removal in trauma victim	14	48.3	15	51.7
13	Secondary physical examination	23	79.3	6	20.7
14	Management of closed chest trauma with hypoventilation	17	58.6	12	41.4
15	Characteristics of tension pneumothorax	25	86.2	4	13.8
16	Priority in a scenario with fire risk.	28	96.6	1	3.4
17	Technique for opening the airway in suspected cervical trauma.	24	82.8	5	17.2
18	Screening in multiple victims	20	69.0	9	31.0
19	Priority given to traumatic brain injury (TBI) with signs of brain herniation.	29	100.0	0	0.0
20	Movement in suspected spinal cord injury	25	86.2	4	13.8

DISCUSSION

This study aims to evaluate the knowledge of undergraduate nursing students regarding pre-hospital care (PHC), with an emphasis on trauma situations. By investigating the ability of these future professionals to recognize and apply essential procedures in the management of urgent and emergency situations, the study sought to investigate whether the training offered during their undergraduate studies has been effective in preparing them for safe and evidence-based practice.

In this context, the results obtained show that the majority of participants (82.8%) correctly identified jaw thrust as the indicated technique for opening the airway in cases of suspected cervical trauma, demonstrating adequate knowledge in emergency situations involving the risk of spinal cord injury. This finding suggests that students have mastery over essential procedures in initial trauma care, aligning with the recommendations of national and international protocols, such as Advanced Trauma Life

Support (ATLS), which emphasize the need to preserve cervical stability during airway management[9].

On the other hand, the proportion of students who opted for inadequate techniques, such as hyperextension of the neck (10.3%) and chin lift with head tilt (3.4%), reveals gaps in knowledge that can compromise patient safety in critical situations. A study conducted in 2025[10] on laryngeal mask insertion in airway management demonstrated that, although a large proportion of Nursing students achieve satisfactory performance in laryngeal mask insertion, with accuracy above 70% in the essential items of the checklist, 16% reported having prior knowledge of the technique. These errors demonstrate the importance of reinforcing practical and simulated teaching in trauma management, since incorrect decisions can aggravate cervical injuries and generate adverse outcomes. The results of this study point to the need for intensified specific training in the undergraduate Nursing curriculum, focusing on evidence-based practice to ensure greater safety and quality of care.

The data obtained in this study reveal a significant discrepancy between the participants' perceived confidence in relation to their prior knowledge and their actual levels of accuracy in PHC questions. Although the majority of respondents (82.8%) did not have technical training in the health field, a positive performance was observed in several questions, which may reflect prior exposure to informal content on the subject, but also indicates possible misperceptions of self-concept of knowledge[11]. This is especially concerning, as overconfidence without technical mastery can compromise decisions in critical situations, such as in cases of trauma.

Regarding abdominal trauma with hypoperfusion, 72.4% of participants correctly answered that the priority should be rapid transport to the trauma center, according to ATLS and PHTLS guidelines, which reinforce the "load and go" approach in these cases. This positive data suggests a good theoretical assimilation of the appropriate conduct, but does not necessarily reflect the ability to apply this knowledge in real-world contexts, where clinical assessment may be confusing or incomplete. Correct prioritization of rapid transport is associated with improved outcomes in victims of intra-abdominal hemorrhage, whose lethality increases significantly with delays in definitive care.

Similar findings were observed by researchers (2022)[12] when evaluating the impact of the ATLS course on the training of medical students. The authors demonstrated that, although theoretical-practical training significantly improves immediate cognitive performance, many students still have difficulty transferring this knowledge to more complex simulated clinical scenarios. The study reinforces that proficiency in trauma care requires continuous training, integration between theory and practice, and repeated exposure to realistic situations in order to reduce decision-making errors in critical contexts. These findings converge with the results of the present study, showing that understanding the priority of rapid transport is only one of the components necessary to ensure safe and effective conduct in the management of abdominal trauma.

The PHTLS guidelines highlight that the initial trauma assessment should prioritize interventions that truly impact survival, avoiding unnecessary procedures that could delay transport to definitive care. Regarding spinal protection, the protocol emphasizes that cervical immobilization should only be used when there is a trauma mechanism compatible with possible spinal cord injury, reinforcing an evidence-based approach and careful risk assessment. This perspective seeks to reduce the indiscriminate application of immobilization devices, since their inappropriate use can cause discomfort, worsen clinical conditions, or prolong pre-hospital response time[5].

Thus, regarding the use of the cervical collar, 89.6% correctly identified that its indication occurs whenever there is a mechanism with a risk of spinal cord injury, as recommended by international protocols such as PHTLS and NEXUS Criteria. However, 10.3% believe that the collar should be used in all cases of traumatic brain injury, which demonstrates an inappropriate generalization of its use. Cervical immobilization, when poorly indicated, can cause iatrogenic effects, such as increased intracranial pressure and respiratory distress, requiring careful clinical judgment.

Regarding tension pneumothorax, 86.2% of participants correctly identified the classic signs of the condition: tracheal deviation, distended jugular veins, and absence of breath sounds. This result is encouraging, considering the severity of this emergency, which requires immediate decompression to avoid cardiorespiratory arrest. However, the presence of 13.8% incorrect answers indicates that some participants may not adequately recognize this condition in a real clinical context, raising concerns about failures in early detection in the pre-hospital setting.

A randomized simulation study showed that brief training with portable ultrasound (POCUS) increased the ability of first responders to recognize tension pneumothorax in pre-hospital scenarios. Although the difference between the trained and control groups was not statistically significant, there was greater confidence in the use of POCUS and in the identification of critical signs. These results show that, even after initial training, there is still a need for practical and targeted training to improve diagnostic accuracy in thoracic emergencies[13].

The unanimity in the question related to traumatic brain injury with signs of brain herniation (100% correct), with participants correctly identifying the need to ensure adequate oxygenation and ventilation, demonstrates a good understanding of the severity of TBI and its pathophysiology. Maintaining a PaO_2 > 60 mmHg and a normal $PaCO_2$ is essential to avoid hypoxia and hyperventilation, factors that worsen secondary brain injury. The emphasis given by protocols such as the BTF (Brain Trauma Foundation) to ventilatory support may have positively influenced performance on this question.

A similar result was identified in another study that evaluated the impact of an educational program on the management of traumatic brain injury in pre-hospital care professionals. The authors identified that structured interventions, especially those based on simulation and clinical scenarios,

significantly improve decision-making in TBI situations, increasing the accuracy in recognizing critical signs and choosing initial actions. Targeted training proved crucial for consolidating essential competencies, reinforcing that the good performance observed in the participants of this study may be related to prior exposure to theoretical content aligned with current guidelines. These findings support the need to maintain continuous training strategies to ensure rapid and safe responses in the face of imminent herniation or neurological deterioration[14].

The application of the START (Simple Triage and Rapid Treatment) protocol revealed greater weaknesses. Only 69% of participants correctly identified the triage criteria: ability to walk, breathing, and pulse. This data reinforces the need to strengthen practical and theoretical training in situations with multiple victims, where decision time is critical. The literature indicates that the underutilization or incorrect application of START can compromise the prioritization of more seriously injured victims, directly affecting mortality in disasters or accidents with multiple injuries[15]. Furthermore, 24.1% incorrectly chose "level of consciousness" as the primary criterion, indicating confusion between START and other protocols, such as AVPU (A - Alert, V - Verbal, P - Pain, U - Unresponsive).

In an integrated way, in this study, although the students demonstrate satisfactory mastery of the most critical fundamentals of pre-hospital care, there are still areas that require practical deepening and consolidation of clinical reasoning. The overall results reveal a promising training profile, with good assimilation of current guidelines, the ability to recognize potentially fatal situations, and prudence in the self-perception of competencies. At the same time, it highlights the need to expand pedagogical strategies based on simulation and realistic scenarios, in order to reduce variability in still weak competencies.

Limitations of the Study

This study presents some limitations that should be considered in the interpretation of the results. The sample consisted exclusively of nursing students from a single institution, which may limit the generalization of the findings to other training contexts or regions. Furthermore, the cross-sectional design does not allow for inferences about changes over time or the impact of continuous educational interventions.

Contributions to the Field of Nursing, Health, or Public Policy

This study contributes to the field of Nursing by demonstrating, objectively, how academic training can strengthen essential clinical competencies for pre-hospital care. The results show that students are able to perform the main pillars of trauma care safely and consistently, indicating that realistic simulation is an effective strategy for professional development. This evidence provides support for improving curricula, guiding pedagogical practices, and informing decision-making by teachers and administrators in training nurses who are better prepared to act in emergency situations.

CONCLUSION

Overall, the results demonstrate consistent performance in the main pillars of pre-hospital care. Of particular note are cervical airway protection, appropriate time-destination prioritization in cases of abdominal trauma with hypoperfusion, judicious use of the cervical collar, and clinical recognition of tension pneumothorax. Furthermore, there was absolute consensus regarding the priority of oxygenation and ventilation in patients with traumatic brain injury and signs of herniation.

On the other hand, some areas showed greater variability, especially ventilation in thoracic trauma and triage in incidents with multiple victims. These points highlight specific fields that still require practical consolidation, reinforcing the importance of continuous training and realistic simulations. In an integrated manner, the findings indicate a conceptual alignment with current practice guidelines and a self-perception consistent with the participants' formative phase, marked by prudence, critical thinking, and a constant pursuit of technical improvement.

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