

HEALTHCARE TECHNOLOGIES USED IN NURSING TO CARE FOR POLYTRAUMATIZED PATIENTS: AN INTEGRATIVE REVIEW

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ABSTRACT: The aim of this study was to identify healthcare technologies used by nurses in the care for polytraumatized patients. This is an integrative review, with articles found in three databases in the period from May to July 2014. Nineteen articles from the period between 2009 and 2014 were selected and distributed among the three categories of healthcare technology: soft, soft-hard and hard. It was found that nursing workers adopted the three types of healthcare technology when caring for polytraumatized patients, emphasizing the soft-hard category. Soft technologies included health support and education of patient and family members/caregivers and training of the nursing team; soft-hard technologies: care management, admission of patients under risk, assessment and treatment of pain, nursing process and development of protocols; and hard technologies: information systems. Care improvements caused by healthcare technologies were found, since they reach all aspects of care.

DESCRIPTORS: Prehospital care; Multiple trauma; Nursing care; Emergency nursing.

TECNOLOGIAS DO CUIDADO UTILIZADAS PELA ENFERMAGEM NA ASSISTÊNCIA AO PACIENTE POLITRAUMATIZADO: REVISÃO INTEGRATIVA

RESUMO: Objetivou-se identificar as tecnologias do cuidado utilizadas pelo enfermeiro na assistência ao paciente politraumatizado. Revisão integrativa, com busca de artigos em três bases de dados, no período de maio a julho de 2014. Foram selecionados 19 artigos, compreendidos no período de 2009 a 2014, distribuídos nas três categorias tecnológicas do cuidado: leves, leve-duras e duras. Verificou-se que os profissionais de enfermagem utilizam os três tipos de tecnologias do cuidado na assistência ao paciente politraumatizado, com ênfase às leve-duras. Entre as tecnologias leves: apoio e educação em saúde do paciente e familiares/cuidadores e a capacitação da equipe de enfermagem; tecnologias leve-duras: gerência do cuidado, acolhimento do paciente com classificação de risco, avaliação e tratamento da dor, processo de enfermagem e elaboração de protocolos; e tecnologias duras: sistemas de informação. Percebeu-se a melhoria assistencial proporcionada pelas tecnologias do cuidado, por estas abrangerem todos os aspectos do cuidar.

DESCRIPTORES: Assistência pré-hospitalar; Traumatismo múltiplo; Cuidados de enfermagem; Enfermagem em emergência.

TECNOLOGÍAS DEL CUIDADO UTILIZADAS POR LA ENFERMERÍA EN LA ASISTENCIA AL PACIENTE POLITRAUMATIZADO: REVISIÓN INTEGRATIVA

RESUMEN: El objetivo del estudio fue identificar las tecnologías del cuidado utilizadas por el enfermero en la asistencia al paciente politraumatizado. Revisión integrativa, cuya búsqueda de artículos ocurrió en tres bases de datos, en el periodo de mayo a julio de 2014. Fueron seleccionados 19 artículos, comprendidos en el periodo de 2009 a 2014, distribuidos en las tres categorías tecnológicas de cuidado: leves, leve-duras y duras. Se verificó que los profesionales de enfermería utilizan los tres tipos de tecnologías del cuidado en la asistencia al paciente politraumatizado, con énfasis a las leve-duras. Entre las tecnologías leves: apoyo y educación en salud del paciente y familiares/cuidadores y la capacitación del equipo de enfermería; tecnologías leve-duras: gerencia del cuidado, acogimiento del paciente con clasificación de riesgo, evaluación y tratamiento del dolor, proceso de enfermería y elaboración de protocolos; y tecnologías duras: sistemas de información. Se percibió la mejoría asistencial proporcionada por las tecnologías del cuidado, a causa de que estas abarcan todos los aspectos del cuidar.

DESCRIPTORES: Asistencia prehospitalar; Traumatismo múltiplo; Cuidados de enfermería; Enfermería en emergencia.

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Received: 12/04/2015

Finalized: 24/07/2015

INTRODUCTION

Polytraumatism is result of traumatic events in which there is a high displacement of force, such as falls, traffic accidents, pedestrian crashes and gunshot wounds, among other causes that result in serious lesions⁽¹⁾. It is considered the main cause of death among individuals in the age group of 20 to 40 years old, in other words, in the individuals' most productive years. For the most part, victims are male. Polytraumatism incidence has been a cause of concern for researchers and administrators, due to the economic and social impacts they generate⁽²⁾.

Trauma-related lesions may cause physical and/or mental disabilities, which can be temporary or permanent, and also lead to death⁽³⁾. Trauma victims go through a painful process, which involves confusion, fear of the unknown and fear of facing death, mutilation, immobilization and other changes in their identity and bodily integrity resulting from trauma, which can also affect their self-care capacity⁽⁴⁾.

The need to individualize care is felt by all workers that take part in these cases due to the many types of presentation, status and complexity of trauma⁽⁵⁾. Nurses have crucial roles in caring for trauma victims since, as coordinators of the nursing team, they must define and prioritize care that is to be administered and establish preventive and healing measures in a scenario where the time between life and death is short⁽⁶⁾. For that end, we highlight the importance of technology production for innovation in the healthcare and nursing fields, because it promotes organization of the service, the types of care and supports and innovates professional performance⁽⁷⁾.

Healthcare technologies are divided in hard, soft-hard and soft. Hard technology, or dead labor, refers to the complex instruments in general, including all treatment hardware, exams and organization of information; soft-hard refers to professional knowledge, well-adjusted to clinic, epidemiology and the other professionals that compose the team. Soft technologies are those used in human relations, such as the creation of rapport, autonomization, and triage, in the encounter between the professional and the and user/patient⁽⁸⁾.

Understanding emergency nursing care from the perspective of technologies enables the construction of accountability, reliability, relations of rapport and triage. In this perspective, nursing care must seek the harmonization of

these three dimensions of technologies, which are determinants for care quality⁽⁹⁾.

A search was performed for nursing publications involving the use of healthcare technologies on this clientele after contemplating the nurses' responsibilities toward trauma patients and knowing the complexities and specificities of the care dedicated to these individuals, who increasingly demand attention from nurses.

This study is relevant for urgency and emergency nursing because it subsidizes clinical practice and evidences the need to reconstruct a care model aimed at the care for polytraumatized patients in all aspects. Its aim is also to disseminate scientific production that is available for assessing options and decision making when caring for these patients through technology applicability.

Based on this reality, the aim of this study was to identify healthcare technologies used by nurses in the care for polytraumatized patients.

METHOD

This study consists of an integrative literature review, a method that aims to synthesize results obtained from studies on a certain theme or issue in a systematic, orderly and wide-ranging way through the careful observation of six stages: identification of the research subject; definition of characteristics of primary research on the theme; selection, by peers, of studies that composed the sample; analysis of findings from the articles; interpretation of results and report of the review, which enables a critical examination of the findings⁽¹⁰⁾.

This review was guided by the following question: Which healthcare technologies have been used by nurses in the care for polytraumatized patients?

The search took place in the period from May until June 2014, using the following databases: Latin-American and Caribbean Literature on Health Sciences (LILACS), Scientific Electronic Library Online (SciELO) and Nursing Database (BDENF), based on the following health science descriptors: "multiple trauma", "emergency nursing" and "nursing care". The search equation was ("multiple trauma" AND "emergency nursing") OR ("multiple trauma" AND "nursing care").

Inclusion criteria for publications chosen for the study were: articles that addressed the proposed goal; which were indexed in the

LILACS, SciELO and BDENF databases; published between 2009 and 2014; in Portuguese, English and Spanish; and electronically available in full; Editorials, letters to the editors, works published in event annals, reflection papers and duplicate publications were excluded.

After a cross-examination of the descriptors, 112 articles were found in LILACS, 86 in SciELO and 16 in BDENF. Three stages for were followed for sample selection. The first stage consisted of reading the titles of the articles, rejecting those that were not related to the theme. Afterwards, the abstracts were read to get closer to and get to know the study. After this selection, texts that were available in full were searched.

The corpus of the integrative review was composed of 19 articles, classified according to the following categories: title, journal and year of publication, type of study and level of evidence. In order to more easily reach this study's objective, information were consolidated through data categorization. These data were divided according to healthcare technologies used by nurses in care for trauma victims.

The following levels were considered to classify the level of evidence (LE): level I – evidence from systematic reviews of controlled randomized studies or from systematic reviews of randomized clinical trials; level II – evidence derived from individual or observational randomized systematic reviews; level III – evidence obtained from studies without controlled randomization, cohort or follow up; level IV – evidence from well-outlined case-controls, case studies and

longitudinal studies; level V – evidence from descriptive studies⁽¹¹⁾.

RESULTS

Studies were divided in tables according to the type of technology employed and organized by year of publication, from the most recent to the oldest.

Countries where the studies that composed the sample were originally published were: Brazil, with 17 (89.5%), Mexico and Colombia, with one (10.5%) each. After analyzing the states and regions where the national articles were published, we concluded that states from the South-Southeast axis were predominant, which evidenced the supremacy of the scientific production of these regions' nurses, with special focus on Santa Catarina, with five (26.3%) studies, and São Paulo, with eight (42.1%).

Regarding the years when articles used in the study were published, in the relevant period, the year of 2012 had the highest amount of studies (26.3%). Important national and international journals stood out, with special attention given to the Revista Eletrônica de Enfermagem, with three pieces (15.8%). Regarding the types of studies, all articles were original, with special focus on exploratory studies (26.3%). Concerning the studies' approach, there was a predominance of the quantitative approach (52.6%).

A total of 68.4% of the pieces had LE V; followed by LE III and IV, with three (15.8%) articles. In an analysis of the use of healthcare technologies in

Table 1 – Results of articles selected according to the use of soft technologies in care for polytraumatized patients. Fortaleza, Ceará, Brazil, 2014

Title	Journal/Year of publication	Type/Study approach	Level of evidence
Workers' perception regarding identification, quantification and treatment of pain in patients of a trauma intensive care unit	Revista Dor, 2011	Prospective and quantitative	IV
<i>El Cuidado de enfermería significa ayuda</i>	Aquichan, 2010	Longitudinal, interventional, quantitative	V
<i>Enseñar a quien cuida el arte de cuidar: un programa educativo con cuidadores de pacientes politraumatizados</i>	Investigación y Educación em Enfermería, 2010	Longitudinal, interventional, quantitative	IV
Training for teams who perform on mobile prehospital care: necessity and importance of permanent education in the perspective of workers	Revista Mineira de Enfermagem, 2009	Descriptive and exploratory, qualitative	V

Table 2 – Results from articles selected according to the use of soft-hard technologies in care for polytraumatized patients. Fortaleza, Ceará, Brazil, 2014

Title	Journal/Year of publication	Type/Study approach	Level of Evidence
Triage with risk assessment and classification: agreement between nurses and institutional protocol	Revista Latino-Americana de enfermagem, 2013	Descriptive, quantitative	V
Real diagnosis and proposals for nursing interventions for multiple trauma patients.	Revista Eletrônica de Enfermagem, 2013	Descriptive, quantitative	V
Challenges for emergency care management in the perspective of nurses	Acta Paulista de Enfermagem, 2013	Descriptive and exploratory, qualitative	V
Triage with risk classification in emergency hospital service; nursing team assessment	Revista Mineira de Enfermagem, 2012	Cross-sectional, qualitative	III
Assessment of polytrauma victims by the nursing team in an emergency service of Santa Catarina	Revista Brasileira de Promoção da Saúde, 2012	Case study, qualitative	IV
Nursing diagnoses in fatal trauma victims in emergency scenarios	Revista Latino-Americana de Enfermagem, 2012	Cross-sectional, descriptive and exploratory, quantitative	III
Nursing diagnoses in trauma victims in the first six hours after the event	Acta Paulista de Enfermagem, 2012	Prospective cross-sectional, quantitative	III
Multidimensionality of pain in nursing education in prehospital care for trauma victims	Revista Dor, 2012	Descriptive and exploratory, qualitative	V
Risk classification in emergency: nursing team diagnosis	Revista de Enfermagem da UERJ, 2011	Descriptive, qualitative	V
Nursing care protocol in aerospace environment for trauma victims: precautions before the flight	Revista Brasileira de Enfermagem, 2011	Qualitative, convergent	V
Nurses in care for trauma victims with pain: the fifth vital sign	Revista Escola de Enfermagem da USP, 2011	Exploratory, qualitative	V
Perception of the nursing team of a mobile prehospital service regarding nursing management	Texto e Contexto Enfermagem, 2010	Exploratory and qualitative	V
Nursing diagnoses for trauma victims in an advanced mobile prehospital service	Revista Eletrônica de Enfermagem, 2009	Exploratory and quantitative	V

Table 3 – Results of selected articles according to the use of hard technologies when caring for polytraumatized patients. Fortaleza, Ceará, Brazil, 2014

Title	Periodical/Year of publishing	Type/Study approach	Level of Evidence
Diagnoses and nursing interventions for trauma victims during prehospital care using the CIPE®	Revista Eletrônica de Enfermagem, 2013	Descriptive, quantitative	V
Help system for nursing diagnoses for trauma victims in mobile prehospital advanced care using the NANDA and NIC taxonomies	Journal of Health Informatics, 2010	Exploratory, quantitative	V

nursing care for polytraumatized patients, there was a predominance of soft-hard technologies, addressed in 13 (68.4%) pieces, followed by soft and hard, as shown in Figure 1.

Analysis of the theme made it possible to

categorize, interpret and gather similar data. Thus, the gathering made it possible to synthesize knowledge from literature, which was divided according to healthcare technologies used by nurses and their teams.

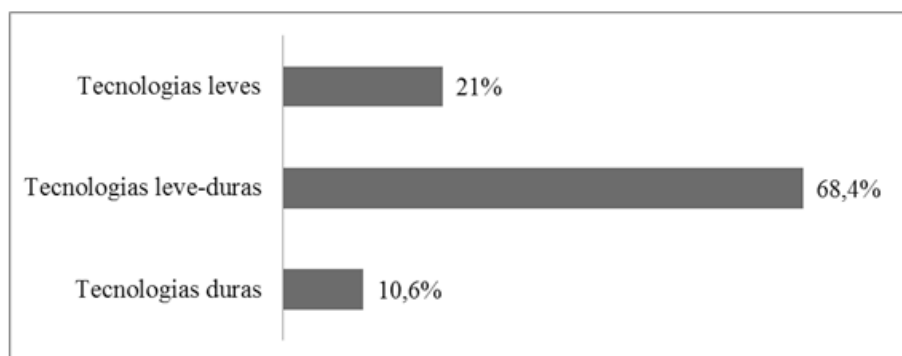


Figure 1. Quantities of articles addressing each healthcare technology used by nursing in care for polytraumatized patients. Fortaleza, Ceará, Brazil, 2014

DISCUSSION

An increase in the number of articles on the use of healthcare technologies in the nursing care practice was observed in the years under analysis. Important articulations of care through the use of technologies in the process of nursing work were also identified.

Among the studies, the quantitative design was predominant. This approach has the goal of bringing to light data, indicators and trends that are observable, generating reliable measures without biases⁽¹²⁾. Among the countries of origin of the studies, Brazil ranked first in terms of articles, which suggests a national interest in the study of the theme.

Soft healthcare technologies

Soft or relational technologies are necessary around the performance of care⁽⁸⁾. The bibliographical material used for the creation of this review reported soft technologies used by nurses as those for support and education in patient and family health, as well as for training the nursing team.

Care implies commitment from the nursing team toward patients. This care involves the management of technology, the ability to avoid complications, the adoption of support behaviors and actions that aim to dignify others in their human conditions and enable a comprehensive growth⁽¹⁻²⁾.

Changes and consequences of trauma lead to the need to prepare nurses for administering care to polytraumatized patients, which ranges from supervision and training of the nursing team to physical and emotional comfort, therapeutic listening and humanized care⁽⁴⁾.

A recent study verified the importance of understanding how individuals experience the trauma situation. The study classified the feelings and emotions experienced during the trauma in categories: background emotions (anxiety, worrying, despair), primary or universal (fear and sadness) and secondary (guilt). The interpersonal relationships categories were: attention (general appreciation) and relationship (relationship with the workers). The authors claimed that, by categorizing information, the nurse could perform comprehensive and holistic actions, which are essential for care⁽¹³⁾.

Care training is extremely important for the performance of effective attention. Educational actions in health can qualify individuals and groups for the construction of new knowledge, leading to a consistent practice of preventive behaviors or of health promotion⁽⁴⁾. Data from an intervention study that had the goal of assessing the effectiveness of an educational intervention program aimed at caregivers of polytraumatized patients showed that this type of educational measure had the effect of improving the level of care knowledge, seeing as how the patients presented lower incidence of secondary

complications related to prolonged immobility⁽¹⁴⁾.

Another research highlighted the importance of training for mobile prehospital care teams. Training was considered necessary for professionals to feel secure and capable of administering care, enabling them to perform care with coherence, quickness and safeness in multiple situations of trauma⁽¹⁵⁾.

Soft-hard healthcare technologies

Soft-hard technologies involve all knowledge and methodologies in the performance of care⁽⁸⁾. The soft-hard technologies used when caring for polytraumatized patients were: care management, assessment and patient triage with risk assessment, assessment and treatment of pain, nursing process (survey of diagnoses and establishment of nursing interventions) and creation of protocols.

Nursing care for trauma victims begins with service and care management, seeing as these are prerogatives that qualify nurses as coordinators of the urgency and emergency wards⁽⁵⁾.

The competences of nurses in prehospital care include supervising and assessing the performance of the nursing team; executing medical prescriptions through telemedicine; administering more technically complex nursing care for critical patients and those at risk of death; and ability to make immediate decisions⁽¹⁶⁾.

Therefore, it is understood that nurses' management in prehospital care is an essential activity, especially because of the complexity of actions as well as because of the characteristics inherent to this service. Nurses have a special place in the process of administration and management of techniques and material resources. The latter is justified by the fact that care cannot be interrupted, be it because of the lack or bad quality of a given material, especially in emergency or urgency settings⁽⁹⁾.

A study pointed to challenges for nurses in the management of emergency care, such as overcrowding, maintenance of care quality and use of leadership as a management tool⁽¹⁷⁾. Therefore, changing care flow is needed, making an assessment system and triage with risk assessment essential.

Triage with risk assessment is a dynamic process for the identification of patients who demand immediate care, according to the risk potential. It is an ethical and professional attitude

toward care, by level of complexity, by means of scales and protocols for risk ranking. The most commonly used are: the Emergency Severity Index (ESI), the Australian Triage Scale (ATS), the Canadian Triage Acuity Scale (CTAS) and the Manchester Triage System (MTS)⁽¹⁸⁾.

Authors agree that triage with risk assessment enables quicker and more humane care for users with severe health harms. The weak points referred to include issues with the physical space, materials and human resources, and show the lack of referrals and counter-referrals, with the resulting accumulation of users in the service, which interferes in the quality of care as well as in the satisfaction of workers at the emergency service⁽¹⁹⁻²¹⁾.

Assessment by the nursing team begins with the performance of a primary exam (airways with spine protection, breathing and ventilation, circulation with hemorrhage control, incapacity/neurological state and exposition/environmental control – ABCDE), and second, with careful evaluation of the polytrauma victim⁽¹⁾. A careful assessment enables the investigation of pain intensity, which causes significant losses for the patient, such as increase in arterial pressure and heart rate, increase in bleeding, increase in sweating, paleness, and decrease in oxygen availability for muscles, hypoventilation, hypoxia and superficial breathing. Authors agree that pain must be assessed at the time of admission and reassessed in short intervals. Thus, workers can quantify the variation in pain complaints, enabling therapeutic readjustments⁽²²⁾.

For pain relief, special attention is given to pharmacological, non-pharmacological and combined measures. Regarding pharmacological measures, it is the nursing team that programs the prescribed pharmacological therapy. Therefore, medicating the patient involves knowing not only the routes of administration of drugs, but also their indications, pharmacological actions, reactions, dosages and interactions⁽²³⁾.

Concerning non-pharmacological measures, studies show that the following activities are part of the nurses' activities for pain relief in trauma patients: distraction; education; relaxing techniques and application of heat or cold to decrease pain; comfort and hygiene measures; massages; support and reassurance; adequate placement; and control of environmental factors⁽²²⁻²³⁾.

Another soft-hard technology of great

importance for trauma victim care is the use of the nursing process. Nursing diagnoses are a clinical assessment of the responses of the individual, of the family or of the community to health problems/vital processes that are real or potential. They provide support for the selection of nursing interventions with the aim of reaching results for which nursing is responsible⁽⁵⁾.

Literature search showed that the main approach for the definition of nursing diagnoses involved the performance of careful and exact physical exams, focused on the compromise of the relevant system and its complications⁽¹⁾. Four studies addressing nursing diagnoses in trauma patients were found. This study considered the diagnoses that were present in more than 50% of the reasoning in selected articles.

In a study conducted with 23 adult trauma victims, 24 nursing diagnoses were found, with predominance of infection risk (91.3%); trauma risk (82.6%); acute pain (73.9%); and impaired tissue integrity (65.2%)⁽³⁾.

In another study, conducted with 406 victims, the authors found 42 diagnoses. The most frequent were: infection risk (95.4%); inhalation risk (86.4%); impaired skin integrity (84%); ineffective breathing pattern (82.8%); bleeding risk (79.5%); impaired spontaneous ventilation (77.3%); impaired comfort (68.3%); risk of ineffective brain perfusion (66%); shock risk (63.8%); decreased cardiac output (59.1%); impaired gas exchange (52.3%); and cranial adaptive capacity (52.3%). The authors stress that all patients who passed away presented one or more of these diagnoses⁽⁵⁾.

Among the diagnoses identified in the analyzed articles, the main one was infection risk. Trauma victims are exposed to various risk factors that can lead to an infection situation, such as invasive procedures commonly performed inside a vehicle, trauma and increased environmental exposure to pathogens. Authors agree that this finding points to the need for safety measures in invasive interventions in the emergency sector and in prehospital care⁽⁶⁾.

Special attention is called to the fact that the need for quickness in procedures that is demanded from multi-professional teams during the delivery of care does not decrease the importance of carrying them out while observing the technical guidelines for asepsis and antisepsis, since failure to observe them causes negative repercussions for the patients' evolution, especially when the victims have fragile vital conditions.

The identification of nursing diagnoses of trauma victims enables the early detection and control of risks by the nurses. It also makes them able to individually plan the care to be administered through specific interventions based on scientific evidences, thus, the most effective and immediate actions⁽³⁾.

The creation of protocols is a soft-hard technology of special importance. A recent study had the aim of presenting a nursing care protocol for the aerospace pre-extraction of adult trauma victims with the aim of administering the safest care for air extracted patients⁽²⁴⁾. Thus, it is understood that the use of care protocols is an important tool for the nurses' decision making, because it prioritizes and organizes nursing actions.

Hard healthcare technologies

Hard technologies comprehend materials, equipment, machines and other instruments used during the provision of care⁽⁸⁾. The article search brought up two studies that addressed these technologies in care for polytraumatized patients.

Technology assistance has great value for workers, both in the optimization of care and because trauma is an emergency clinical situation. The use of information systems has received attention in the health field, because it helps decision making in diagnoses and therapies in patient care⁽²⁵⁻²⁶⁾.

A recent study had the goal of developing an aid system for decision making in nursing diagnoses for trauma victims in advanced mobile pre-hospital care, considering the taxonomy North American Nursing Diagnosis Association (NANDA). It also had the goal of proposing interventions based on the Nursing Interventions Classification (NIC). The authors found that management, recording and time of information response happened in feasible time, which showed optimization for the creation of diagnosis⁽²⁵⁾.

Another study had the aim to identify nursing diagnoses and interventions based on the International Classification for Nursing Practice (ICNP®), an information technology. The authors found that the technological system enables the identification of nursing diagnoses and interventions that are more focused and systematized. It also favors nursing records⁽²⁶⁾.

Therefore, it may be inferred that the implementation of systems enables more specific care, since it decreases the time for the

identification of nursing diagnoses because of how dynamic and simple it is to use the NANDA and NIC taxonomies.

FINAL CONSIDERATIONS

Many researchers understand trauma as a devastating event in modern society, since it is a silent and lethal epidemic. Therefore, it is a public health problem, with strong impact on the population's morbidity and mortality.

Many studies report uses of healthcare technologies in nursing care practice for polytraumatized patients and this review proved such fact. The selected articles evidenced the nurses' concern with offering care that is more focused, effective and immediate for trauma victims through the creation of specific diagnoses. However, there were no reports of custom forms created by nurses specifically for this end.

Meanwhile, it was observed that nursing workers used the three types of healthcare technologies, with emphasis on soft-hard technologies. There are no doubts regarding the improvement of care enabled by healthcare technologies, since they reach all aspects of care.

Therefore, there is an urgent need to conduct further research on the systematization of nursing care for trauma victims, since nurses are among those responsible for the early care for these patients and need tools that enhance this care. Thus, there are benefits for the population, for the worker and for the system, both for the quality of care and for the economical and organizational sectors. The use of information systems to streamline the care process should also be mentioned.

The results of this study show that it is necessary to concentrate efforts on the creation of studies addressing the theme at hand, especially regarding the practice of nursing care systematization based on custom forms for guiding actions.

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