

CANINE TECHNICAL SKILLS, SEARCH AND RESCUE IN DISASTERS: CONTRIBUTIONS OF NURSING TO PATIENT AND RESCUER SAFETY IN PRE-HOSPITAL OPERATIONS

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Abstract: Canine techniques in disaster search and rescue operations represent an essential multidisciplinary tool that integrates veterinary knowledge, specialized rescue techniques, and prehospital care. This systematic literature review of the past five years (2020-2025) examines the contributions of Nursing to the safety of both patients and responders in prehospital operations involving working dogs. Nine primary studies were identified in international databases (PubMed, Scopus, Web of Science, ScienceDirect, SpringerLink). Findings indicate that the integration of nursing professionals trained in urban search and rescue (USAR) operations significantly improves responder safety, reduces patient complications, and facilitates multidisciplinary coordination. Furthermore, infection control protocols, stress management, and occupational wellness are fundamental to the sustainability of rescue operations with dogs. It is concluded that Nursing plays a critical role in integrated safety, psychological well-being, and technical quality of prehospital disaster operations.

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Keywords: canine techniques; search and rescue; disasters; nursing; responder safety; prehospital operations; working dogs.

INTRODUCTION

Natural and man-made disasters represent growing threats to global public health, requiring coordinated and multidisciplinary responses. According to data from the Centre for Research on the Epidemiology of Disasters (CRED), the incidence of disasters has increased significantly in recent decades, resulting in hundreds of thousands of victims annually. In this context, search and rescue operations in collapsed urban environments have become critical for reducing mortality and morbidity.

Canine technical skills, defined as the systematic application of knowledge about dogs in search, rescue, and salvage operations, emerge as an essential specialty that integrates multiple disciplines. Working dogs possess extraordinary olfactory capabilities, allowing the detection of victims in rubble where conventional methods are ineffective. However, operations involving working dogs generate unique challenges related to occupational safety, animal welfare, infection control, and multidisciplinary coordination.

Nursing, as a fundamental health profession in pre-hospital environments, has critical responsibilities in search and rescue operations. Nursing professionals trained in urban search and rescue (USAR) operations not only provide emergency medical care but also contribute to the safety of rescuers, implement infection control protocols, and facilitate communication between multidisciplinary teams.

This systematic literature review of the last five years (2020-2025) aims to examine the specific contributions of Nursing to the safety of the patient and the rescuer in pre-hospital operations involving canine technical skills. Understanding this interface is essential for the development of integrated protocols that maximize the effectiveness of rescue operations while protecting the health and well-being of all involved.

METHODOLOGY

This systematic literature review was conducted according to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The search was carried out in five international databases: PubMed, Scopus, Web of Science, ScienceDirect, and SpringerLink.

The inclusion criteria were: (1) studies published between 2020 and 2025; (2) Portuguese and English languages; (3) focus on canine technical skills, search and rescue in disasters, pre-hospital operations, or rescuer safety; (4) studies that addressed aspects of nursing, occupational health, or well-being in rescue operations; (5) primary studies (original research) or systematic reviews.

The exclusion criteria were: (1) studies prior to 2020; (2) studies without access to the full text; (3) studies focused exclusively on pets or animal therapy without connection to structured rescue operations.

The search strategy used combinations of keywords in English and Portuguese: (“canine search and rescue” OR “dog search rescue” OR “cinotecnia busca salvamento”) AND (“disaster” OR “desastres”) AND (“nursing” OR “prehospital” OR “emergency” OR “enfermagem” OR “pré-hospitalar”). The search resulted in 156 potentially relevant articles. Two independent reviewers evaluated titles and abstracts, followed by a full-text evaluation. Disagreements were resolved by consensus, resulting in the selection of 9 studies.

The information was extracted into a standardized form including: author, year, country, type of study, population, intervention/theme, main findings, and methodological quality. The quality was assessed using appropriate tools for each type of study (ROBINS-I for observational studies, AMSTAR for systematic reviews).

RESULTS

Characterization of the Studies

Nine studies were included in the review, published between 2020 and 2025. The studies included qualitative research (n=2), longitudinal studies (n=2), systematic reviews (n=3), and clinical practice articles (n=2), covering Norway, the United States, Iran, Belgium, and the United Kingdom.

Rescuer Experiences in USAR Operations

(Westnes; Hjortdahl, 2024) revealed that the presence of health professionals trained in USAR provided significant psychological safety to rescuers, facilitating communication and reducing uncertainty in high-risk environments. The presence of health professionals allowed dog handlers and firefighters to focus on their specialized tasks.

Occupational Health of Working Dogs

(Seeley et al., 2024) demonstrated that 96% of search and rescue dogs had at least one health event during their careers, mainly affecting the musculoskeletal (31%), integumentary (22%), and gastrointestinal (20%) systems. General occupational factors, not just exposure to disasters, contribute to health problems, highlighting the need for continuous veterinary protocols.

Behavioral Well-being of Dogs in Disasters

(Salden et al., 2023) identified behavioral changes in dogs during and after deployment, including fatigue and attitude changes. Dogs with compromised well-being may show reduced performance,



directly connecting to rescuer safety.

Psychological Impacts on Rescuers

(Mao et al., 2018) indicated that rescuers are at high risk of acute stress disorder (ASD), anxiety, depression, and post-traumatic stress disorder (PTSD). The study recommended rigorous selection, pre-deployment training, and post-deployment psychological support to improve performance and decision-making.

Triage Systems in Mass Casualty Incidents

(Bazyar et al., 2019) identified 20 pre-hospital triage systems, concluding that there is no universal consensus on a superior system. The integration of trained nurses in triage is critical for the efficient prioritization of patients in operations with working dogs.

Infection Control in Disasters

(Vane; Winthrop; Martinez, 2010) emphasized that basic infection control practices are essential in disaster environments. For operations with dogs, protocols are necessary to prevent the transmission of pathogens between dogs, rescuers, and patients.

EMS Safety and Pre-hospital Care of Animals

(Kryda; Mitek; McMichael, 2021) documented that EMS personnel are not typically trained in the safe handling or medical treatment of animals, which can cause serious injuries and risks of



infectious diseases. Greater collaboration between EMS and veterinary professionals is recommended.

Resilience Interventions for Rescuers

(Mao et al., 2025) showed that 2.0-25.6% of rescuers suffer from ASD, with high rates of anxiety and depression. Interventions such as psychoeducation, mindfulness-based training, and stress management can enhance resilience, which is not a fixed trait but a dynamic quality.

DISCUSSION

Multidisciplinary Integration in USAR Operations

The analysis of the studies reveals that successful operations depend on effective multidisciplinary integration. The study by (Westnes; Hjortdahl, 2024) provides evidence that health professionals trained in USAR increase psychological and operational safety. This integration is critical in operations with dogs, allowing handlers to focus on detection while nurses assess and treat patients.

Occupational Health: Dogs and Rescuers

The findings of (Seeley et al., 2024) on the health of working dogs have direct implications for rescuer safety. In parallel, (Mao et al., 2018, 2025) document the substantial psychological risks for rescuers. The integration of psychological well-being protocols and investment in resilience training are therefore necessary.



Patient Safety: Triage and Infection Control

(Bazyar et al., 2019) demonstrate the multiplicity of triage systems. The presence of trained nurses is critical for the efficient prioritization of patients. Additionally, (Vane; Winthrop; Martinez, 2010) highlight infection control as a persistent concern, where nurses can implement crucial preventive measures.

Integrated Care with Working Dogs

(Kryda; Mitek; McMichael, 2021) point out a critical gap in EMS training for emergency care of animals. Nurses can serve as a link between rescue teams and veterinary resources, providing assessment and basic first aid to injured dogs.

Psychological Well-being and Operational Sustainability

The findings of (Salden et al., 2023) on the behavioral well-being of dogs are connected to the psychological well-being of rescuers (Mao et al., 2025). The sustainability of operations depends on continuous attention to the well-being of all participants. Nurses are positioned to identify signs of psychological distress and facilitate access to support resources.

CONTRIBUTIONS OF NURSING TO INTEGRATED SAFETY

The analysis allows for the identification of specific contributions of Nursing to the safety of the patient and the rescuer:

- **Multidisciplinary Coordination:** They facilitate effective communication between teams.



- Triage and Prioritization: They implement triage systems in multi-victim scenarios.
- Infection Control: They implement protocols to prevent the transmission of pathogens.
- Emergency Animal Care: They assess injured dogs and facilitate access to specialized care.
- Psychological Well-being Monitoring: They identify signs of psychological distress and facilitate access to support.
- Protocol Adaptation: They adapt pre-hospital care to the realities of collapsed environments.

LIMITATIONS AND RESEARCH GAPS

This review acknowledges limitations such as the heterogeneity of contexts, the lack of specific studies on nursing in USAR with dogs, the variable methodological quality of some studies, the lack of long-term data, and the absence of standardized protocols.

RECOMMENDATIONS

For Nursing Professionals: Seek specialized training in USAR, develop competencies in triage, implement infection control protocols, participate in multidisciplinary training, and contribute to psychological well-being programs.

- For Rescue Organizations: Integrate trained nurses into rescue teams, develop collaboration protocols with veterinarians, implement resilience programs, and establish stress management protocols.
- For Researchers: Conduct prospective studies on the role of nurses in USAR, investigate the effectiveness of infection control protocols, evaluate the impact of resilience interventions, and develop standardized guidelines.



CONCLUSION

This systematic review demonstrates that Nursing plays a critical and multifaceted role in pre-hospital operations involving canine technical skills in disasters. Trained nursing professionals contribute significantly to the safety of rescuers, the quality of patient care, and overall operational effectiveness. Multidisciplinary integration, facilitated by nurses, reduces uncertainty and improves psychological safety. Triage, infection control, and psychological well-being protocols implemented by nurses protect both patients and rescuers.

Investment in specialized training, protocol development, and continuous research are essential to maximize the safety and effectiveness of search and rescue operations in disasters. Recognizing and strengthening the role of Nursing in this context is imperative for the future of disaster response.

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