Improving Air Medical Transport Training:

A Nurse Leader Perspective

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Adapting to the air medical transport environment is challenging and complex for crewmembers, with many variables extending beyond medical management of the critically ill patient. The need for all air medical transport professionals to maintain a solid commitment to safety remains paramount. Not only are individual crewmembers responsible for maintaining safe delivery of care, but organizational leadership is responsible for establishing and promoting a culture of safety. Although the air medical transport community varies on their need to establish such guidelines, nurse leaders should work to support the development of best practice guidelines for standardized training at their facilities to ensure the safety of their air medical crews and the patients they serve. The Dorothy Ebersbach Academic Center for Flight Nursing at The Frances Payne Bolton (FPB) School of Nursing in Cleveland, Ohio designs standardized training for novice to expert crewmembers focusing on the adoption of safe patient care practices during medical transport in civilian environments.

Air medical transport is a comprehensive term describing the use of either airplane or helicopter to move patients to and from health care facilities and accident scenes. Air medical transport personnel provide comprehensive prehospital and emergency care in unstructured environments to all types of critical patients during medical evacuation or rescue operations aboard helicopter and fixed-wing aircraft.[1] Given the uncertain and unpredictable environment, a strong safety culture must be established, extending from the highest level of nursing and hospital administration to the newest crewmember.[2] Further, all members of the air medical transport community are responsible for ensuring crew safety and the delivery of quality safe patient care.[2]

Air medical transportation is widely regarded as beneficial to improving the chances of survival and recovery for trauma victims, particularly in rural areas that lack advanced-care facilities such as trauma or burn centers. Medical theory and practice hold that providing critically injured patients with medical intervention within the first "golden hour" after injury occurs, can significantly improve the chance for survival and recovery.[3] Air ambulance helicopters, with their ability to descend vertically at the scene of an accident and quickly shuttle to landing areas at or near hospitals, can significantly reduce patient transport time.[3]

Air medical transport aircraft, sometimes referred to as "ambulances" are of 2 types: rotor wing or helicopter and fixed-wing or jet/airplane. Helicopters provide on-scene responses for brief hospital-to-hospital transports, whereas fixed-wing aircraft provide longer transports across country and between airports.[4] Helicopter air ambulances make up the majority, approximately 74%, of all air ambulances. Although many may assume helicopters are most frequently used for on-the-scene response to motor

KEY POINTS

- **There are no evidence-based standards for the most effective orientation process of air medical personnel.**
- **The Dorothy Ebersbach Academic Center for Flight Nursing prepares air medical personnel for unstructured environments, organizes disaster-response training, and conducts research to build evidence for safe practice.**
- **Nurse leaders should be aware of the need to standardized air medical transport training in order to ensure provider safety and improve patient care outcomes.**

vehicle accidents, the majority of transports are interfacility in nature, transferring from a rural hospital to a higher trauma-level hospital.[4] Air Methods, the largest air ambulance provider, reported that in June 2016, approximately 70% of their flights were interfacility and 30% were responses at the scene.[4]

INCIDENCE

The Association of Air Medical Services (AAMS) collects data on the air medical transport world exclusively and reports that the industry has nearly 400,000 aircraft, helicopter or fixed wing, in the air today, with the demand for these services continually rising.[5] Currently, there are over 219,000 air medical providers, either employed full or part time in the air medical transport industry globally.[6] North America holds the commanding share of the air medical transport industry with more than 300 service providers and more than 1,300 aircrafts in the United States alone. Moreover, the United States reports nearly 400,000 helicopter transports annually and an additional 150,000 patients transported via fixed wing aircraft each year (2018).[5]

The air medical transport industry accounts for approximately $16 billion in revenue, with an annual growth of 1.2% over the last 5 years.[6] In the United States alone, air medical transport is a $4 billion industry, with 2.7% growth over the same period. Growing demand is largely due to an aging US population, the consolidation of hospital resources and providers of health care, as well as the steady decline in access to emergency care in rural areas.[6]

SAFETY

Crewmember safety is a major concern in the air medical transport industry. Air medical programs in the United States reported an alarming number of fatalities between 1991 and 2008, which exceeded any other type of aviation. Moreover, the 2008 fatality rate was the highest in the recorded history of the industry.[7] As small aircraft and helicopters have become more complex, engineering technology has advanced to provide systems to manage operational safety. In the event of an accident, many of these systems have presented additional hazards to first responders at an aircraft accident scene.[8]

The Federal Aviation Administration (FAA), in cooperation with General Aviation Manufacturers Association, industry manufacturers, first responders, and professional organizations, has developed standardized training for safety practices at the scene of an aircraft accident.[8] Training materials initially developed for firefighters, emergency medical services , and police now also provide useful information for lay persons who may come across an aircraft accident.[8] The FAA has also developed the FAA Safety Team (FAASTeam) with the goal to promote safer skies through education, training, and outreach to establish partnerships that promote a culture of safety within the aviation community.[9]

AIR MEDICAL TRANSPORT TRAINING

According to The Air and Surface Transport Nurses Association (ASTNA), the transport environment is composed of a multitude of risks and dangers, and crewmember's knowledge of how to mitigate the risk and avoid the dangers are key to the transport teams survival.[2] Quality training and practice on a regular basis have demonstrated a significant improvement on air medical transport team's response to emergency situations.[10] Air medical transport providers must be proficient in aircraft safety, radio operations, emergency procedures, and knowledge of weather patterns, and the use of good communication with the other members of the transport team are essential.[2] ASTNA believes air medical transport and crewmember safety is significantly enhanced if safety training is repeated annually in conjunction with a continual review of safety policies and drills that regularly test the effectiveness of safety policies.[10]

Currently, there are a limited number of standards published on the orientation content necessary for new air medical transport crewmembers. The Commission on Accreditation of Medical Transport Systems[11] outlines expected standards for minimum levels of training and provides suggestions for didactic and clinical experiences, as well as optional simulation training for particular transport experiences. ASTNA[12] in 2014 identified the concepts needed for best-practice orientation process including a comprehensive list of patient management topics, advanced procedures, and a varied list of evaluation methods including simulation and case presentations.[11]

SIMULATING THE AIR MEDICAL TRANSPORT ENVIRONMENT

Adapting to the critical care transport environment is challenging and complex for novice, as well expert, air medical transport providers.[13] In a 2016 study, 315 crewmembers from the 3 largest professional air medical transport organizations: AAMS, ASTNA, and Association of Critical Care Transport responded to a national survey aimed at determining the greatest challenges facing new crewmembers.[14] Responses revealed that crewmembers felt they were lacking in education and training in the areas of communication, safety, environment, and crew resource management. Survey responses validated the need for air medical transport simulations involving low-volume/high-risk patient populations.[14] Further, 74% of novice air medical crewmembers felt training within a full-scale helicopter capable of replicating the phases of flight during transport would be extremely advantageous.[14] To this end, faculty at the Frances Payne Bolton (FPB) School of Nursing began exploring the possibility

to train advanced practice nurses in a simulated environment to enhance their ability to develop a plan of care for transferring critically ill patients from unstructured environments to definitive care.[1]

The Dorothy Ebersbach Academic Center for Flight Nursing (DEACFN) at the FPB School of Nursing at Case Western Reserve University in Cleveland, Ohio was founded in 2002 and is part of the Master of Science in Nursing Adult-Gerontology Acute Care Nurse Practitioner (AG-ACNP) program. The DEACFN prepares advanced practice nursing students to deliver quality safe patient care in unstructured environments, organizes interprofessional disaster-response drills during its annual summer camp, and conducts research to build evidence-based practice with the air medical transport industry.[15]

In 2014, faculty at FPB's DEACFN collaborated with industry leaders to design a full-scale Sikorsky S76 helicopter simulator that allows flight faculty to select any 2 flight coordinates in the world, customizing a flight appropriate for their learners. The system created by Redbird Flight Simulations enables faculty to select the time of day with realistic weather patterns, turbulence, and phases of flight. The goal of the DEACFN is to prepare interdisciplinary air medical transport teams in collaborative practice, research, and leadership utilizing highly structured experiential learning activities with measurable outcomes.[15] The center has trained nearly 600 experienced national air medical crewmembers over the past 2 years with plans to expand training to the interdisciplinary team including flight physicians, paramedics, and fire-rescue personnel. Preliminary data suggest that training at the DEACFN has improved competency of new and experienced crewmembers through shortened orientation, lower rates of accidents and near misses, as well as improved quality and safe patient care practices during medical transport in civilian environments.

NATIONAL TRAINING EXAMPLE

In 2016, the DEACFN hosted their 15th annual flight camp dedicated to trauma and critical care transport to meet the learning needs of 29 graduate critical care nurses from Puerto Rico.[16] Graduate nurses were prebriefed on safety protocols prior to participating in various transfers and in-flight patient scenarios. Faculty observed and evaluated the graduate nurses' ability to manage the dynamic needs of the patient while providing prompts with the aid of 2 interior-mounted cameras and aviation headsets. Video recording the inflight simulations enhanced faculty's ability to review and debrief scenarios with the graduate nurses while reinforcing safety protocols for quality patient outcomes.[16]

FUTURE PLANS & DISCUSSION

Faculty are currently working on designing predeployment scenarios for tactical critical care air transport teams and measuring the effects of training on the incidence of post-traumatic stress disorder; identifying electronic phenotypes associated with patient health outcomes of interhospital transfer patients; and various projects related to team building, standardization of handoffs, and collaborative safe practice.[15] Faculty believe collaborating with national and international colleagues, as well as flight industry leaders, to improve air medical training is the first step in promoting safe and effective air medical transport globally.

In summary, adapting to the air medical transport environment is challenging for new and experienced crewmembers, with many external complex variables affecting their safety and the medical management of their critically ill patients.[15] The need for all air medical professionals to maintain a solid commitment to safety remains paramount. Not only are individual crewmembers responsible for maintaining safe delivery of care, organizational leadership is responsible for ensuring a culture of safety.[17] As nurse leaders, we need to be active members of the air medical transport community providing standardized evidence-based training that ensures crewmember safety and ultimately the delivery of safe quality patient care.[2]

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