

Running head: PARAMEDIC SKILL DETERIORATION IN EMS

Advanced Life Support Skill Deterioration Among Paramedics in Low Call Volume Emergency

Medical Service Systems

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Abstract

The problem that was explored in this research was that paramedics in Emergency Medical Service (EMS) systems that run fewer than fifty Advanced Life Support (ALS) calls a month do not get to practice those skills on real patients enough to keep them from deteriorating. The purpose of this research was to explore the problem of the deterioration of ALS skills in paramedics that work in low call volume EMS systems and determine if regular practice on simulated victims could prevent this deterioration. An action research methodology was used to answer the question. An experiment was conducted in which five paramedics practiced two ALS skills at the beginning of every shift. A control group of four paramedics did not practice the skills. The hypothesis was that those paramedics who practiced the skills would perform those skills with a higher success rate in the field. The results of the research showed that while no increase in the percentage of successful procedures in the field could be demonstrated, the paramedics who took part in the research felt more confident in their abilities. The recommendation that was made is for the Mount Weather Fire Department to implement regular ALS skill practice in addition to regular continuing education.

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Introduction

The provision of advanced life support (ALS) by emergency medical services (EMS) agencies throughout the nation is almost expected in this day and age. The paramedic's scope of practice has been expanded in most areas to include procedures that early paramedics would have never dreamed of performing. Advances in medical science have extended the advanced care once found only in an emergency room to the back of many ambulances on the road in the United States. While this has increased the level of care that many critical patients have been able to receive, it also raises questions about the ability of paramedics to remain proficient at delivering that care.

The Mount Weather Fire Department became an ALS EMS agency within the last three years and trained nine Paramedics in-house. The department generally runs fewer than fifty EMS calls a month. The problem is that the ALS skills that these paramedics learned are deteriorating with time leading to patient care that is below the department's standards. The department also hired four experienced paramedics who are now operating within the system. Due to attrition of several of the paramedics who were trained in-house, the department currently employs nine paramedics- five of whom have fewer than three years of experience and four of whom have greater than three years of experience.

The purpose of the research is to determine the best way to keep ALS skills from deteriorating in paramedics that work in low call volume systems. This is especially important with the less experienced paramedics who have not had the opportunity to gain experience by completing a large number of calls in the field. The research conducted for this applied research project is primarily action research aimed at answering the following questions:

- 1) How long does it take ALS skills to degrade in new paramedics?

2) Which ALS skills are most prone to degradation?

3) How much experience is necessary to prevent skill degradation despite a low call volume?

4) Are there any alternatives to gaining experience with actual patients to keep skills up?

A small-scale experiment was also conducted to try to quantify the effect of regular practice on training aids as it translates to the performance of the paramedic in the field. The hypothesis associated with this experiment is that paramedics who regularly practice on simulated patients will have greater success rates when performing the same skills on actual patients in the field.

Background and Significance

The emergency transport of sick and wounded dates back to the Napoleonic Wars in the 1790's when horse drawn carriages were used to ferry injured soldiers to a battlefield hospital that was located away from the battle. While no care was provided to these soldiers during their transport, it still represented a major step forward in the battlefield medicine and medicine in general. In the United States, Clara Barton organized a battlefield ambulance service during the Civil War, which, as in the previous example, provided no care to the wounded but did transport them to areas in which care could be received (Bledsoe & Benner, 2006).

After the Civil War, some large city hospitals began providing ambulance services. These ambulances also provided no treatment to patients but did provide transport to the hospitals they served. Funeral homes began providing ambulance service in many communities in the 20th Century, however, until the late 1960's, they provided little, if any, patient care. That changed soon after the publication of a National Academy of Sciences paper called "Accidental Death and Disability: The Neglected Disease of Modern Society". This paper recommended the

establishment of Emergency Medical Technician (EMT) training programs. EMT's would be trained in basic life support (BLS) skills and basic first aid (Bledsoe, Porter, & Shade, 1994).

The concept of ALS began in Belfast, Ireland in the late 1950's, when Dr. J. Frank Pantridge began staffing an ambulance with physicians, who provided ALS care to patients. In 1970, the first Paramedic training program was held in the United States. Dr. Eugene Nagle conducted the course in Miami, Florida. After that, programs sprang up around the United States and ALS care began to be practiced by Paramedics around the country (Bledsoe & Benner, 2006).

Since these early days, the profession of EMS and the regulations governing the initial and recurrent training of EMT's and Paramedics has taken on many incantations. Most recently, the National Highway Traffic Safety Administration (NHTSA) released the EMS Agenda for the Future in 2005. This document sets a "scope of practice" and curriculum for all EMS programs with a target implementation date of January 1, 2013 (National Highway Traffic Safety Administration, 2008). This document represents the biggest step yet taken to ensure that the initial and recurrent training of EMS professionals as well as the procedures they are allowed to perform in the field are uniform throughout the United States.

Among the procedures that Paramedics have been authorized to perform since the early days of ALS training are Endotracheal Tube (ET) placement and Intravenous (IV) cannulation. While much has been written about the ability of Paramedics to place ET tubes, very little study has been done on the ability of Paramedics to successfully place an IV angiocatheter. This is a relatively simple skill, however, many other ALS skills, like the administration of medications, require that an IV cannula be placed first. A Paramedic who's skills have deteriorated in this skill due to lack of practice may be putting their patients at risk, or at the very least, not be able to provide their patients with the highest level of care. This is of particular concern in EMS

systems in which the Paramedics do not get to perform these skills on live patients on a regular basis.

The following research is linked to the Unit 10: Service Quality section of the Executive Development Course in which the students are taught to “recognize the importance of quality in the fire service and the role of the Executive Fire Officer (EFO) in encouraging quality”(United States Fire Administration, 2006, p. 10-1). This study was conducted to help the United States Fire Administration meet its operational objective of responding appropriately in a timely manner to emerging issues.

Furthermore, it is also linked to United States Fire Administration goal number 3: Improve the fire and emergency services’ capability for response to and recovery from all hazards, goal number 4: Improve the fire and emergency services’ professional status, and specifically, operational objective 4.1: Enhance the professionalism of the Nation’s Fire and emergency services leaders as outlined in the United States Fire Administration’s strategic plan for Fiscal years 2009-2013(United States Fire Administration, 2008).

Literature Review

In order to determine the breadth of research already completed in this area, a literature review was undertaken. Much of the literature found on this specific subject dates to the early and mid 1980’s. For example, Zautcke, Lee, and Ethington conducted research in Chicago that was published in the Journal of Emergency Medicine in 1985 that examined 40 paramedics that were graduates of the city of Chicago’s Paramedic training program. This research showed that after certification, the Paramedics studied showed marked decreases in ability when compared to those demonstrated upon their graduation from the program. Areas studied included airway management, IV therapy and immobilization. The study did show that while airway

management skills and IV skills deteriorated, they were not shown to be unacceptable (Zautke, Lee, & Ethington, 1987).

Wood, Kalinowski, Miller, and Newton conducted research that was published in 2004 in *Pediatric Emergency Care* that showed that paramedic skills begin to deteriorate between 6-12 months after initial training (Wood, Kalinowski, Miller, & Newton, 2004).

In 2007, a group of researchers from the Medical College of Wisconsin looked at the critical care skill and experience benchmark standards established by the Milwaukee County, WI EMS system. This study found that when the number of Paramedics in a system increased, the number of procedures that the average paramedic in the system completed decreased. “These data reaffirm that high-risk skills are performed infrequently. Milwaukee County paramedics have limited exposure to critically ill adult and pediatric patients. This suggests a multifaceted approach should be considered for maintaining provider competency.” (Vrotsos, Pirrallo, Guse, & Aufderheide, 2008, p. 306)

When looking at whether experienced paramedics are as prone to skill deterioration as newer paramedics are, a group of researchers from the Truman Medical Center determined that “the number of patients in whom intubation was attempted per paramedic was significantly correlated with the intubation success rate. Months of experience per paramedic had no significant correlation with intubation success rate” (Garza, Gratton, Coontz, Noble, & Ma, 2003, p. 256). The study also showed that paramedic airway skills decline about 25% within 40 weeks after training.

This study may soon be challenged by new research that has not yet been published from the University of Pittsburgh in which the correlation between the experience of paramedics performing ET intubations and patient survival rates. This research suggests that survival rates

are higher among patients intubated by paramedics who have high or very high experience levels (Wang, Balasubramani, Lave, Yealy, & Cook, 2009)

Several studies looked at the learning process involved with ET intubation. A 2004 study by the University of Pittsburgh School of Medicine found that proficiency in ET intubation improved with the number intubations attempted during a paramedic class. In fact, the researchers found that the percentage of successful intubations that a paramedic student was able to log jumped from 77.8% to 95.8% after they had attempted over 30 ET intubation procedures (Wang, Seitz, Hostler, & Yealy, 2005, p. 159). This study looked only at “live” intubation on real patients in different clinical and prehospital settings. It did not study the effect of mannequin practice or other simulated learning experiences.

Another study by Dr. Wang shows that ET intubation is a complex procedure that is primarily a skills-based procedure, but requires rules based and knowledge based thought processes. This study states, “Few efforts have investigated medical decision-making processes in acute or critical care settings” (Wang & Katz, 2007, p. 237). This shows the need for research into the mindset of paramedics and how they make decisions and perform skills in the field.

In 2002, a study was conducted in the state of Maine regarding the success rates of paramedics in rural areas who are unable to perform intubations in the field regularly. This study found that 5317 attempts yielded 4517 successful adult ET intubations which translates to an 84% success rate overall. Among providers with five or more intubation encounters within the previous twelve months, out of 641 attempts, 551 were successful. This is an 86% success rate for these providers. This study concluded that it would be difficult for many rural ALS providers to meet an experience requirement of six to twelve intubations a year (Burton, Bauman, Maoz, Bradshaw, & Lebrun, 2003).

The problem of skill maintenance is not just a rural EMS system problem. Evidence of this is found in a 2001 study that was published in the *Annals of Emergency Medicine*. The researchers at the JFK Medical Center in Orlando, Florida found that of 108 patients that were intubated in the field by EMS providers, 27 (25%) had misplaced ET tubes upon transfer to the emergency room as confirmed by an attending physician or the senior resident at the emergency room upon patient transfer (Katz & Falk, 2001). In the conclusion of this study, the authors state that paramedics “can be trained to perform this function properly and successfully” and that “ongoing monitoring and a vigilant continuous quality improvement system may be critical elements to ensure that our citizens receive the high-quality out-of-hospital care they expect and deserve.” (Katz & Falk, p. 36) This serves as proof that all paramedics, even those from high-call-volume systems need recurrent training to stay sharp.

From an education standpoint, nowhere in the current national recertification curriculum is it required that a paramedic perform skills on live or simulated patients in order to recertify. In 2003, the National Association of EMS Educators (NAEMSE) released two position statements on the issue of recertification. The Standards and Practices Committee Position Paper states that “Recertification should not only measure the EMS professional’s ability to react appropriately in the everyday or typical patient encounters but also it must assess their ability to manage atypical or less frequent situations” (National Association of EMS Educators, 2003). While not relaying how recertification training should be conducted, the NAEMSE made it clear in this paper that recertification training should include education on low frequency procedures like ET intubation.

The second NAEMSE position paper was issued by the Distributed Learning Committee and deals with the use of internet based distributive learning (IBDL). The paper states that while the NAEMSE does not recommend IBDL for initial training of psychomotor skills, like ET

intubation and IV cannulation, it does state that IBDL is “very useful for refreshing little-used skills after they have already been learned, particularly for EMS providers practicing in rural or remote locations” (National Association of EMS Educators, 2003, p. 6). The paper provides no evidence, however, as to the proof that this type of training aids in the retention of psychomotor skills.

The Los Angeles Biomedical Research Institute at Harbor- UCLA conducted the most comprehensive study that will be covered in this literature review. This study looked at 245 paramedics from Los Angeles and Orange Counties in California who volunteered to attend a retraining session on pediatric ET intubation and Bag valve mask (BVM) ventilation. The researchers used questionnaires to determine the self-efficacy of the paramedics with these skills prior to and after the training session. Furthermore, the sample was split into one of four retraining groups- no retraining (control), videotape retraining, self-directed retraining, or instructor facilitated retraining (Youngquist et al. 2008).

The researchers found that pediatric airway skills diminish greatly just six months out from training. Also, they found that those who went through the instructor-facilitated retraining scored the highest during post testing, the self-directed learning group performed similarly to the control group, but the videotape group did worse than the control group. Overall, skill retention after six months was poor for both pediatric BVM skills and pediatric intubation skills. Finally, the researchers found that “Paramedics from low-call-volume areas reported lower base line self efficacy and derived larger increases with training, but also experienced the most decline between training events” (Youngquist et al. 2008, p. 1295).

Procedures

In order to answer the research questions posed in this applied research project, the author began by conducting a literature review. By reviewing the available literature, the author was able to gain insight into the question how long does it take for ALS skills to degrade in new paramedics and are there any alternatives to gaining experience with actual patients to keep skills up? Which ALS skills were most prone to deterioration was more difficult to ascertain through reviewing available studies. A look into how much experience was necessary to prevent skill deterioration despite low call volume found two studies with contradictory results.

While conducting the literature review, the author also made personal observations, pulled data from a computer database that tracks procedures performed, and conducted interviews with the medical director for the Mount Weather Fire Department, a provider from outside the department with more than twenty years of experience as an emergency room nurse and a prehospital provider, and several paramedics with experience varying from less than one year to more than ten years. These interviews were candid and unstructured in order to put the respondent at ease and gain valuable and honest information however, all four research questions were posed to each individual interviewed at some time in the interview. The author also promised the paramedics interviewed that their names would be withheld from the paper.

The author then set up an experiment in which the eight paramedics employed by the Mount Weather Fire Department would practice at least one IV on a simulated arm designed to practice IV cannulation, and one ET intubation on a mannequin also designed for that purpose at the beginning of each shift. This began as an attempt at quantitative research, however, due to the inability to randomize the study sample, present the study to an institutional review board for approval, and collect meaningful statistics due to time constraints coupled with low call volume,

the study was reworked as voluntary daily practice that occurred from August 10, 2009 to September 10, 2009. During that time, all eight of the paramedics (excluding the author) took part in the training to varying degrees. Each was scheduled to work ten shifts during the time frame, but may have worked fewer due to leave. One of the eight paramedics took part fewer than five times due to being injured early in the program and was not present to partake in the training. The rest took part between five and ten times.

The paramedics were asked to record the number of attempted and successful IV's on the practice arm, attempted and successful IV's made outside of the department since their last shift (e.g. at a second job or volunteering), number of attempted and successful ET tube placements on the airway trainer, and number of attempted and successful ET tubes placed outside of the department since their last shift. The date of these attempts was also noted as well as a number that was assigned to each of the participants in order to maintain their anonymity to everyone except the author.

Limitations of this study include the inability to provide any statistically significant data due to a small sample size and low call volume that led to the inability to generate statistical data. Only one patient required an IV after the practice sessions and that provider required two attempts to successfully start the IV. No patients required intubation. The author also was unable to legally conduct quantitative human research due to the lack of an institutional review board being made available to ensure that all ethical considerations were taken into account. Also, this study only looked at two of the many skills in which paramedics are required to maintain proficiency.

Results

The author interviewed the department's medical director in his office on May 12, 2009. When asked how long he believed it took ALS skills to degrade in a new paramedic, his answer was similar to that found when reviewing the literature. He stated that he believed skills dropped sharply within three to six months after graduation from training if strong recurrent training wasn't conducted. He was also of the opinion that ET intubation skills were most prone to deterioration. When asked how much experience he believed was necessary to prevent deterioration, he stated that he believed there was a point in which the skills would degrade much slower than when the paramedic was new, but he was unsure what that point was. The medical director also believed that practice mannequins could aid in developing good technique for ET intubation and IV cannulation, however practice on live patients was the most beneficial to paramedics (J. Potter, personal communication, May 12, 2009).

Also on May 12, 2009, the author interviewed an emergency room nurse who had recently retired after over 20 years of working at a busy emergency room in Virginia. This nurse also had prehospital patient care experience as a Cardiac Technician (a level similar to an EMT-Intermediate which no longer exists in Virginia) in the 1980's and early 1990's. The nurse stated that he also believed that skills degraded quickly in new paramedics. He noted that during their training, they spend many hours performing IV cannulation and other procedures in clinical settings and in the field, but when they enter the field, they no longer have this regular exposure to the procedures. They also only have a "safety net" in the way of a preceptor generally for a short period of time. A preceptor is an experienced paramedic who acts as a field training officer for paramedic students and new paramedics until it is determined that they are competent enough to act as paramedics on their own.

When asked which skills were most likely to deteriorate, he stated that he saw a drop in IV skills among new paramedics after they began practicing on their own and a drop in confidence which often caused them to be less aggressive in the treatment of their patients. He stated that this often continues for a long period of time. He also stated that he had started thousands of IV's and believes that he could not start one for several years and still be proficient at the skill. He stated that he had significantly less ET intubation experience and that he would not be confident performing that skill. Finally, he stated that he wasn't very familiar with the newer simulators and mannequins and was unsure if they would be able to take the place of actual patient care experience, which he considered to be the gold standard (G. Mauk, Personal Communication, May 12, 2009).

The author also interviewed four of the nine paramedics on staff at the Mount Weather Fire Department. It should be noted that one of the nine paramedics employed at this department is the author. Of the four paramedics interviewed, one had more than ten years experience, but all of that experience was in low call volume systems and he had practiced very little for the past seven years, guessing that he had seen fewer than ten ALS patients in the last five years. He stated that his skills had degraded quickly after paramedic school, and that since he had not treated a patient in so long, he would be uncomfortable doing so now without another paramedic there to assist. He believed that the skills most prone to deterioration were assessment skills rather than the procedural skills looked at in this project. He was unsure how much experience was needed to prevent skill deterioration, but stated he never hit that point. He also stated that while alternative training aids were helpful, they did not help instill confidence in him to be able to perform procedures on live patients (Anonymous 1, personal communication, July 20, 2009).

The second experienced paramedic that the author interviewed also had over ten years of experience, but his experience included performing IV cannulation as a technician in a moderately busy emergency room in Virginia and performing skills as a field paramedic in an EMS system that was busy enough to afford him the opportunity to treat over 100 ALS patients a year. This paramedic stated that he did not feel that his skills degraded after his paramedic class, but the reason may have been that he was working in the emergency room at that time. He also said that he thought assessment skills were quicker to degrade than the procedural skills but that most paramedics with five or more years of field experience are less likely to experience skill deterioration. He believes that using training simulators is a good way for experienced paramedics to maintain their skills, but is unsure if they would help newer paramedics (Anonymous 2, personal communication, June 19, 2009).

The author also interviewed two paramedics who had been trained in the in-house paramedic training program that was conducted from January to July of 2007. Both of these students showed similar progress and both passed the computer based and practical testing required to obtain paramedic certification from the National Registry of EMT's (NREMT) late in 2007. Both completed their field training in a timely manner and were released to practice independently as paramedics early in 2008. One major difference between these two paramedics is that one volunteers as a paramedic with his volunteer fire department on his days off and the other one does not. Both were interviewed again after they were given the opportunity to practice on training mannequins for a month.

The new paramedic who volunteered extensively had greater self-efficacy when it came to all procedures he is authorized to perform. He did state that he believed his IV skills were not as good as they were during his class, however he said he had confidence in his ability to perform

all of the other paramedic skills. He stated that he had not yet hit the point that he feels he has enough experience to prevent skill deterioration during a long lay off. He also believes that practice in the form of mannequin practice and courses such as Advanced Medical Life Support (AMLS) are of great value for newer paramedics (Anonymous 3, personal communication, April 19, 2009).

The other new paramedic that I interviewed stated that the fastest skill that degraded from his point of view was electrocardiograph (EKG) interpretation. He stated that he was never entirely comfortable with this skill during the paramedic course and that it deteriorated within weeks of the end of his class. He believed that much more experience than he has is needed for him to be proficient as a paramedic. He believes that there is no substitute for actual patient contact for gaining experience (Anonymous 4, personal communication, April 20, 2009).

The author's personal observations were recorded on random ALS calls involving live patients between April 6, 2009 and August 10, 2009. The author responded to four different ALS calls during this time with other paramedics from the department and observed their performance of ALS skills. Three of these calls were run by paramedics with less than two years of experience and one was run by a paramedic with more than ten years of experience. All four patients required establishment of an IV line and none required ET intubation. All four IV's were placed successfully on the first try, but the author noted that the more experienced paramedic started the IV more quickly and efficiently while speaking to the patient, while the three less-experienced paramedics started the IV lines in complete silence in what appeared to be a state of heavy concentration and perhaps nervousness.

The author also pulled data from a database maintained by the department that tracks the success rates of ALS and BLS procedures. The data showed that between January 1, 2009 and

August 1, 2009, the department ran 27 ALS calls in which the patient required at least an IV line. Only 1 call required the placement of an ET tube during this time. Of the nine paramedics on staff during this time, only seven ran any ALS calls. Of those seven providers, the average number of calls run was 3.8 with three providers running only one call and one provider running seven calls. Out of 27 IV attempts during this time, 19 were successful for an overall success percentage of 70%. The one ET intubation attempted during this time was successful.

Table 1

Number of attempts and successes of procedures during practice period.

Number	IV attempts on arm	IV success on arm	IV attempts outside MWFD	IV successes outside MWFD	ET attempts on trainer	ET successes on trainer	ET attempts outside MWFD	ET Successes outside MWFD
1	12	12	15	12	10	10	0	0
2	11	11	0	0	11	11	0	0
3	7	7	0	0	6	6	0	0
4	8	7	0	0	6	6	0	0
5	5	5	0	0	5	5	0	0
6	8	7	0	0	8	8	0	0
7	11	11	10	7	12	11	0	0
8	1	1	0	0	1	1	0	0

After the practice was completed, two of the new paramedics (Anonymous 3 and Anonymous 4) who were interviewed prior to the training sessions were interviewed again. Neither of them had started an IV while operating under the auspices of the Mount Weather Fire Department since the end of the practice sessions. Both stated that they did feel somewhat more confident in their skills than they did prior to the practice sessions, but that they felt regular recurrent training in these areas was necessary to continue feeling more confident for an extended period of time.

Discussion/ Implications

The research conducted led the author to the following answers regarding the original research questions. 1) How long does it take for ALS skills to deteriorate in new paramedics? The research conducted appears to be in line with the authors of the studies that state that ALS skills deteriorate significantly within six months of the paramedic's completion of his or her class as stated by Garza et al. (2003) and Youngquist et al. (2008). This study showed that while the percentage of successful procedures remained fairly high (70% for IV attempts and 100% for ET attempts) the paramedic's self-efficacy has diminished severely due to lack of experience on real patients.

Research question 2) which ALS skills are most prone to deterioration? While most of the studies examined in the literature review dealt with ET intubation skills, this study found that paramedics were also concerned with deteriorating IV skills, patient assessment skills, and EKG interpretation skills. The Youngquist et al. (2008) study did not delve into issues about ALS skills outside of pediatric intubation, but the study did show a correlation between self-efficacy and the ability to successfully complete that skill. The author also found that the paramedics

with the highest levels of self-efficacy (although not quantified) performed best on skills despite experience or the lack thereof.

The author could not quantify the answer to research question 3, which asked how much experience is necessary to prevent skill deterioration despite low call volume. The studies by Wang et al. (2009), Wang et al. (2005), Wood et al. (2004), and Youngquist et al. (2008) seem to show that as experience increases, success rates of ET intubation also increase or, if nothing else, retraining seems to be more effective. This however is challenged in the Garza et al. (2003) study that found that experience did not play a part in successful procedure outcomes. While this study was unable to quantify how much experience is necessary for the provider to become “immune” to skill deterioration, discussions with providers show that there is nearly a universal belief in this concept. The author, on the other hand, believes based upon his personal observation that no matter how experienced a provider is he or she needs to practice ALS skills regularly to ward off skill deterioration. This position is supported by the position papers cited from the NAEMSE (National Association of EMS Educators, 2003).

Finally, question number 4, which asks about alternatives to actual patient care experience being needed to keep skills up is also difficult to quantify. While there is no evidence that practicing with IV arm or airway training head improved the success rates of these skills by paramedics, there was a general feeling among those interviewed that the practice sessions did increase their self-efficacy. Youngquist et al. (2008) concludes that self-efficacy is an important part of being able to successfully complete a skill.

The organizational implications of this study were many. As practice increased among the paramedics, their self-efficacy also seemed to increase. All of those interviewed after the practice sessions believed that the project was worthwhile and they would relish the opportunity

to conduct more training above and beyond what is required for recertification. This study also played a small part in the acquisition of an advanced ALS practice mannequin by the department in order to conduct more realistic training.

Recommendations

The author is making several recommendations to the other members of the leadership of the Mt. Weather Fire Department based upon the finding of this study. These recommendations are aimed at solving the initial problem presented in this research project. That is, ALS skills are deteriorating among the paramedics at the Mt. Weather Fire Department due to a low call volume leading to few opportunities for the paramedics to practice them.

The first recommendation that the author is going to make is the implementation of quarterly “skills drills” that will require the paramedics to practice ALS skills every three months in a non-punitive setting- allowing them to learn from each other. These skills drills will not just encompass the skills of IV cannulation and ET intubation, but also other skills that were brought to the author’s attention during the interviews discussed in the study. This endeavor will be aided by the recent acquisition of an advanced ALS simulator that will be used to deliver a more realistic retraining experience. An overview of the skills to be practiced is included in the appendix.

The author will be completing further analysis of the data over the next several years in order to see if a positive correlation between the quarterly skills practice sessions and the success rate of procedures can be quantified. The author will also continue to conduct follow up interviews to see if the self-efficacy of the paramedics in the department is improving and why.

In conclusion, this study has shown the author that this topic is one that needs further research. A quantitative study of paramedic skills in low call volume systems needs to be done as well as a quantitative study on how to best maintain these skills.

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Appendix A

MWFD Paramedic Skills Practice Log

Number_____

Date_____

IV Cannulation on practice arm: Attempted_____ Successful_____

IV's started outside MWFD since last shift: Attempted_____ Successful_____ (Volunteer, part time, etc.)

ET Tube placement on Airway trainer: Attempted_____ Successful_____

ET Tube placement outside MWFD since last shift: Attempted_____ Successful_____ (Volunteer, part time, etc.)

Appendix B

Quarterly Skills Practice Requirements for the Mount Weather Fire Department

All procedures must be completed on the ALS skills mannequin unless otherwise stated

Patient Assessments (3 minimum)

IV cannulations (6 minimum)

Adult Intubations (3 minimum on live patients or 6 on the mannequin)

Pediatric intubations (6 minimum on the pediatric airway trainer)

Alternate airway placement (LMA, Combitube) (3 minimum)

Thoracotomy (3 minimum)

Needle Cricothyroidotomy (3 minimum)

EKG interpretation (4 different rhythms identified correctly)

Drug dosage calculations (complete 10 questions provided on a work sheet)