

# Research and Professional Education in Emergency Medical Services

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## Abstract

Emergency Medical Services (EMS) is a critical component in the delivery of quality healthcare services. Being the first line of professionals to respond and evacuate patients to hospitals, paramedics play a major role in influencing the short term and long term health outcomes the clients with traumatic injuries. In this case, there is need to continuously empower paramedics them with up to date skills and knowledge, to enhance their competence in the profession, through continuous professional education and research in emergency medical services. However, lack of adequate repository of knowledge such as books and scholarly research studies in the field is a major hindrance. This study sought to examine the trend in EMS research, by investigating the scholarly research studies published in the filed in the last 10 years. An electronic search was conducted in the various databases to monitor the number of published scholarly research articles in 13 countries across the world. The study found that although there has been a gradual increase in the number of published research studies during the period of review, the number is so far below the required standards. This indicates low interest in continuous professional development of EMS through research, a situation that hinders delivery of improved services in the field.

**Keywords:** EMS research, paramedic education.

## Background

Emergency Medical Service (EMS) is one of the critical components of healthcare system, which is normally involved in the rescue, stabilization and transportation of trauma patients to medical institutions for treatment [5]. The demand for EMS in both developing and developed countries has been on an increasing trend, due to ever increasing incidences of automobile accidents, violence and disasters. United States has 850,000 emergency medical services providers actively involved in providing pre hospital care services to about 20,000 emergencies that occur annually in the country [1]. However, professional development of paramedics to enhance their ability to deliver improved quality pre-hospital services has emerged as a major area deserving attention from all stakeholders.

Being a paramedic with all levels of academic background are infrequently to spend a lot of time in researching and writing for the EMS industry, generally, paramedics are depending on routine Continuing Medical Education (CME) and recertification as their regular professional learning. As a matter of fact, many advances in professional education are intimately connected to the research for solutions to practical problems [6]. Such research is use-inspired, if executed as part of a systematic and strategic program of inquiry, it can support new understandings at the most fundamental and basic scientific level, this applied to paramedic as well.

EMS related research encompasses out-of-hospital based emergency cases, in the recent years; there has been a growing contribution to the literature by

paramedics to counter the considerable lack of field data available to support specific interventions or practices. Taking United States as example, federal government agencies annually contribute research funding to pre-hospital EMS [7, 8], such as the National Institutes of Health (NIH), the Agency for Healthcare Research and Quality (AHRQ), the National Highway Traffic Safety Administration (NHTSA), the Health Resources and Services Administration (HRSA), and the Centers for Disease Control and Prevention (CDC), they all have various programs in place to support for the EMS field. However, comparing to some Asian cities, including Hong Kong, Macau, Taiwan and etc., the research foundation to support EMS or related studies is actually less well developed. Consequently, EMS has for years performed without scientific support for many of its actions [9, 10].

Education through research in EMS is somehow limited by a variety of factors, including a lack of investigators being considered to concentrate their work on this area of research that restrict the number of sharing of related information, on the other hand, lack of funding directed specifically to support EMS research also a contributing factor. Despite some paramedics are willing to develop research interest, it is a fact that they currently receive little or no formal training in research methodologies, biostatistics, or informed consent and are not experienced in how to perform a critical reading of the literature [11]. Only a small number of EMS personnel have become accomplished as researchers by taking formal training and advanced degrees that were not part of their initial training in ambulance service [12, 13].

Promoting continuous learning and research has been identified as one of the key approaches of enhancing competence in EMS and healthcare system at large [3]. This realization has been brought about by need to have the entire healthcare system

adapt and adequately address the emerging trends and demands of healthcare services in the 21<sup>st</sup> century.

These include the need to improve the quality and outcomes of patient care, providing universal and affordable healthcare and application of emerging medical technologies [3].

Empirical research evidence indicates that continuous learning and professional development among paramedics empowers them with skills that enhance recovery outcomes of emergency patients and in generation of new knowledge crucial to advancement of the profession [1, 2]. A research study by Guy and Brachet [2] found that paramedics that trained on the use of pre-hospital Advanced Life Support (ALS) reported a decline in the seriousness of injuries and mortality of trauma patients within 24 hours. Moreover, ALS intervention was found to enhance recovery from multiple traumatic injuries [2]. Evidence based research studies on delivery of EMS services in remote areas have also indicated an improvement in survival rates for trauma patients after administration of on scene interventions in Ireland [3] and prediction in occurrence rate for pre-hospital cardiac arrest in Hong Kong [4]. All of these studies underline the research importance of continuous professional development of paramedics. A study investigating the effects of continuous professional development on paramedics indicated found that the learners reported significant benefits, including gaining new knowledge and updating their skills and introducing new evidence based practices into the profession. However, there is shortage of research on various aspects of EMS, including evidence based studies investigating the efficacy of out of hospital interventions and management for patients with trauma injuries in addition to promoting paramedics welfare as crucial stakeholders in the healthcare sector.

The lack of adequate scientific literature and research on various aspects of EMS and low motivation of paramedics to engage in lifelong learning and continuous professional development is a major issue of concern in the healthcare system<sup>1</sup>. Various experiential studies investigating published research

on continuous professional development of paramedics across the world have found extremely low numbers<sup>2</sup>. The trend is a considerable impediment to achieving quality healthcare services and in improving professional development of paramedics. Various research studies have investigated the impediments to research and continuous learning in EMS. Some of the impeding factors are associated with the working environment and lack of engagement among the existing paramedics.

EMS work environment is characterized by high levels of stress, concerns about personal safety, irregular working hours, rigorous training, limited professional mobility and poor compensation [2, 5]. Paramedics are exposed to various occupational hazards, which includes contact with body fluids from disaster scenes, risk of falling objects and exposure to violence [2]. A combination of these factors makes EMS one of the careers with lowest staff retention rates. The challenging working environment has over the years been attributed to playing a significant role in undermining establishment of a learning culture in the EMS [1].

This research study sought to investigate the number of scholarly research studies published in paramedics and EMS.

### Methodology

To investigate research development in paramedics and emergency services an extensive electronic search was conducted in various research databases across the world. The search sought to establish the number of scholarly studies in paramedics and emergency medical services from 1997 to 2016 in 13 countries. The countries included United States, United Kingdom, Germany, Canada, France, Hong Kong, India, China, Japan, South Korea, Singapore, Australia and Taiwan. . To identify relevant scholarly journals, the search words applied included “paramedics” “emergency, medical services” and ambulance. The number of articles were noted and tabulated.

### Findings

Table 1: Countries with the highest Number of Research studies published in Paramedics and Emergency medical services from 2008-2016

Country	2008	2009	2010	2011	2012	2013	2014	2015	2016
United states	749	895	903	1130	1130	1530	1390	1750	1630
Australia	531	528	649	689	806	879	931	1170	1020
UK	799	936	1020	1190	1310	1570	1450	1710	1655
Canada	559	617	739	764	838	840	850	1070	949

Table 2: The total number of published Scholarly research studies in Paramedics and EMS in 13 countries, from 2007 -2016.

Year	Number of scholarly articles
2016	4620
2015	4750
2014	4090
2013	4090
2012	3650
2011	3330
2010	3000
2009	2710
2008	2550
2007	2130

Figure 1: Published scholarly journals on Paramedics from 1997-2016

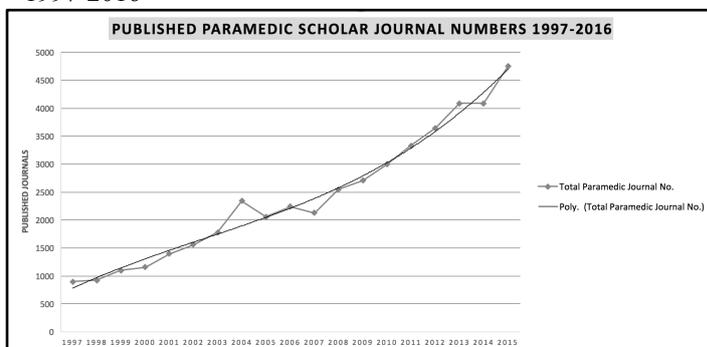
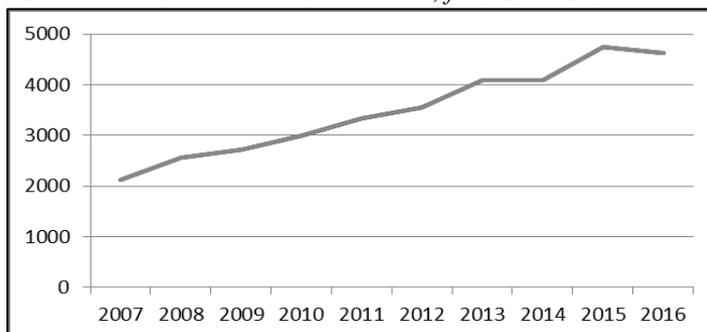


Figure 2: Number of scholarly research articles on Paramedics Published in 13 countries, from 2007-2016



Year	Total Paramedic Journal No.	Hong Kong	Singapore	Taiwan	Japan	South Korea	China	India	Australia	USA	Canada	Germany	French	UK
2016	4620	188	244	159	435	238	457	457	1020	1630	949	671	516	1650
2015	4750	201	243	156	473	339	478	459	1170	1750	1070	578	515	1710
2014	4090	150	168	149	433	254	422	390	931	1390	850	594	576	1450
2013	4090	141	344	122	525	227	384	349	879	1530	840	530	667	1570
2012	3650	173	158	122	393	207	398	349	806	1130	838	515	546	1310
2011	3330	145	217	109	355	185	376	325	689	1130	764	467	518	1190
2010	3000	139	157	97	311	158	347	292	649	903	732	471	459	1020
2009	2710	117	131	81	269	149	285	284	528	895	617	386	423	936
2008	2550	140	148	100	257	173	331	279	531	749	559	380	388	799
2007	2130	87	116	57	219	96	224	213	423	676	514	289	313	656
2006	2240	104	564	100	248	91	653	642	888	1160	949	782	289	1110
2005	2060	70	93	54	158	63	143	231	414	546	460	198	257	610
2004	2340	409	378	55	509	58	489	138	281	857	669	552	217	776
2003	1780	74	77	39	172	65	119	153	262	478	343	203	228	419
2002	1560	47	81	39	140	57	96	217	212	412	366	167	293	322
2001	1400	85	76	21	136	35	1005	127	242	425	248	202	177	368
2000	1160	35	37	24	97	37	65	82	144	314	185	123	125	212
1999	1100	38	17	11	104	35	67	73	125	280	198	110	109	231
1998	925	31	26	8	66	19	48	48	97	271	139	68	95	191
1997	900	36	18	11	75	19	36	35	147	294	180	102	72	167

Table 3: Journals published from 1997-2016 related to Paramedics

Table 1 demonstrates the leading countries in the publication of research on paramedics and emergency medical services from 2008 to 2016. During the period, there has been a gradual increase and interest in the area of paramedic research, as indicated by the increasing number of the publications. In 2008, a total of 2, 638 research articles were published in four countries leading in paramedic research in the world, namely United States, United Kingdom, Australia and Canada. In 2016, the total number of articles published in the four countries was 5,254 representing an increase of about 99% within the 9 year period.

Table 2 represents the total number of articles published in paramedics and emergency medical services in 13 countries across the world from 2007 to 2016. In 2007, a total of 2130 articles in the discipline were published in the discipline, which increased to 4,620 in 2016. This represented an increase of 116% within a period of 10 years (2007-2016). Table 3 demonstrates the trend in publication of scholarly journals related to paramedics in 13 countries, from 1997-2016. The table demonstrates a gradual but slow increase in the number of journals

published within the period, as indicated in figure 1 and figure 2.

Although there is has been a gradual increase in the number of scholarly research articles in paramedics and EMS published from 1997 to 2016 as indicated in figure 1 and figure 2, it does not compare with other disciplines in healthcare, such as nursing and medicine.

### Discussions and Conclusion

To make research more pleasurable so as to foster life-long professional education and development, it should not be a process causing anxiety and pressure by spending more time reviewing various publications within the EMS framework. As researchers, we want to get our research to do it in a way that people will find accessible, enjoyable and engaging. I think it is time for all of us to begin looking at this continuing education system differently. For one, most if not all paramedics have to do, so obviously there is some benefit if the EMS field as a whole does this.

Paramedic practices are more based on conventional and mentorship practices which may slow to adopt most current trends. Nonetheless, promoting research as part of the continuing professional education for

paramedics to determine what constitutes better standard in the pre-hospital setting would allow for enhancements over time. To start with, there are many traditional or non-traditional journal articles including but not limited as listed below, where some emergency medicine journals are not for paramedic that at least occasionally include pre-hospital and ambulance related topics.

As EMS professionals in this unique and challenging world, we must remember that it is very important to stay up-to-date and research for the newest information so we can best treat our patients with knowledge to fit in different emergency scenes, it also leads to new treatments or prove existing practice may be improved by new initiatives; though the results are sometimes ambiguous, others simply open our eyes to innovative ideas and challenges.

Research findings indicate that incorporating various adult learning principles in training promotes development of learning culture. The principles include immediacy and selection of topics that are relevant to promote learners engagement, the other approach entails infusing a sense of curiosity in learners to initiate and sustain intrinsic motivation to engage in lifelong learning [1]. This fosters development of behaviors that encourage acquisition of new knowledge, which could ultimately result to increased engagement in research and lifelong learning among the paramedics.

Continuous professional development of paramedics should be made a mandatory component of medical practice to promote enhancement of skills, competence in addition to development and dissemination of new knowledge in EMS. However, this would require considerable investment by all stakeholders involved in EMS, including individual paramedic practitioners in taking stewardship of own learning. Addressing these issues is critical to promote a culture of lifelong learning and research in EMS practice. This would encourage a formation of a vibrant practice, which is updated on current best

practices to promote professional and personal development.

From time to time, it is not uncommon to hear that EMS providers discuss about not being considered as part of the medical profession (not doctor or nurse) or being left out for this reason or that. May be making this change will be the first step in achieving a more level playing field with some of our counterparts.

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