

RESEARCH REPORTS

PERCEIVED BARRIERS TO PARTICIPATION IN EMERGENCY MEDICAL SERVICES RESEARCH

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ABSTRACT

Background: Research is essential to guide evidence-based practice in emergency medical services (EMS), but the barriers to performing EMS research remain poorly characterized. Therefore, this study aimed to identify barriers to EMS research participation using a survey of collegiate EMS affiliates.

Materials and Methods: The mixed methods cross-sectional survey was distributed virtually through the National Collegiate Emergency Medical Services Foundation's social media. Questions were multiple choice and free-text and asked about participants' training background, demographics, and perspectives on EMS research. Results were stratified by respondents' prior EMS research experience and compared via a Chi-Square test.

Results: Seventy responses were included. Mean age was 32±12 years. The population was predominantly male (60.9%) and white (86.8%). Educational levels and professional certifications were most commonly bachelor's degrees (56.5%) and EMT (38.6%), respectively. Thirty (43.5%) participants reported EMS research experience. Those with prior EMS involvement reported easier access to EMS research ($p=0.008$). Value of EMS research ($p=0.56$), barriers to participation ($p=0.50$), and resources to increase involvement ($p=0.66$) for EMS research were similar between groups. Open-ended responses on barriers to research revealed three themes: lack of research experience, temporal/financial limitations, and insufficient institutional support. Among those without EMS research experience, 91.2% reported interest in pursuing EMS research. In free-text responses, participants characterized current gaps in EMS research and offered solutions.

Conclusions: The most common barriers to EMS research were lack of research experience, financial/temporal difficulties, and insufficient institutional support. Understanding these barriers guides solutions such as structured research education for EMS providers, EMS research fellowships, and team-centered research approaches.

Relevant and current research is essential for the ongoing evolution and improvement of evidence-based medicine. Current and ongoing research is vital in both the prehospital and hospital settings (Djulbegovic and Guyatt, 2017). Despite a recent increase in prehospital research (Chua et al., 2021; Mausz and Cheskes, 2015), ongoing study is needed to address current limitations in narrow topic focus and common methods (Cavanagh et al., 2023). Prior studies have found data availability, regulations, funding,

and cultural barriers to contribute to difficulty in performing EMS research (Vianen et al., 2024).

With over 16 million patients transported in the prehospital setting for 911 responses annually (National Association of State EMS Officials, 2020), this relative paucity of literature in EMS affects an enormous population. The need for further EMS research is well characterized (Chua et al., 2021; Tate, 2015; Whitley et al., 2020; Jeppesen and Wiig, 2020; Lockey, 2017; Carpenter et al., 2011). A prime opportunity to expand research is through the involvement and mentorship of students and/or young professionals with interest in this field. However, there is a gap in knowledge of the barriers contributing to the lack of EMS research and involvement of interested young professionals. Improved understanding of barriers to EMS research can guide solutions aimed at increasing participation in EMS research.

Collegiate EMS providers are uniquely positioned at the intersection of academia and EMS, providing them a prime opportunity to contribute to EMS research. Collegiate EMS services provide emergency medical care at over 145 institutions throughout the country (Fisher et al., 2006). Emergency Medical Services provide clinical experience that can support college students in application to medical school and other healthcare programs, and this same motivation may drive research done by this population. Collegiate EMS-focused publications reflect the research interest of collegiate EMS affiliates (Friedman et al., 2019; Friedman et al., 2020; Friedman et al., 2022; Friedman et al., 2022; Monahan et al., 2021; Gaeta, 2020; Stefos and Nable, 2016; Jeffrey et al., 2017). Understanding barriers to further EMS research in this population will lay the groundwork for future study and interventions to improve EMS research more broadly. We hypothesized there were common barriers to performing EMS research. The aim of this study was to explore barriers to EMS research among collegiate EMS affiliates.

METHODS

A cross-sectional mixed methods survey was distributed for a one-month period in August 2022. The survey was distributed virtually through the social media platforms of the National Collegiate Emergency Medical Services Foundation, including Facebook (Menlo Park, CA) and Twitter (San Francisco, CA), with multiple groups resharing and distributing to attempt to increase responsiveness. The resulting convenience sample of participants was invited to complete a voluntary, anonymous survey coded through Qualtrics (Provo, UT).

The survey consisted of three sections: background and training, demographics, and perspectives on EMS research (Supplementary Figure 1). Participants were given unique questions based on prior EMS research involvement. Responses were excluded if participants did not consent to participation, were younger than 18, completed less than 30% of the survey, or reported no prior involvement with EMS. Question types included single-option multiple choice, multi-selection multiple choice, and free text responses.

Results were reported as n (%) for categorical variables and mean \pm standard deviation for continuous variables. Perspectives on research were stratified by whether respondents had prior EMS research experience. Descriptive statistics were performed to compare groups using a Chi-Square test. All statistical analyses were performed using R statistical software version 3.6.2 (R Foundation for Statistical Computing) within RStudio

statistical software version 1.2.5033 (RStudio). All open-ended responses were reported, with modifications for grammar and brevity, and analyzed for shared themes by two authors (EL and KJ).

RESULTS

The survey received a total of 72 responses. Two responses were excluded based on the exclusion criteria, and 70 responses were included.

The demographic distributions of the study population are detailed in Table 1. The mean age of participants was 32 ± 12 years. The sample was predominantly male (60.1%), white (86.8%), and not Hispanic or Latino (90.5%). Most respondents reside in the eastern region of the United States (72.4%).

Educational background varied among participants (Table 2). Level of education ranged from some high school (1.4%) to doctorate degrees (14.5%), with a bachelor’s degree as the most common (56.5%). All respondents were or had been certified at the state

Variable	Survey Participants (n = 70)
Highest level of education	
Some high school	1 (1.4%)
High school	5 (7.2%)
Trade school	3 (4.3%)
Associate’s degree	3 (4.3%)
Bachelor’s degree	39 (56.5%)
Master’s degree	8 (11.6%)
Doctorate degree	10 (14.5%)
Highest level of training	
EMT	27 (38.6%)
AEMT	5 (7.1%)
Paramedic	20 (28.6%)
Nurse	10 (14.2%)
Nurse practitioner	2 (2.9%)
Medical student	3 (4.2%)
Resident physician	2 (2.9%)
Attending physician	1 (1.4%)
National- or state-certified healthcare provider	70 (100%)
Current healthcare provider	64 (91.4%)
Collegiate EMS involvement	58 (85.3%)
Years EMS experience	13 ± 11
<i>Continuous variables reported as mean ± standard deviation, and categorical variables reported as n (%).</i>	

Table 2. Educational and career background of survey participants.

Variable	Survey Participants (n = 70)
Age	32 ± 12
Gender	
Female	27 (39.1%)
Male	42 (60.1%)
Race	
Asian	6 (8.8%)
White	59 (86.8%)
American Indian and Alaska Native	1 (1.5%)
Black	0 (0%)
Two or more races	2 (2.9%)
Ethnicity	
Hispanic or Latino	6 (9.5%)
Not Hispanic or Latino	57 (90.5%)
US Region of Residence	
East	50 (72.4%)
Midwest	11 (15.9%)
South	3 (4.3%)
West	5 (7.2%)
<i>Continuous variables reported as mean ± standard deviation, and categorical variables reported as n (%).</i>	

Table 1. Demographics of survey participants.

or national level as a healthcare provider. Sixty-four (91.4%) were currently practicing. There was a

range of provider types represented, including EMT (38.6%), AEMT (7.1%), paramedic (28.6%), nurse (14.2%), nurse practitioner (2.9%), medical student (4.2%), resident physician (2.9%), and attending physician (1.4%). Mean duration of EMS involvement was 13 ± 11 years. Fifty-eight (85.3%) participants reported current or prior involvement with collegiate EMS.

Participation in EMS research was reported by 30 (43.5%) participants (Table 3). Ease of involvement in EMS research was the only EMS research perspective with significant differences between groups, with those having prior EMS research experience finding involvement easier than those without prior EMS research experience (p = 0.008). Those with and without prior research experience reported similar barriers to participation (p = 0.50) and resources that would increase involvement (p = 0.66) for EMS research.

Open-ended responses on barriers to participation in EMS research revealed three key themes: lack of research experience, temporal/financial barriers, and lack of institutional support (Figure 1).

Of those who participated in EMS research (Table 4), 9 (37.5%) used a state or national database and 13 (54.2%) used institutional data. Among those who answered “other”, surveys and literature reviews were reported as data sources. Fourteen (58.3%) participants used data analysis software in their EMS research, including R (16.7%), SAS (12.5%), Stata (8.3%), and Python (8.3%). Participation was productive, with 18 (75.0%) reporting research output such as abstracts (20.8%), posters (12.5%), presentations (37.5%), and publications (41.7%). Career benefit of EMS research experience was equally divided, with 50.0% reporting a positive impact, and 50.0% reporting neutral or no impact. Among those without EMS research experience, 31 (91.2%) reported interest in pursuing EMS research.

Variable	Prior EMS research experience (n = 30)	No prior EMS research experience (n = 39)	P
Importance of EMS research			0.56
Very important	24 (80.0%)	26 (66.7%)	
Important	4 (13.3%)	7 (17.9%)	
Neutral	0 (0.0%)	1 (2.6%)	
Unimportant	0 (0.0%)	0 (0.0%)	
Very unimportant	2 (6.7%)	5 (12.8%)	
Ease of EMS research involvement			0.008
Very easy	1 (4.0%)	0 (0.0%)	
Easy	5 (20.0%)	0 (0.0%)	
Neutral	6 (24.0%)	8 (24.2%)	
Difficult	12 (48.0%)	14 (42.4%)	
Very difficult	1 (4.0%)	11 (33.3%)	
Barriers to EMS research			0.50
Lack of mentorship	7 (29.2%)	15 (45.5%)	
Difficulty accessing data	12 (50.0%)	15 (45.5%)	
Unaware of opportunities	14 (58.3%)	29 (87.9%)	
Lack of prior research experience	5 (20.8%)	16 (48.5%)	
Resources that would increase involvement in EMS research			0.66
Data access	15 (62.5%)	19 (59.4%)	
Data analysis support	12 (50.0%)	16 (50.0%)	
Mentorship	15 (62.5%)	27 (84.4%)	
Funding	17 (70.8%)	17 (53.1%)	
<i>Categorical variables reported as n (%) and compared via Chi-Square test. Some questions allowed multi-selection, so percentages may sum to greater than 100%.</i>			

Table 3. EMS research experience.

Theme 1: Lack of research experience
“No idea where to start”
“Not knowing where to look”
“Not sure where to start”
“Lack of methods education”
Theme 2: Temporal and financial barriers
“Unsure of funding resources available”
“Time restraints. I work multiple jobs to afford to live where I am”
Theme 3: Lack of institutional support
“Not in the urban core, busy but small service”
“No PI, or no instruction on how to be (or find) a PI; many EMS services do not have an IRB or the necessary relationships to “chair” the research (beyond, perhaps, the medical director)”
“Lack of EMS research unlike the multitude of nursing research”
“Lack of willingness to excel among leadership, lack of wanting to learn above what is expected”
“No opportunities available nearby”
“Lack of access to research institutions that care about EMS research”
<i>Responses were grouped by theme in qualitative analysis.</i>

Figure 1. Free-text responses on barriers to EMS research for survey participants.

Among the open-ended responses to general comments on EMS research (Supplementary Figure 2), participants characterized current gaps in EMS research and offered solutions, including more accessible Institutional Review Boards (IRBs), better patient follow-up, and improved connection of the EMS research community.

DISCUSSION

This mixed methods survey of EMS providers yielded new information about perspectives on and barriers to EMS research. The highly variable educational levels and clinical certifications of the participants provides a range of perspectives. The relatively high rate of participation in EMS research among this population, at 43.5%, reflects an increasing interest in EMS research. Even among those who had not performed EMS research, 91.2% reported interest in it. Finally, we identified key themes in the barriers to EMS research, including experience, resources, and institutional support. Together, these findings build a foundation to further EMS research participation.

Barriers to EMS research were similar between those with and without prior research experience. The most identified barrier on the multiple-choice response was being unaware of opportunities (prior EMS research experience: 58.3%, no prior EMS research experience: 87.9%). Lack of research experience was also commonly cited as a barrier, especially for those without prior EMS research experience (prior EMS research experience: 20.0%, no prior EMS research experience: 48.5%). These were reflected in four open-ended responses focused on lack of research experience. These findings align with literature from other fields, such as otolaryngology, medicine, and pharmacy, identifying research education as a key barrier to research participation (Eyigör and Kara, 2021; Nair et al., 2019; Murray et al., 2020). Structured research education programs have been characterized (Boninger et al., 2001; Ward, 2013) and demonstrated to be successful in increasing productivity (Ahmad et al., 2013). As such, design and implementation of structured research education programs in EMS may play an important role in increasing participation in EMS research.

The second theme of financial/temporal barriers continued among the multiple choice and open-ended responses. "Funding" was selected by over 50% of participants in both groups as a resource that would increase their participation in EMS research (prior EMS research experience: 70.8%, no prior EMS research experience: 53.1%), and two participants cited time and money as barriers in the free-text response. Time and funding have been well-reported to limit research participation in clinicians, agreeing with the findings of this study (Nair et al., 2019; Murray et al., 2020; AlSardi et al., 2021; Rubagumya et

Variable	Survey Participants (n = 70)
Data	
National database	8 (33.3%)
State database	6 (25.0%)
Institutional data	13 (54.2%)
Other	6 (25.0%)
Software	
R	4 (16.7%)
SAS	3 (12.5%)
Stata	2 (8.3%)
Python	2 (8.3%)
Other	4 (16.7%)
None	10 (41.7%)
Outcome of research	
None	6 (25.0%)
Abstract	5 (20.8%)
Poster	3 (12.5%)
Presentation	9 (37.5%)
Publication	10 (41.7%)
Benefit to career	
Very useful	7 (29.2%)
Useful	5 (20.8%)
Neutral	7 (29.2%)
Not useful	5 (20.8%)
Very not useful	0 (0.0%)
<i>Categorical variables reported as n (%). Some questions allowed multi-selection, so percentages may sum to greater than 100%.</i>	

Table 4. Outcomes for survey participants with EMS research experience .

al., 2019). Research fellowships specific to EMS may help address this barrier, providing both dedicated time as well as funding to perform, improve, and teach research (Cronholm et al., 2009; Carter et al., 2020; Wilson et al., 2019). These findings also demonstrate need and interest for access national databases to facilitate EMS research that can answer clinical questions.

Additionally, institutional support, such as data access and analysis, mentorship, and research resources were suggested to improve EMS research participation in both the multiple choice and free-text questions. Administrative difficulties and inefficient team communication have been described to limit research productivity (Sanjari et al., 2015; Chambers et al., 2021). Finally, the ability to navigate institutional hierarchy may also pose a challenge for those looking to gain research experience and unintentionally limit both the flow of ideas and collaboration among those without institutional ties. These resources are often accessible to providers with more training but may not be readily available for EMS providers interested in research. In this study, 85.5% of respondents did not have a doctorate degree, and multiple participants reported not having relationships with faculty involved in research, access to opportunities, or institutions with research focuses. This highlights the importance of identifying entry points to research participation for students.

LimitationsThe major limitation of our study is selection bias and convenience sampling. We suspect that people who are interested in EMS research, who find EMS research important, or who have had difficulty with getting involved were more likely to participate in the survey. We expect that our survey overestimates interest in EMS research and underestimates barriers and difficulty of involvement in research. Similarly, our survey was distributed to collegiate EMS affiliates who do not represent the broader overall population of EMS providers, as reflected by education levels and prior research experiences, which again may falsely increase apparent interest in EMS research. In addition, due to the nature of distribution through social media, it is unclear how many people viewed the survey and decided not to respond. Our study was also limited in racial and geographic diversity, which may impact the broader applicability of its findings. Finally, the small sample size may cause differences in groups to be statistically insignificant due to insufficient power and may limit conclusions that can be drawn from this study.

CONCLUSIONS

There is a shortage of EMS literature to guide evidence-based practice. This study used a mixed methods survey distributed to collegiate EMS affiliates to identify barriers to EMS research. Lack of research experience, financial and time constraints, and insufficient institutional support were identified to be the most common barriers to performing EMS research. Understanding these barriers can guide solutions such as structured research education for EMS providers, EMS research fellowships, and team-centered research approaches.

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