

RESEARCH REPORT

ASSESSING THE FEASIBILITY OF ON-SHIFT SIMULATION TO IMPROVE CAPACITY ASSESSMENTS BY EMS CLINICIANS: A PILOT PROJECT

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Recommended Citation: DuPont, D., Bar, J., Baca, J., Hunter, K., Kuc, A., Shah, A., & Carroll, G. (2023). Assessing the feasibility of on-shift simulation to improve capacity assessments by EMS clinicians: A pilot project. *International Journal of Paramedicine*, (5), 118-124. <https://doi.org/10.56068/XCQZ5297>. Retrieved from <https://internationaljournalofparamedicine.com/index.php/ijop/article/view/2752>.

Keywords: education, simulation, capacity, emergency medical services, EMS, paramedicine

Received: April 17, 2023

Revised: December 4, 2023

Accepted: December 4, 2023

Published: January 5, 2024

Declarations: The authors have no financial conflicts of interest to disclose.

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ABSTRACT

Objective: Determining the decision-making capacity of patients in the prehospital setting is a high-risk area for EMS agencies. This risk is only enhanced by the growing prevalence of mental health, neurological, and substance use disorders. This study sought to evaluate the feasibility of on-shift simulation as an educational method, in this case to improve EMS clinicians' ability and confidence in performing capacity assessments.

Methods: This was a prospective feasibility study performed at an urban hospital-based EMS service. All participants were active EMTs or Paramedics. Subjects completed a written pretest containing 10 patient scenarios addressing specific components of capacity assessments. For each, participants were asked to decide if the patient had capacity and to rate how confident they were in their answer. They then participated in an educational session involving a simulated patient encounter and debrief, designed to evaluate, and teach skills in capacity assessment, while on shift. Lastly, subjects took a posttest consisting of the same scenarios and confidence assessments as the pretest.

Results: It was feasible for EMS clinicians to complete an educational simulation session while on shift, with 26 subjects being recruited and 22 (85%) completing the full study protocol. While there was no significant difference between the number of scenarios answered correctly before and after the intervention (9.18 vs 9.27), confidence scores did significantly increase (87.2 to 95.2, $p < 0.001$). This increase was driven by scenarios pertaining to pediatrics, mild dementia, and substance use.

Conclusions: EMS clinicians were able to complete an educational session including a simulated patient encounter and debrief while on shift. The intervention led to a significant increase in confidence in performing capacity assessments without a significant change in the number of scenarios adjudicated correctly. This study revealed specific areas in which clinicians would likely benefit from further education, but further research is needed to help establish generalizability.

INTRODUCTION

The burden of mental health, neurological, and substance use disorders has been increasing worldwide (Patel et al., 2016). As of 2016, more than one billion people were afflicted by psychiatric and substance use disorders, accounting for 7% of global disease burden (Rehm & Shield, 2019). This subset of patients has been shown to require increased use of EMS (Duncan et al., 2019; Knowlton et al., 2013; Larkin et al., 2006). When EMS clinicians encounter these patients, they are faced with numerous challenges, especially when the patient is attempting to refuse medical treatment and/or transport to the hospital.

These situations represent very high-risk situations for EMS agencies, both clinically and medicolegally. If patients who lack the capacity to refuse treatment and/or transport are allowed to do so and then deteriorate later, the EMS agency and its personnel risk facing charges of negligence or patient abandonment (Colwell et al., 1999; Morgan et al., 1994; Wang et al., 2008). Furthermore, if patients with capacity to refuse are taken to the hospital against their will, allegations of assault, battery, or, in rare cases, wrongful imprisonment may ensue (Weaver et al., 2000). EMS personnel must be skilled in assessing patients and accurately determining their capacity to make medical decisions for themselves.

The existing literature on the ability of EMS clinicians to assess capacity is sparse. O'Connor et al. (2010) evaluated inter-rater agreement between prehospital personnel and physicians who were asked to listen to 30 medical control calls and interpret whether the patients involved had capacity. Participants also reported their confidence in their decisions. Ultimately, inter-rater reliability both between and among the cohorts was poor. The authors suggest that capacity assessment has not been sufficiently standardized or validated in emergency medicine and they advocate for further study. There is also a dearth of literature on how to best educate prehospital clinicians on how to perform capacity assessments. In one study, authors evaluated the documentation of capacity by advanced life support (ALS) clinicians at one month and one year after a 1.5-hour educational module on decision-making capacity. They found that there was no difference in documentation (Riley et al., 2004).

Simulation is common in EMS education (McKenna et al., 2015). Previous research demonstrates its benefits (Gurňáková & Gröpel, 2019; Gordon et al., 2005; Hall et al., 2005) but has not examined the use of simulation while on shift or the use of simulation to teach or evaluate capacity assessment. The primary objective of this pilot study was to evaluate the feasibility of on-shift simulation as an educational method. In this case, on-shift simulation was used to teach EMS clinicians to better assess capacity. Their ability to do so and confidence in that ability were assessed as secondary objectives.

DESCRIPTION AND METHODS

STUDY DESIGN AND SETTING

This was a prospective feasibility study performed at an urban, tertiary, academic medical center (Cooper University Hospital) that has a hospital-based EMS service (Cooper EMS). Cooper EMS is a two-tiered service primarily utilizing Emergency Medical Technicians (EMTs) and paramedics with additional support from a 24-hour paramedic supervisor response vehicle and EMS physician response units. The Cooper University Hospital Institutional Review Board approved this research study.

PARTICIPANTS AND INTERVENTION

Participants were considered eligible for recruitment if they were 18 years of age or older and were currently working clinically for Cooper EMS as an EMT or Paramedic. They were recruited via email or in-person solicitation.

Participants first completed a pretest. The pretest gathered demographic information and contained 10 patient scenarios. Each scenario consisted of a patient who wanted to refuse care with a different factor complicating the refusal. The ten factors were religious beliefs, head injury on blood thinners, withdrawal after naloxone, refusal to participate in the assessment, mild dementia, competing family emergency, pediatric patient, active labor, report of suicidal ideation from family, and intoxication.

For each scenario, participants were asked to determine whether the patient had capacity to refuse and to rate their confidence in their answer on an ordinal Likert scale. The scenarios were written by one of the authors (JB) and then refined by the rest of the EMS physician group until each case was felt to be clearly worded and unanimous agreement was reached on a correct answer. The scenarios were then trialed by EMS clinicians from two separate agencies to ensure that the scenarios were unambiguous and written at an appropriate level. These clinicians did not participate in the rest of the study.

After the pretest, the subjects participated in a live simulation exercise at a local simulation center. In the simulation, an actor portrayed a standardized patient with mild intoxication and a head injury who wanted to refuse care. The scenario was designed to evaluate and teach skills in capacity assessment. Each participant's performance in the exercise was evaluated using a standardized script and a checklist of critical action items. A post-scenario debrief including a general review of capacity evaluation was conducted. Participants were allowed to ask general questions, but specific questions about test scenarios were not answered. The full sessions lasted approximately 30 minutes.

The simulation sessions were conducted during participants' normal scheduled shifts. Cooper EMS fields 60 hours of Advanced Life Support ambulance coverage and 96 hours of Basic Life Support ambulance coverage per day, averaging 80 daily dispatches. Call volume permitting, on-shift crew members who had completed the pretest were

taken out of service and went to a medical school simulation center in their response area while the other units covered emergency calls.

After the simulation session, participants were asked to complete a posttest containing the same scenarios as the pretest assessment. Posttests were completed an average of one to two weeks after the simulation session.

OUTCOMES AND STATISTICAL ANALYSIS

The primary objective of this study was to determine whether it was feasible for EMS clinicians to complete an educational simulated patient encounter while on shift, measured as the percentage of enrolled participants who completed the simulation session and posttest. Improvement in pre- and posttest correctness and confidence scores were measured as secondary outcomes. All test score comparisons between EMTs and paramedics were completed using independent t tests. Comparisons between pre- and posttest questions were analyzed using a paired t test.

RESULTS

It was feasible for EMS clinicians to complete an educational simulation session while on shift. 26 subjects completed the pretest. Of those, 22 (85%) completed the full study protocol. Of the 22 who completed the posttest, 19 (86%) were male and 10 (45%) were paramedics. One female paramedic completed the study. Subgroup analyses were not performed due to small numbers.

There was no significant change in the number of scenarios that participants answered correctly on the pretest and posttest. Mean scores (out of 10) on the pretest and posttest were 9.18 (+/- 0.96) and 9.27 (+/- 0.88), respectively ($p = 0.747$). Subjects' confidence in their answers, however, increased by a modest but statistically significant amount. Total mean confidence scores (out of 100) improved from 87.2 (+/-10.06) to 95.2 (+/- 5.84) ($p < 0.001$).

The increase in confidence scores was principally driven by three specific scenarios: pediatric patient, patient with dementia, and mildly intoxicated patient. Participants' mean confidence increased in every scenario except for that of the patient in active labor. In this case, the mean confidence score stayed constant at 9.54 (+/- 1.06) out of 10.

DISCUSSION

In our busy urban system, we found that it was feasible for EMTs and paramedics to complete a simulation exercise with a standardized patient while on shift without significant disruptions in service. Simulation is widely recognized as a valuable educational modality but is often thought of as time intensive. On-shift simulation offers benefits to both clinicians, who can complete training while working their usual schedule, and administrators, since they do not need to pay for extra staff coverage or separate training pay.

Since on-shift simulation is only useful if it achieves the desired educational goal, participants' test scores and confidence levels were tracked as secondary outcomes in this study. Because this was primarily a feasibility study of on-shift simulation and the specific educational content was of secondary importance, we used it as an opportunity to begin the development of tools to improve and evaluate skills in capacity assessment. The specific questions, scenarios, and evaluation tools will require further refinement.

With that in mind, participants were able to correctly determine capacity in a variety of common scenarios on a written test both before and after the educational intervention. Based on our experience in the field and in reviewing medical command calls regarding questions of capacity, we believe that further education and training in capacity assessment are needed. The high pretest scores probably reflect that the test scenarios could be made more difficult in order to find knowledge gaps.

Based on the improvement in confidence scores for particular questions, it is likely that education targeted to specific topic areas regarding capacity would be beneficial. In our service these were pediatrics, dementia, and mild intoxication; topic areas would likely vary between different services, depending on their predominant call types and patient populations.

LIMITATIONS

The most important limitation of this study is that it was a pilot study with a small number of participants. Numerical results should be interpreted with caution appropriate to the small study population. Additionally, participants were principally those who workday shifts since the patient actors were only available during regular daytime work hours.

The fact that the same scenarios were used for the pre- and posttests could also be considered a limitation. Given the nature of this pilot study, it would have been disproportionately difficult to write two different tests while being confident that both assessed the same topic areas at the same level of difficulty. Writing two tests and using a random crossover control model was considered, but the small study size made that statistically impractical. In an attempt to mitigate this potential limitation, participants were not given any feedback about test answers between the pre- and posttest.

CONCLUSION

In this pilot study, EMTs and paramedics working in a busy urban system were able to complete a simulation exercise with a standardized patient while on shift without significant disruptions in service. Participants were able to correctly determine capacity in a variety of common scenarios on a written test, but our educational intervention significantly increased their confidence in their capacity assessments. Further work is needed to apply educational intervention to both day and night shift personnel and to find the appropriate level of difficulty of scenarios in evaluating capacity assessments. On-shift simulation has the potential to be a useful and cost-effective method of providing EMS education in a wide variety of topic areas and settings.

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