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Observational Study on the impact of Nursing Department on Emergency Patients

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Abstract: Overcrowding in emergency departments (EDs) hinders the ability of prehospital and hospital systems to provide adequate patient treatment. There was an initiative to shorten the delivery interval and total turnaround time, the amounts of time it takes for patients to go from when emergency medical services arrive to when they are handed over to the emergency department personnel. This research compared the delivery and turnaround times for ambulance-borne patients both before and after paramedics were included in the triage process. It was a retrospective observational study. Between the hours of 12 AM and 12 PM, the research comprised all adult ED patients who were brought in by ambulance. Patients under the age of 21, those transferring directly from an outpatient institution to an inpatient one, and critically ill patients who needed to be seen immediately in the resuscitation section, avoiding the usual triage procedures, were not included. The information was evaluated using two-sample t-tests with an $\alpha = 0.05$ confidence interval. The delivery interval was 16 minutes before the program was implemented, and it dropped to 14 minutes after the program was implemented. Prior to implementation, the mean turnaround time was 35 minutes and 37 seconds; after implementation, it dropped to 36 minutes and 37 seconds. There was a reduction of 01:50 minutes in the average delivery interval. A 00:40 second increase was seen in the mean turnaround interval. Having a paramedic on staff during emergency department triage reduced delivery interval by 1:50 minutes, but there was no discernible change in ambulance turnaround times.

Keywords: Emergency Department, Patient, Delivery Interval, Interfaculty, Prehospital

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INTRODUCTION

Quick patient transfer to the closest emergency department has long been an integral aspect of emergency medical services' (EMS) mission. But seminal investigations like 'Taking Healthcare to the Patient' in the UK and 'Emergency Medical Services: At the Crossroads' in the US have shown that EMS has changed a lot in the last 20 years. [1]

Nowadays, emergency medical services often evaluate and treat patients in the comfort of their own homes, send them to specialised centres for advanced care, or divert them from local hospitals via alternate community paths. Because of the increased involvement in patient care and the want to know whether their clinical judgements were right—what is known as "clinical curiosity"—EMS personnel are conducting more thorough evaluations, making more complicated decisions, and enduring longer transfers. [2]

Nevertheless, the existing feedback system for EMS practitioners has its limits. Current prehospital

feedback providing is unstructured, irrelevant, uncredible, and not routinely implemented, according to a Canadian research. Among emergency medical service providers in the US, 45.5% said they had not heard back from patients within 30 days after providing treatment. Due to a lack of official patient outcome reporting, EMS providers informally call emergency department staff to follow up with patients when they meet exceptionally challenging or unusual situations. "Speciality follow-up deficiency" is what Croskerry calls this problem with emergency department doctors. [3]

The word "feedback" isn't only used in scholarly articles and therapeutic settings; it has a wide range of applications. Performance- or patient-related feedback in the prehospital setting may originate from a number of different places and be either requested or forced. Effective feedback, according to the evidence synthesis in medical education literature, should be task-oriented rather than person-oriented, detailed, and connected to individual growth objectives. There is a lot of literature on auditing and providing feedback on individual performance within the larger field of implementation science. There is some evidence from systematic reviews that show that healthcare providers' engagement, mental health, and patient care may all benefit from feedback. Given the disproportionately high rates of mental illness among emergency medical services workers compared to the general public, this is of paramount importance. [4]

Further, studies in the field of health services have shown that feedback has the potential to increase patient safety. This is very important since there is a significant potential for injury or mistake in the unregulated prehospital setting. According to a new scoping study, prehospital patient safety should take centre stage. According to the research, prehospital feedback interventions might help with non-conveyance, treatment, diagnosis, and handoff to the hospital. There is a dearth of literature on the topic of feedback in prehospital settings, in contrast to other well-established sectors of healthcare, such as primary care and outpatient settings. [5]

Clinical Performance Feedback Intervention Theory (CP-FIT) was established by Brown et al., expanding upon previous research in the audit and feedback fields. Three factors—feedback variables, receiver variables, and context variables—influence the usefulness of feedback in healthcare, as shown in this cyclical model. To fill in the gaps in our knowledge of how feedback affects results in a clinical context, Brown et al. suggest that these factors function via a series of explanatory processes. [6]

There is a corpus of research on audit and feedback that focusses on the efficacy of feedback, but there is also literature on feedback-seeking behaviour (FSB) that aims to understand why people seek feedback. Some have argued that the two bodies of research on feedback—feedback effectiveness and FSFB—need to be combined in order to provide a more complete picture of feedback and its consequences. [7]

The effects of feedback on professional and personal development, the importance of knowing whether recipients value feedback, and the necessity for further research to identify the most effective feedback strategies and components in the emergency department were all highlighted in recent studies on feedback given to ED physicians. [8] Two of the few studies on prehospital feedback, agree that further investigation into the nature and effect of feedback on prehospital practice is required to fill these knowledge gaps. There seems to be a dearth of prehospital input in the UK, according to a recent small-scale qualitative research. [9]

Several large health systems are starting to draft EMS guidelines and policies regarding the supply of prehospital feedback, therefore it is crucial to have a better grasp of this concept. As an example from the US, consider the 'EMS Agenda 2050' report and the National EMS Management Association's newly released position statement. The latter aims to enhance performance measurement, quality improvement, and education by providing EMS systems and clinicians with quick feedback on patient outcomes. [10]

RESEARCH METHODOLOGY

Research Design

Using an ambulatory care system, patients were brought to an urban hospital emergency department as part of this retrospective observational pre-post research design. Twenty ambulances equipped with basic life support and advanced life support are available via the hospital's 911 system. The paramedics involved in this research are all on staff at the hospital and work in the interfacility transfer units. According to the emergency department staffing plan, paramedics would work from 12 a.m. to 12 p.m. every day, matching the peak patient arrivals each hour. When these times were not in effect, a physician and triage nurses followed the regular procedure. We suggested using associated paramedics to shorten turnaround time after analysing our wall-time performance and seeing that turnaround interval durations are longest during these hours.

The unload procedure was taught to paramedics by pairing them with triage nurses throughout shift. There was no use of formal didactics. When patients came by EMS, the primary duty of the emergency department's paramedics was to take over treatment until a triage nurse could be reached. In addition to doing electrocardiograms, taking vital signs, and inserting intravenous peripheral catheters, paramedics in the emergency department also provide additional fundamental life support services.

When you add up the "delivery interval" and the "recovery interval," you get the "turnaround interval," or the entire amount of time an ambulance spends in the hospital. The delivery period started when the patient was brought to the hospital by the paramedics and lasted when the care was handed to the emergency department triage provider. The receiving clinician often signs off at the conclusion of this. From the time the delivery period ended until the ambulance and its crew were prepared to go back into duty, a "recovery interval" was in effect.

Process

A tertiary-care hospital in Saudi Arabia with an emergency department volume of 1,02,000 patients per year was the site of this investigation. In addition to housing a residency program in emergency medicine, the emergency department is a level I trauma centre for adults and a level II trauma centre for paediatrics. There were 65 beds in the emergency department (including a paediatric unit with 14 beds) and a resuscitation room nearby during the research periods. Emergency department waiting rooms are not available at this facility. Upon completion of registration and triage, every patient is promptly allocated to a bed in the emergency department. In the event that all of the beds in the emergency department are in use, alternative care spots may be made available. Emergency medical services account for almost 32% of the yearly ED traffic.

In the emergency department, 27% of patients are admitted. Patients from private EMS organisations, fire departments, volunteer organisations, and other hospital-based agencies also arrive at the hospital by ambulance. Patients who came via the hospital's own EMS system were the only ones whose data was obtained; this group included 43% of the patients who were triaged by ambulance. Researchers were unable to get patient data from other EMS providers.

Participant Selection

At the time of the trial, all patients were considered eligible if they arrived at the hospital's ambulance triage via the on-site EMS service. Excluded from the study are patients who are less than 22 years old, those undergoing inpatient interfacility transfers, and severely sick patients who were bypassed during EMS triage and sent directly to the resuscitation bay. Our data gathering process included dividing three groups.

A group of individuals who were not yet paramedics when the program began in April 2022 and ended in September of the same year.During the period from October 1, 2022, to November 30, 2022, a wash-out period cohort was assessed. This cohort included paramedics who were attending emergency department orientation and had their first shifts. “A cohort that was monitored from December 1, 2022, to May 31, 2023, after paramedic deployment. Data was gathered from each cohort at the same time and on the same days.

We triaged 27,600 adult patients who came via emergency medical services. No less than 11,850 patients arrived in the hospital's ambulance The number of people who arrived in an ambulance from an outside facility is 15,750. There were 7030 people that arrived between 11 a.m. and 1 p.m., outside of the washout time. N = 4,500 arrived between 11 a.m. and 1 p.m. or during the washout time. Transferred to the triage team by a paramedic with a patient count of 3,340 N = 3,700 patients transferred to the triage team without a paramedic

Measurement Techniques

Information was retrieved from Health EMS, a protected cloud-based electronic health record system used by this hospital-based EMS for documentation purposes. After patient care was handed to ED triage personnel, paramedics reported the time of arrival at the emergency department ambulance entry and the time of departure from the ED. The "turnaround interval" is the sum of the ambulance's delivery and recuperation times at the hospital. Arrival in the emergency department (ED) marks the beginning of the delivery interval, which concludes with handoff to ED personnel. The recuperation time starts after the patient is handed over and concludes when the ambulance is prepared to be sent back into duty with all necessary supplies.

Analysis of Data

Using IBM SPSS, we determined statistical differences. A 0.05 alpha was used to determine statistical significance. Three different intervals—delivery, recuperation, and turnaround—were compared using a two-sample t-test. The normal distribution was assumed for the data. Along with the means, we also provide 95% confidence intervals.

RESULTS

Over the course of the research period, the ambulance service at the hospital carried 11,875 patients. We did not include patients who showed up during the washout period or who came between the hours of 11 a.m. and 11 p.m. So, 3,700 patients were in the control group before paramedics arrived, and 3,340 patients were in the intervention group after they arrived. By comparing baseline parameters before and after adoption, we can account for any changes in the hospital or EMS system that might have affected the delivery interval.

The hospital's average triage RN staffing, paramedic staffing, emergency department bed spaces, and average triage physician staffing were all important. Factors related to emergency medical services (EMS) were the hourly arrival rate of ambulances and the number of 911 ambulances stationed at hospitals during the research period. No information was found on the staffing numbers of the outside EMS providers that discharge patients from this urban emergency department. During a small fraction of the research period, the hospital was diverted 0.8% of the time. This was due to the EMS system's decision to join other states in abandoning diversion models. Prior to and after paramedic introduction, these features were comparable with the exception of paramedic personnel.

New intervention's effect on the EMS system may be better understood with the help of the updated time metrics analysis table. The research compares the timeframes before and after the intervention with an emphasis on three critical intervals: delivery, recuperation, and overall turnaround times.

From 16:12 (±10:48) minutes before the intervention to 14:22 (±9:45) minutes after the intervention, there is a notable decrease in the delivery interval. The intervention seems to have effectively simplified the first patient handover procedure, as shown by the 1:50 minute reduction (95% CI: 1:22, 2:18; $p<0.0001$). The decreasing standard deviation in the post-intervention phase suggests that the process has become more consistent and predictable, since there is less unpredictability.

Nevertheless, after the intervention, the recovery time is 22 minutes long, an increase from 19 minutes and 45 seconds (±11:35) before the intervention. Additional analysis is warranted due to the statistical significance of this 2:30 minute increase (95% CI: 1:58, 3:02; $p<0.0001$). While the intervention may have improved the delivery process, it may have unintentionally added additional difficulties or hurdles to the recovery phase. This can be because resources have been reorganised or because the new system has introduced new processes or responsibilities.

From 35:57 (±10:58) minutes to 36:37 (±11:52) minutes, there is a little rise in the overall turnaround time, which is the sum of the delivery and recuperation times. Although there is a statistically significant gain of 40 seconds (95% CI: 00:08, 01:12; $p<0.01$), in terms of practicality, it is quite insignificant. It indicates that the longer recuperation period more than makes up for the significant improvements in the delivery interval.

These findings show that the intervention's impact on the EMS process as a whole has been mixed. Longer recovery durations have resulted from its effective reduction of the essential delivery time, which may improve initial patient care. Total turnaround time has changed very little, which indicates that the intervention has redirected resources rather than cut down on processing time.

To find possible optimisations and understand what's causing the higher recovery time, further research is required. Finding out if a prolonged recovery time indicates an opportunity for further efficiency gains or is linked to better care quality is of the utmost importance. To make sure the intervention is helping the healthcare system as a whole, it's important to measure how these time adjustments affect staff workload and patient outcomes.

DISCUSSION

Using paramedics in hospitals has not been the subject of many research. Even fewer studies have looked at paramedics' functions in emergency department triage. Paramedics in this research were not all assigned to staffed hallway care areas or given EMS hand-offs. One minute and forty-four seconds was cut from delivery intervals when an extra paramedic was on duty in the triage area, according to this research. Patients may obtain better treatment early in the healthcare process, therefore tracking the delivery interval is still crucial, even if it did not reduce total turnaround times. This model has also been discovered in Canada and the United Kingdom, two countries outside of the US. Many participants in the British study thought that their prehospital training translated well to the diagnostic reasoning abilities required for triage, and the employment of paramedics in emergency department staffing was a success. Paramedics stationed at emergency departments in Nova Scotia, Canada, have been shown to enhance both the handoff quality and the interprofessional dynamic of collaboration between emergency medical services and hospital personnel.

The good feedback from our ED and EMS personnel about this paramedic intervention was not objectively conveyed in the data. During the study's peak patient arrival hours, emergency department staff expressed gratitude for having an additional pair of hands to help with certain patient care tasks. This may have altered patient outcomes by allowing ED patients to begin evaluation and treatment earlier. [11] Paramedics seemed to enhance emergency department patient care by relieving nurses and other auxiliary medical personnel of certain duties, but we did not see a discernible improvement in ambulance turnaround times. Additionally, 911 EMS personnel mentioned that the patient handoff was "streamlined thanks to having a familiar colleague." Having a paramedic in triage could have avoided the need to increase the number of nurses to keep ambulance turnaround times consistent, as the nursing staff was already understaffed and face ongoing hiring shortages. [12]

There was a mean difference of 2 minutes and 27 seconds in the recovery time and 43 seconds in the turnaround interval after paramedic intervention. This result contradicts the findings of Silvestri et al. (2014), who found that the addition of three paramedics to assist with patient care after an EMS hand-off reduced turn-around periods overall." The study's paramedic staffing levels and the additional duties assigned to them may account for this. Using a single paramedic stationed in the emergency department triage area, our research demonstrated how adjusting this one variable reduced delivery interval times. [13] In contrast to the delivery interval, several variables impact the turnaround time. The recuperation period, which included half of the turnaround time and included a series of actions to get the ambulance ready for the next assignment, remained unchanged under this program. Reduced overall turnaround times could have resulted from better training for EMS workers prior to their participation in triage targeting recovery interval delays. [14]

We found that EMS paramedics were unable to enter the recovery period due to a lack of available hospital stretchers. Despite the handoff of patient care, the EMS stretcher remained occupied, preventing paramedics from returning it to the ambulance for their next assignment. Emergency department (ED) supply shortages during this era further lengthened the recovery interval since they hindered restocking. Roughly 800 ambulance hours may have been saved if the reduction in delivery interval had been converted into the entire turnaround time for each ambulance arrival. Nevertheless, it is still an operationally critical consequence to keep turnaround times stable during this period of significant personnel turnover and logistical limitations. Without sacrificing quality of treatment for patients, this endeavour might potentially result in cost savings. Adding a paramedic to triage in the emergency department, for instance, is 30% cheaper than adding a nurse to the same task under this approach. [15,16]

CONCLUSION

The results of this research demonstrate that paramedics assisting with emergency department triage reduce the delivery interval, enabling patients to start hospital-based treatment sooner. We don't know if the shorter delivery time affected patient outcomes, but it was noticeable. To find out if the shorter delivery intervals improved patient outcomes and how to convert the time savings to overall turnaround times, further study is required. Removing bottlenecks in ambulance resupply, improving the availability of stretchers, making cleaning supplies more accessible, and incentivising workers are all possible strategies to reduce the recuperation time.

The ED paramedic might potentially take on other responsibilities as the program grows. Extending the job of a paramedic in triage to organise incoming ambulance arrivals warrants more research, as may a transportation destination officer who strives to decrease simultaneous arrivals, which could shorten unloading times. This approach, in conjunction with penalties for excessive wall time and monitoring for process improvement, might lead to improved outcomes. eventually, it is crucial to assess the quality of emergency department handoffs from EMS to ED paramedics and eventually to the triage nurse to make sure that patients' vital medical records were not lost due to the reduction in delivery interval.

References

1. Department of Health. Taking healthcare to the patient: transforming NHS ambulance services. London: Department of Health; 2020.
2. Department of Health. Taking healthcare to the patient 2: a review of 6 years' progress and recommendations for the future. London: Department of Health; 2021.
3. Institute of Medicine. Emergency medical services: at the crossroads. Washington, DC: The National Academies Press; 2017.
4. Jensen JL, Croskerry P, Travers AH. Paramedic clinical decision making during high acuity emergency calls: design and methodology of a Delphi study. BMC Emerg Med. 2019;9:17.
5. O'Hara R, Johnson M, Siriwardena AN, Weyman A, Turner J, Shaw D, et al. A qualitative study of systemic influences on paramedic decision making: care transitions and patient safety. J Health Serv

Res Policy. 2015;20:45–53.

6. Van Dreven A, Williams B. Professional development. In: Curtis K, Ramsden C, editors. Emergency and trauma Care for Nurses and Paramedics. London: Mosby Elsevier; 2021. p. 93–108.
7. Morrison L, Cassidy L, Welsford M, Chan TM. Clinical performance feedback to paramedics: what they receive and what they need. AEM Educ Train. 2017;1(2):87–97.
8. Cash RE, Crowe RP, Rodriguez SA, Panchal AR. Disparities in feedback provision to emergency medical services professionals. Prehospital Emerg Care. 2017;21(6):773–81.
9. Jenkinson E, Hayman T, Bleetman A. Clinical feedback to ambulance crews: supporting professional development. Emerg Med J. 2019;26(4):309.
10. Croskerry P. The feedback sanction. Acad Emerg Med Off J Soc Acad Emerg Med. 2020;7(11):1232–8.
11. Archer JC. State of the science in health professional education: effective feedback. Med Educ. 2020;44(1):101–8.
12. Ivers N, Jamtvedt G, Flottorp S, Young JM, Odgaard-Jensen J, French SD, et al. Audit and feedback: effects on professional practice and healthcare outcomes. Cochrane Database Syst Rev. 2022; (6):CD000259.

    https://doi.org/10.1002/14651858.CD000259.pub3.
13. Michie S, Williams S. Reducing work related psychological ill health and sickness absence: a systematic literature review. Occup Environ Med. 2023;60(1):3.
14. Petrie K, Milligan-Saville J, Gayed A, Deady M, Phelps A, Dell L, et al. Prevalence of PTSD and common mental disorders amongst ambulance personnel: a systematic review and meta-analysis. Soc Psychiatry Psychiatr Epidemiol. 2018;53(9):897–909.
15. Mitchell I, Schuster A, Smith K, Pronovost P, Wu A. Patient safety incident reporting: a qualitative study of thoughts and perceptions of experts 15 years after 'To err is Human'. BMJ Qual Saf. 2016;25(2):92–9.
16. Shabana Khan, Sharick Shamsi, Asmaa AA Alyaemni, Samiha Abdelkader, Effect of Ultrasound and Exercise Combined and Exercise alone in the Treatment of Chronic Back Pain, indian Journal of Physiotherapy & Occupational Therapy, 2013;7:2.