Emergency Communication Nurses’ ability to correctly select Abdominal Pain as the appropriate protocol in telephonic nurse triage system

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Citation

ABSTRACT

Introduction: Abdominal pain is the most common symptom with which patients present to the emergency department (ED), and overall visits to EDs in the U.S. are growing twice as fast as the overall population. Interventions that can safely mitigate such a high usage of ED resources would be a great asset in the delivery of effective and efficient ED care. One such intervention is a secondary triage of patients calling 911 for an ambulance who were subsequently triaged as a non-urgent low-acuity caller. Emergency medical services (EMS) using secondary nurse triage to manage low-acuity calls from 911 or other three-digit emergency numbers will benefit from this study. By appropriately selecting the correct protocol and achieving the most appropriate care disposition for the patient with abdominal pain, best practices are confirmed. This can be particularly challenging for the nurse when multiple symptoms accompany abdominal pain.

Objectives: The primary objective of this study was to determine the ability of an Emergency Communication Nurse (ECN) to appropriately identify the Abdominal Pain Chief Complaint Protocol to use to triage patients in low-acuity cases. The secondary objectives were to establish the most frequently used primary triage code (Medical Priority Dispatch System™ (MPDS®) Determinant Codes), triggering the use of the Abdominal Pain Chief Complaint Protocol in the Emergency Communication Nurse System™ (ECNS™), as well as the percentage of these calls resulting in a Recommended Care Level (RCL) of “emergency ambulance response” and “ED as soon as possible.”

Methods: The retrospective and non-controlled descriptive study analyzed audio recordings of 100 randomly selected ECNS cases (50 from each of the two centers) where the Abdominal Pain Chief Complaint Protocol was the selected protocol to triage the patient’s symptoms. The specific data elements extracted from the ECNS database were: call types (entry via 911 or 7-digit nurse triage line), if abdominal pain was the correct protocol choice, the choice of protocol by the case reviewers performing quality assurance, the final disposition (RCL) reached by the ECN and the reviewer, date and time of call, and if the call came via 911, the MPDS Determinant Code that was reached.

Results: Of the 100 randomly selected cases, the mean age was 41.6 years, and more than two-thirds of the patients were female. The reviewers agreed with the decision of the ECNs on their selection of the Abdominal Pain Chief Complaint Protocol as the most appropriate protocol 72% of the time. The reviewers agreed on the RCL reached by the ECNs 22% of the time. Of the 30 calls classified by the ECNs as needing an ambulance to take them to the hospital, the reviewers found only five patients requiring ambulance transport to the hospital (a 6-fold difference). The ECNs reached the “Seek Emergency Care as soon as possible” disposition more than three times as often as the reviewers.

Conclusion: Abdominal pain was selected as the correct Chief Complaint Protocol less than 75% of the time, with reviewers agreeing with the Emergency Communication Nurses (ECNs) on the Recommended Care Level only 22% of the time, which is lower than was expected with a significant over-triage by ECNs on this Protocol. The findings showed the mitigating potential a secondary triage system might have on the burden of growing demand emergency medical dispatchers are experiencing. It also highlighted several areas for potential improvement for the ECNs in their triage skills.

Keywords: Abdominal Pain; Emergency Communication Nurse; Recommended Care Level; Medical Priority Dispatch System Protocols; Telephonic nurse triage system.
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INTRODUCTION

Data from the National Hospital Ambulatory Medical Care survey (1999-2008) indicated that the number of emergency department (ED) visits in which abdominal pain (non-injury) was the primary reason for the visit increased 31.8% during the 10-year study period, data from the 2017 National Hospital Ambulatory Medical Care Survey confirmed that stomach and abdominal pain is the number one principle reason for ED visits in the United States.1,2 Yet in spite of this increase the proportion of those visits with a serious diagnosis remained the same. Abramson et al. concluded in their study among adult 911 patients with a dispatch Chief Complaint of abdominal pain that time-sensitive events in this cohort were exceedingly rare.3 Further, the use of advanced medical imaging increased strongly (122%) for ED visits related to abdominal pain.1 Unfortunately, this practice increases the amount of time a patient spends in the ED, and increases costs, thereby contributing to ED overcrowding and its adverse consequences.4-6

In fact, stomach and abdominal pain (including cramps and spasms in that region of the body) was the number one reason for ED visits in the United States of America (USA) in 2006 (with a total ED visits of nearly 120 million) and again in 2017.3,5 This was confirmed by Hooker et al. in their study looking at data from the National Emergency Department sample between 2010 and 2014.6 For patients arriving by ambulance, the percentage of non-injury ED visits with a complaint of abdominal pain was 26.9% higher in 2007-2008 (12.6%) than in 1999-2000 (10%).

Given the rapid increase in the number of patients accessing the ED, any intervention that can safely mitigate such a high usage of ED resources would be a great asset in the delivery of effective and efficient ED care. McClelland et al. noted that one of the largest groups gaining insurance status after the Affordable Care Act (ACA) is newly eligible Medicaid beneficiaries. In an analysis of Oregon’s Medicaid expansion lottery, there was a 40% increase in ED use in this population relative to those who remained uninsured.7 Taubman et al. found increases in emergency-department visits across a broad range of types of visits, conditions, and subgroups, including increases in visits for conditions that may be most readily treatable in primary care settings.8

In the U.S., the number of hospitals with ED services has decreased over the past decade by about 9.0-12.0%.9-14 The use of nurse advice lines and telephone nurse triage have become increasingly popular as medical costs have risen worldwide. Telephone triage nurses answer patients’ questions about common medical problems and help callers determine whether or not they need medical care—and if so, what kind and how soon.9-11

Many hospitals, medical practices, and insurance companies offer such triaging services, in part to increase customer satisfaction and provide information during out-of-office hours, but also to reduce patient overuse, or inappropriate use, of expensive emergency and urgent care services. This is particularly important as ED overcrowding and overuse continue to escalate.12,13 Therefore, an intervention that can alleviate this deteriorating situation would be an essential asset in the delivery of effective and efficient emergency care at the ED—with a significant potential of mitigating the overall cost of care in the health care continuum.

Although telephone advice lines are common, as are nurse triage services connected with EDs, telephone nurse triage at the 911 dispatch point is new in the U.S. and relatively new worldwide—despite the fact that such services can significantly reduce expensive Emergency Medical Services (EMS) resource use and ED visits, as long as its accuracy and safety can be assured.15-18

The International Academies of Emergency Dispatch’s (IAED®; Salt Lake City, Utah, USA) Emergency Communication Nurse System™ (ECNS™) is a protocol-driven system for integrating telephone nurse triage processes at the 911 dispatch point. Calls identified as low acuity by a trained and certified Emergency Medical Dispatcher (EMD) can be transferred to an ECNS-certified nurse who provides further triage and identifies the appropriate level of care needed by the patient (such as ED right away, seek medical attention within 1-4 hours, make a doctor’s appointment within the next three days, and so on). This disposition or level of care is referred to as the Recommended Care Level (RCL). The nurse also helps the patient arrange for non-EMS care by making appointments, sending alternative (non-ambulance) transport if necessary, and scheduling patient follow-up callbacks.

Each call is categorized initially by the nurse according to the patient’s Chief Complaint, also referred to as a protocol, since the Emergency Communication Nurse (ECN) is required to follow a structured set of questions associated with that Chief Complaint; collectively these questions comprise the evaluative process in the protocol for that case. Correct protocol selection is vital to the use of the system, as each protocol is designed to gather specific patient symptoms relevant to the initial problem described and then provide clinical decision support, based on sound medical triage practices.

Protocols are classified as either medical- or trauma-related. Medical protocols cover illness-related symptoms and conditions (for example, chest pain, abdominal pain, wheezing, back pain, fever, and many more). Trauma-related protocols deal with physical injury (for example, protocols covering chest injury, abdominal injury, ankle injury, falls, and many more). The ECNS is a secondary triage system used in emergency call centers; it is therefore critical that ECNs do not overlook symptoms that could indicate that, despite the initial coding of a case as low acuity, the patient’s condition is an emergency.

A recent study on the distribution of 911-triaged call incident types within the ECNS system indicated that the Abdominal Pain Protocol was the most frequently chosen protocol in one center and the second most frequently selected protocol in another center with nearly one in every 10 calls being triaged using the Abdominal Pain Protocol.19

Although in some cases patients may believe that they should be sent an ambulance at the time of emergency no matter what, many call 911 (or 999, 112, 000, or some other three-digit emergency number) because they simply don’t know whether their situation constitutes an emergency. Rather than sending an emergency ambulance (a very expensive, potentially dangerous,
and generally, highly limited resource) to every call, emergency communication centers can better serve patients’ needs, better manage their own limited resources, and efficiently serve the often overcrowded EDs in their service area by triaging patients into more appropriate avenues of care, including urgent care centers, primary care provider clinics, and even carefully constructed home care. The costs of emergency medical care have been increasing for at least the past 20 years, and one of the causes of this increase is the overuse of emergency services.20 In order to effectively do this, emergency call centers must be certain that their triage services are highly accurate—that patients identified as having very low-acuity conditions, are, in fact non-urgent.

EMS services that engage secondary nurse triage services to triage low-acuity calls from 911 (or other three-digit emergency numbers) will benefit from this data by confirming best practices in selecting the correct protocol and thereby increasing the likelihood of achieving the most appropriate RCL for the patient with abdominal pain.

OBJECTIVES

The primary objective of this study was to determine the ability of an Emergency Communication Nurse (ECN) to appropriately identify the Abdominal Pain Chief Complaint Protocol as the correct protocol (given the patient’s history and any other presenting symptoms) to use in order to triage patients. The ability to accurately select the Abdominal Pain Chief Complaint Protocol should be reviewed in those calling 911 and then being transferred from the MPDS to the ECNS as well as for those patients who elected to gain access to a nurse health advice line via a 7-digit contact number.

Two secondary objectives were identified. The first was to establish the most frequently used primary triage code from the MPDS’ Determinant Codes triggering the use of the Abdominal Pain Chief Complaint Protocol in the ECNS. Th second was the percentage of the calls processed through the ECNS using the Abdominal Pain Chief Complaint Protocol that resulted in an RCL of “emergency ambulance response” and “ED as soon as possible.”

METHODS

Study setting and design

The two sites studied were Regional Emergency Medical Services Authority (REMSA) in Reno, Nevada, USA, and MedStar in Fort Worth, Texas, USA. This is a retrospective and non-controlled descriptive study. This study was approved by the IAED Institutional Review Board.

The study sites were included based on current use of the ECNS and their status as IAED Accredited Centers of Excellence (ACEs) in MPDS. Agencies with ACE designations have proven, consistent high compliance to performance standards in relation to protocol use. In addition, REMSA has earned an ACE designation for ECNS, which demonstrates that this agency has less than 7% non-compliant calls per their audits and independent review of their audits. This study used data collected between January 2017 up to November 2018 at the two ECNS agencies to be studied.

Data management

The specific data elements extracted from the ECNS data were: the call types (entry via 911 or via 7-digit nurse triage line), if abdominal pain was in fact the correct protocol choice, the reviewers’ choice of protocol, the final RCL reached by the ECN, reviewer RCL, date and time of call, and if the call came via 911, the MPDS Determinant Code that was reached. The two agencies were asked to redact all the audio files to remove all patient/caller identifying information before sending the files to the study investigators for review. The de-identified audio files were stored in a secure server at the principal investigators site, behind a firewall. Only the study investigators had access to the redacted audio files.

Outcome measures

The primary endpoint of this study was the number of times the Abdominal Pain Protocol selection was correct or incorrect (including the percentage for each).

The secondary endpoint was the frequency of the most often used MPDS Determinant Codes triggering the use of the Abdominal Pain Chief Complaint Protocol in the ECNS when the call originated via 911.

The other endpoint was the number of calls with an Emergency Department as soon as possible (RCL for the Abdominal Pain Chief Complaint Protocol determined by the ECN and that of the Emergency Communication Nurse – Quality reviewer (ECN-Q).

Data analysis

Two ECN-Q reviewers evaluated audio recordings of 100 randomly selected ECNS cases (50 from each of the two centers) where the Abdominal Pain Chief Complaint Protocol was selected to triage the patient’s symptoms. The audio recordings were reviewed to determine if abdominal pain was the appropriate Chief Complaint Protocol to use in each selected case. Where there was a difference of opinion between the two ECN-Q reviewers in a given case, a third ECN-Q reviewer would review the case for a final decision.

The MPDS Determinant Code for each of these calls was documented when present (all calls to the REMSA center came straight from the public on the nurse help line) as well as the RCL reached for each of these calls.

STATA for Windows’ software (STATA Statistical Software: Release 16.0 ©2019 StataCorp, College Station, TX, USA) was used in this study for data analysis. Descriptive statistics such as frequencies and percentages were used to present study findings on the distributions of demographic measures, the number of times the Abdominal Pain Protocol selection was correct or incorrect, the most frequently used MPDS Determinant Codes triggering the use of the Abdominal Pain Chief Complaint Protocol in the ECNS when the call originated via 911, and the number of calls with an ED RCL for the Abdominal Pain Chief Complaint Protocol determined by the ECN and that of the ECN-Q reviewer.

RESULTS

A total of 100 randomly selected cases from two agencies were reviewed in which the ECNs selected the Abdominal Pain
Protocol as the chief protocol. A total of 50 calls from one agency were referred from their 911 system after being categorized as low-acuity calls. The remaining 50 calls from the second agency were all direct-dial calls into their nurse health line.

More than two-thirds of the patients were female with a good representation of the various age groups calling in with a mean age of 41.6 years (Table 1). The ECN-Q reviewers agreed with the decision of the ECNs on their selection of the Abdominal Pain Chief Complaint Protocol as the most appropriate protocol 72% of the time. The ECN-Q reviewers agreed on the RCL reached by the ECNs 22% of the time.

ECN-Q reviewers listened to the audio recording of the call with particular attention to the problem description/clinical history with which the patient presents. When selecting the most appropriate Chief Complaint Protocol, the ECN should take into consideration the presence of all symptoms stated and or mechanism of injury.

ECN-Q reviewers have completed their ECNS training as well as an ECN-Q certification course. One of the ECN-Q reviewers is an RN and the other an MD. The ECN-Q reviewers and the ECN agreed with the Abdominal Pain Protocol being used as the most appropriate protocol in 72% of the cases. Table 2 below lists other more appropriate protocols which the ECNs could have chosen instead of the Abdominal Pain Protocol, for example, vomiting, rectal bleeding, constipation, diarrhea, and other.

Only one of the two agencies triaged calls that had been classified as low acuity after being triaged through the MPDS primary 911 triage system. This system generates a dispatch Determinant Code for each of the 50 calls triaged at this agency. Table 3 lists the 50 codes by MPDS dispatch Determinant Code, and Abdominal Pain (01-A-01) was the most common Determinant Code sent to the ECNS for secondary nurse triage at 34%.

Of the 30 calls classified by the ECNs as needing an ambulance to transport the patient to the hospital, the reviewers found only five patients requiring an ambulance transport to the hospital a 6-fold difference). Seeking Emergency Care as soon as possible disposition (indicating that the patient should be seen in an emergency department setting, but an ambulance transportation was not indicated) was reached over three times more often by the ECNs than the reviewers (Table 4).

**DISCUSSION**

It is important to look at alternative care resources for patients suffering from abdominal pain since it is the number one reason for ED visits in the United States and a subsequent burden on health care expenses.
Telephonic nurse triage is one way of managing this cohort of patients into alternative resources other than the emergency department. Triage must be done accurately and safely to ensure patients are not under-triaged with an ultimate delay in diagnosis and treatment.

The ECNs is comprised of more than 200 symptom and injury-based protocols to assist a trained, certified registered nurse to triage patients with a multitude of symptoms and injuries.

Review of the data showed that reviewers agreed on the correct use of Abdominal Pain as the chief protocol to use in 72% of cases. The balance of the cases could have benefitted from more appropriate protocols to navigate the symptoms with which the patient was calling for, e.g., vomiting, rectal bleeding, constipation, and diarrhea to name a few.

As expected, the most common primary triage code generated by the primary triage system (MPDS) was the Abdominal Pain code 01-A-01 (a low acuity abdominal pain code), representing 34% of calls, followed by Sick Person (other pain) 26-A-08 representing 28% of calls, Chest Pain (breathing normally age 12-34) 10-A-01 at 12% of the calls, and Sick Person – Fever/chills (26-A-04) representing 6% of the calls. These top four codes represent 80% of the MPDS codes that were sent for further triage.

The reviewers agreed with the ECNs on RCL in only 22% of the cases. The reviewers reached a six-fold lower Emergency Response disposition (sends the patient to hospital via ambulance) n=5 versus n=30. Reaching an Emergency Response disposition on these patients (while a less urgent disposition might have been appropriate) could have a significant impact on the number of ED visits as a large proportion of these patients may have been referred to alternative health care resources other than the ED.

As a result of this study, educational material was developed and distributed to ECNs at these
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two agencies and others involved in secondary nurse triage to capitalize on the findings and ensure more appropriate utilization of scarce resources. Also, ECNS instructors have been updated as to key teaching points in the use of the Abdominal Pain Protocol at workshops. In addition to addressing the topic of Abdominal Pain Protocol selection when a more appropriate protocol exists, teaching points included addressing trends found in this study regarding the ECN’s interpretation of protocol assessment questions, caller answers, and nursing documentation.

Limitations

As it is infeasible to determine causal relationships with retrospective descriptive studies, only association or correlation could be assessed in this study. In addition, some key statistics could not be measured, e.g., ECNs training/qualification or experience levels, and any potential confounding temporal relationships were difficult to assess. Also, the study was based on data collected from only two agencies in the U.S.—hence the study findings may not be explicitly generalizable to other settings. Therefore, the study findings should be applied with caution in other settings.

Use of retrospective data in this study allowed for ready availability of cases to review. The inclusion of retrospective sample bias was limited due to the randomized method used by each agency in case selection. The bias of retrospective studies was further mitigated by use of audio recordings taken at the time of the protocol selection and did not involve any recall or survivorship on the part of the ECNs.

CONCLUSION

The findings in this study showed that reviewers agreed with the ECNs on the RCL in only 22% of cases, which is lower than was expected, with a significant over- triage by the ECNs on this Protocol. Choosing the correct protocol further enhances one’s chances of reaching the most accurate RCL. The research highlighted a host of learning opportunities for our ECNs, which will be applied at every opportunity to ensure nurses are triaging abdominal pain cases more accurately. Additionally, the study findings showed the potential to mitigate the burden the EDs are experiencing with growing demand. It also highlighted several areas for potential improvement for the ECNs in their triage skills, ultimately improving the efficiency of their own resource allocation decisions.

References


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