An Emergency Department Experience with Tele-Triage to Manage the Surge of COVID-19 Related Visits

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Abstract

In March 2020, the World Health Organization (WHO) declared COVID-19 a pandemic. Since then, the number of cases worldwide has increased rapidly, causing panic and leading to an increase in patients visiting emergency departments. A key factor in slowing transmission of COVID-19 is social distancing through decreasing person-to-person contact. Using a telemedicine technique to score and triage patients according to their symptoms might help to limit unnecessary emergency department visits and decrease the risk of exposure to COVID-19. In Saudi Arabia, the increase in the number of cases has stressed many emergency departments. At King Abdulaziz University Hospital, a tele-triage program was used to screen patients, with the goal of limiting unnecessary visits to the emergency department for screening or information. Based on self-reported data, a 27% drop in the number of people planning to visit the emergency department for COVID-19 related complaints was registered in the initial month. Research also suggests that involving tele-medicine in routine practice could ease its implementation during a pandemic or disaster. The article describes the program's rationale, the protocol developed, and the results of statistical analysis of the first month's data, as well as some of the challenges faced in implementing such a program and in drawing conclusions.

Keywords

Tele-triage; COVID-19; Telemedicine; Telehealth; Emergency department overcrowding

Introduction

Coronavirus disease 2019 (COVID-19) is an infectious disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). This new virus and the disease it causes were unknown before the outbreak began in Wuhan, China in December 2019. Since then, the number of COVID-19 cases has risen rapidly. In March 11th 2020, the WHO declared the outbreak as a pandemic[1]. At the time this paper was written, the global number of confirmed cases had reached 25.8 million cases, with a mortality rate of 858,000 deaths. The figures for Saudi Arabia at that time were 317,486 cases and a mortality rate of 3,956 deaths[2].

Emergency Department (ED) crowding is a factor that affects the quality of medical services, as it leads to delays in medical care and an increase in exhaustion among healthcare providers. ED crowding is also associated with poor patient outcomes and increases the risk of medical error[3,4]. Such a burden can have an egregious impact on healthcare systems, especially where infrastructure is poor[5,6].

The COVID-19 pandemic has caused widespread fear and trepidation. As a result, many people are visiting EDs seeking reassurance through screening exams, and this has led to ED crowding. In such a context, innovative technology uses can help providers both meet the surge in demand and, where possible, avoid person-to-person contact when serving patients; virtually could be a boon to healthcare systems[7].

Telemedicine has most frequently been used as an adjunct to clinical practice. However, with the pandemic, its use has become a necessity in some settings. Previously, too, telemedicine was subject to numerous regulations and barriers, but its use has been expanded since the advent of COVID-19[8,9]. In this context, it is helping many healthcare facilities to discern which patients need to self-isolate and which need to come to the hospital for further evaluation[10-12].

Social distancing is a significant measure to control the spread of the virus. Telemedicine would help providers to care for patients without having them wait in crowded EDs[10]. This is especially crucial for the elderly and for patients with comorbidities, who can have grave complications due to the infection[10-12].

To the best of the author's knowledge, no study has yet evaluated the impact on the number of ED visits of offering patients tele-triage from their homes, in the context of an infectious disease pandemic. This article aims to highlight the key processes we used to implement telemedicine in our hospital for remote triage to reduce the ED crowding and to prevent the spread of infection during the pandemic.

Materials and Methods

The King Abdulaziz University Hospital (KAUH) Tele-triage Solution

Prior to COVID-19, our institution had no call center for emergency consultations. After approval from the leadership at the institution, however, such a center was inaugurated. It consisted of a mobile phone, 12 paramedic staff, and 10 emergency medicine physicians who were available by phone 24/7 for consultation. The paramedics answered calls and administered the triage questions. For unique or uncertain situations, they were backed up by an on-call emergency physician. New funding needs for the center were minimal, as most of the necessary resources were available within the hospital. Hence, most of the effort went into developing the protocol.

Tele-triage protocol

Elements of the Tele-triage protocol that we developed (Appendix 1) – in particular, the "key questions" – were adopted from the International Academy of Emergency Dispatch (IAED) protocol 36: Pandemic/Epidemic/Outbreak (Surveillance or Triage)[13]. These questions were integrated with criteria from the Saudi Ministry of Health (MOH) Visual Triage Checklist for Acute Respiratory Illnesses (V1.1; Appendix 2)[14].

Overall, the questions asked of each caller under this protocol fall into the following four categories:

Category A: Eligibility

The program was developed to serve only employees of our institution and their dependents. If the caller was determined non-eligible, he or she was directed to appropriate channels (namely, the MOH 937 hotline). The service was also developed to address only respiratory illnesses, including COVID-19. Thus, patients with other concerns were also redirected to the correct channels (MOH 937 number).

Category B: Medical Stability Assessment

This set of questions was designed to assess whether the patient was sufficiently stable to receive advice over the phone or needed to be immediately conveyed to the ED. These questions were adapted from the IAED protocol 36[13]:

- Is there a change in the patient's consciousness level?

- Is the patient unable to complete sentences in one breath?

- Is there an overall difficulty breathing?

- Is there chest pain for a patient above 35 years old?

Any affirmative to these questions requires the paramedic to ask the caller to hang up and go to the nearest ED for evaluation or to call for ambulance transport. The paramedic also informs the emergency medicine physician on duty of the patient's potential impending arrival.

Category C: COVID-19 Triage Scoring Questions

If the patient was deemed eligible and clinically stable enough to receive advice via phone, the paramedic would proceed with questions designed to determine the need for COVID-19 assessment. The Saudi MOH Visual Triage Checklist for Acute Respiratory Illnesses (V1.1; Appendix 2) was used for this purpose[14]. A score of four or above indicates a need for physician evaluation for possible COVID-19 testing. Patients receiving such a score were booked for an appointment in the Acute Respiratory Illness (ARI) clinic and were provided with, and instructed to follow, the MOH 12-point home quarantine guidelines. In addition, the patient was instructed not to visit the ED unless "red flag" symptoms developed. Patients were also instructed to call back if they had any concerns.

If the score was less than four (*i.e.,* not high enough to recommend a COVID-19 evaluation), patients were instructed to monitor their symptoms and to maintain social distancing and good hand hygiene.

Category D: Survey Questions

As part of the project, data were collected to track the impact of remote triage on ED crowding. The following two questions were specifically included in an attempt to measure the effect of such a service on the number of ED visits:

- Were you planning on going to the ED for a checkup prior to calling this service?
- After the phone call, are you still planning on going to the ED for a checkup?

Data management and Statistical Analysis

All calls were documented, and the data were saved and stored in accordance with the data safety and security measures of the hospital. Patients were called back a few days after their call by our staff to collect information regarding service satisfaction and to ensure patient stability.

Data were analyzed using the Stata 16 software package. Continuous data were analyzed using mean, median and standard deviation. Categorical data were analyzed using percentages. Only descriptive statistics were used in this analysis.

Results

We reviewed the call data from the initial 30 days of operation of the COVID-19 tele-triage hotline. These data are summarized in Table 1 according to the four question categories described above. In all, 196 calls were received. The number of non-eligible callers and calls for non-respiratory/COVID-19 issues was 68. Of the 128 calls remaining, 17 (13.28%) patients were determined to be too medically unstable for phone triage and were asked to go to the ED. Of the remaining 111 callers (*i.e.,* those both eligible and suitable for tele-triage), 68 (61.26%) were scheduled to have a COVID-19 assessment performed at the ARI clinic while 43 (38.74%) were advised that a COVID-19 evaluation was not needed.

The data also show that of the 111 patients who were eligible and stable, when asked about plans to visit the ED, 42 (38.53%) answered that they had been planning to visit the ED to be checked for their symptoms prior to placing the call. However, when asked if they were still planning to visit the ED after having completed the call and receiving tele-triage service, only 12 (11.01%) answered "Yes."

Discussion

Many institutions worldwide have implemented telemedicine solutions to try to support their burdened healthcare systems during the present pandemic. Nonetheless, there is as yet little or no published data or analysis ready for gauging the impact of such strategies on ED crowding or function. In this project, the aim was to implement telemedicine to reduce the burden of the COVID-19 pandemic on our local healthcare system by establishing a hotline tailored to triaging suspected COVID-19 cases in a way that could potentially reduce person-to-person contact by eliminating some unnecessary ED visits. ED crowding adds risk for both patients and physicians to contract infections, especially in the case of a pandemic. Emergency departments crowding also carries risk of compromise in quality of care, poorer patient outcomes and decreased physician productivity[5-7]. In the case of

Table 1. Call data for initial month of tele-triage program

Category A – Eligibility			
Excluded patients*		68 (34.69%)	
Included patients		128 (65.31%)	
Total Calls		196 (100%)	
Category B – Medical Stability Assessment			
Clinically stable		111 (86.72%)	
Clinically unstable		17 (13.28%)	
Total		128 (100%)	
Category C – COVID-19 Triage Score			
Score of $\geq$ 4 (suspected case)		68 (61.26%)	
Score < 4 (no suspected case)		43 (38.74%)	
Total		111 (100%)	
Category D – Survey Questions			
Were you planning on going to the Emergency Department for a checkup prior to calling this service?		After the phone call, are you still planning on going to the Emergency Department for a checkup?	
Yes	42 (38.53%)	Yes	12 (11.01%)
No	67 (61.47%)	No	97 (88.99%)
Total	109 (100%)	Total	109 (100%)

Inclusion criteria: institution staff person or staff person's dependent calling for respiratory and/or COVID-19 related issues.

COVID-19, cities with greater population density are also at greater risk.

Clearly, the results of the present study, which was conducted in an urban hospital environment, are promising. In particular, the 27% drop identified in the number of patients intending ED visits pre- and post-call (*viz.*, from 38.5% of callers to 11.01% – see Table 1) suggests that programs like ours can have a significant positive impact on ED crowding, despite certain limitations on the conclusions that can be derived from these data, which are addressed below.

Intuitively, having a tele-triage system can be expected to channel patients away from the ED, which can lead to less exposure and subsequently less transmission of the virus. In the present study, we also observed no safety complications from advising patients to home quarantine without going through a more traditional face-to-face evaluation by a physician in the ED or in the ARI clinic.

Notably, however, the application of telehealth studied here was newly introduced and had not been part of routine practice or training at the facility. According to Smith *et. al*.[15], regular telehealth practice leads to more sustainable models of care, as well as to a telehealth-ready workforce. These authors further argue that telehealth adoption requires a whole-system strategy, and that embedding telehealth into routine service delivery – as practiced by all healthcare providers – is the most effective way to ensure that telehealth can be readily used during emergencies. This requires that institutions maintain operational telehealth networks, telehealth policies and procedures, and technology infrastructure that can be scaled-up during times of disaster[15].

Therefore, it is imperative to include telehealth in curricula and in routine daily care to ease its scalability in case of disaster or pandemic.

Conclusion

In the context of a pandemic or a disaster, many people find themselves visiting EDs for care and/or information, which leads to ED crowding and places a strain on healthcare systems. Switching to providing care by using technology, in the form of tele-triage, may help to curb the effects of disasters on EDs and healthcare systems. Further studies are needed to evaluate and quantify the effect of tele-triage on ED crowding in response to disasters. Studies are also needed to evaluate the safety of using tele-triage during a pandemic. Nevertheless, this paper contributes to the literature by revealing promising preliminary data and by highlighting some of the issues encountered when implementing tele-triage in such a context. In this regard, the author recommends implementing telemedicine as a routine element in healthcare practice in order to optimize its potential to have a positive impact during a crisis.

Limitations

Although our experience with the program reported here is promising, it must be noted that we faced obstacles on implementation; and that there is insufficient data for solid conclusions. As mentioned above, our project was developed out of necessity, and the use of telemedicine had not been routine at the facility prior to the pandemic. Intuitively, people are less likely to use technology-based healthcare solutions in emerging needs if they have not become accustomed to using them as part of regular healthcare practice. We also had limited resources for the project, and an alternative to our tele-triage solution was available to our patient population simultaneously through the MOH – all of which is likely to have reduced the number of calls that might otherwise have been received. The small number of program participants makes it impossible to ground claims about the reduction of unnecessary ED visits in statistically significant data, or to draw conclusions regarding patient safety. Nevertheless, the results can be interpreted as a compelling call for further research on the impact of such programs using research designs that provide for a larger sample size and greater generalizability.

Acknowledgements

Conflict of Interest

The authors declared that there is no conflict of interest that is related to this study and this article.

Disclosure

The authors did not receive any type of commercial support either in the form of compensation or financial support for this case report. The authors have no financial interest in any of the products, devices, or drugs mentioned in this article.

Ethical Approval

The study was approved by the Ethics Committee of the KAUH in Jeddah, Kingdom of Saudi Arabia, also known as the Institutional Review Board of Hospitals.

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Appendix 1. Tele-triage protocol PDF file

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وقايــــة
Weqaya
المركز الوطني للوقاية من الأمـــراض ومكافحتها
Saudi Center for Disease Prevention and Control

وزارة الصحة
Ministry of Health

APPENDIX 4
Visual Triage Checklist
Visual Triage Checklist for Acute Respiratory Illnesses

Date:	Time	MRN:
Name:	ID#:	Hospital:

Circle the number reflecting the patient's condition (exposure and clinical picture) and calculate the final score:

Risks for Acute Respiratory Illnesses	Score		
A. Exposure Risks (in the past 14 days prior to symptom onset)	*Any Patient (Adult or Pediatric)*		
1. Had a history of travel to areas with presumed ongoing community transmission of COVID-19 (**China, Iran, South Korea, Japan, Singapore, Hong Kong,** or any updated information added on CCC website: moh.gov.sa/CCC/healthp/regulations/Documents/SuspectedCOVID19Supplement.pdf) **OR** A close physical contact in the past 14 days prior to symptom onset with a confirmed case of COVID-19 **OR** Working in or attended a healthcare facility where patients with confirmed COVID-19 were admitted.	5		
2. Exposure to a confirmed MERS case in the last two weeks	3		
3. Exposure to camel or products (direct or indirect*) in the last two weeks	2		
4. Visit to a healthcare facility that had MERS case in the last two weeks	1		
B. Clinical Signs and Symptoms	*Patient with Exposure Risk No. 1*	*Patient with or without Exposure Risk No. 2, 3, or 4*	
		Pediatric	*Adult*
1. Fever	1	1	2
2. Cough (new or worsening)	1	1	2
3. Shortness of breath (new or worsening)	1	1	2
4. Sore throat and/or runny nose	1	-	1
5. Nausea, vomiting, and/or diarrhea	-	-	1
6. Chronic renal failure, CAD/heart failure	-	-	1
Total Score			

*Patient or household

A score ≥ 4, place patient in an isolation room and inform MD for assessment. MERS-CoV testing should be done only according to case definition.
A score ≥ 6, place patient in an isolation room and inform MD for assessment. COVID-19 testing should be done only according to case definition.

Staff name: _____   ID number: _____

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Appendix 2. The Saudi Ministry of Health visual triage checklist for acute respiratory illnesses
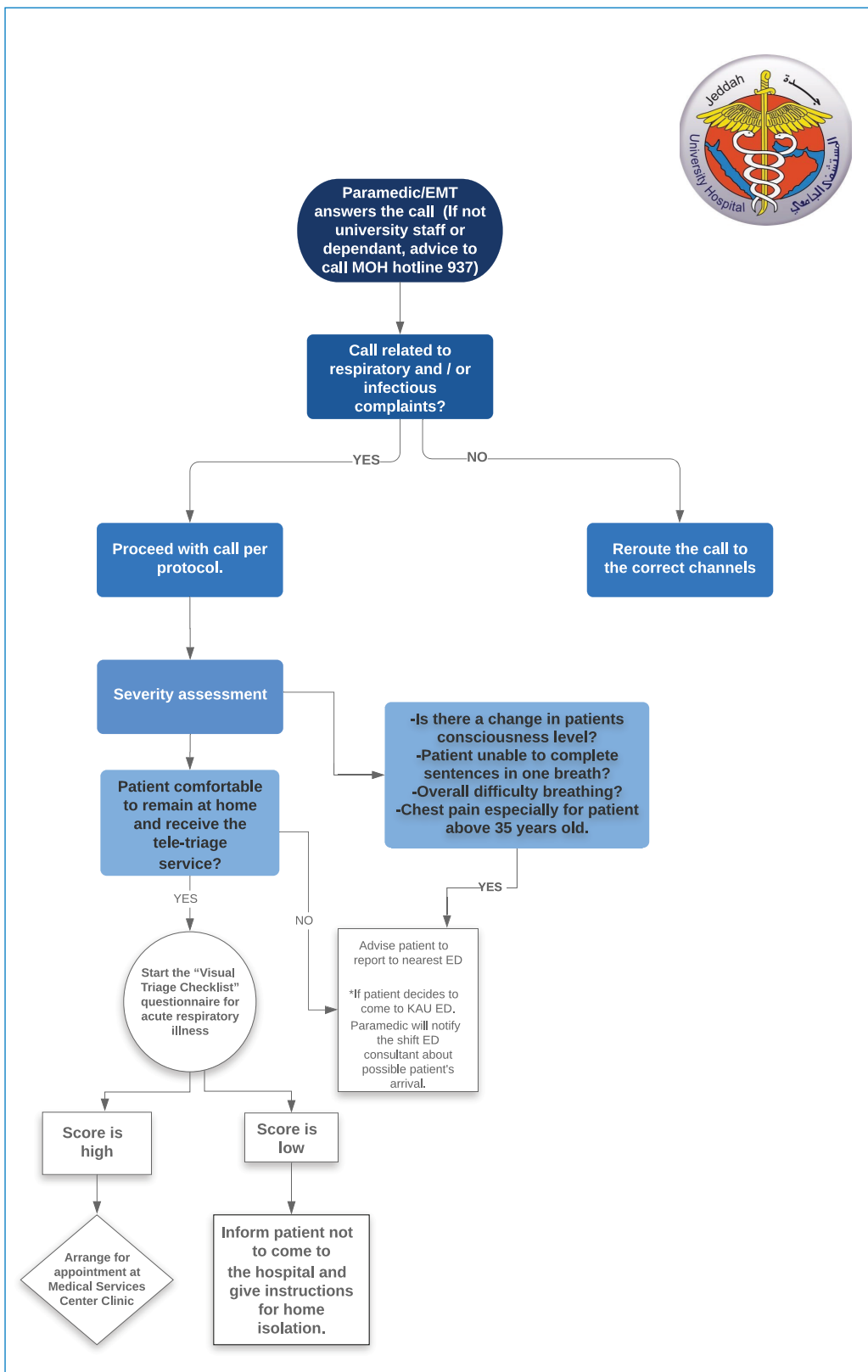
تجربة قسم الطوارئ في استخدام الفرز عن بعد (الطب الاتصالي) لتقليل الازدحام خلال جائحة كورونا

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. في مارس٢٠٢٠، أعلنت منظمة الصحة العالمية أن فيروس كورونا المستجد قد أصبح جائحة عالمية. ومنذ ذلك الحين ازداد عدد الحالات في جميع أنحاء العالم بسرعة كبيرة مما أدى إلى حالة من الذعر وبالتالي ازداد عدد المرضى الذين يزورون أقسام الطوارئ. يعد التباعد الاجتماعي عاملاً رئيسياً في إبطاء انتقال فيروس كورونا المستجد من خلال الحد من اقتراب الناس بعضهم ببعض. إن استخدام الطب الإتصالي لفرز المرضى بحسب اعراضهم قد يقلل من زيارات الطوارئ غير الطارئة وذلك يقلل من خطورة انتقال المرض. وشكل ازدياد الحالات المصابة بفيروس كورونا المستجد في المملكة العربية السعودية عبئاً على أقسام الطوارئ في المستشفيات. وقد استخدمنا في مستشفى جامعة الملك عبد العزيز بروتوكول الفرز عن بعد. وكان الهدف من ذلك تقليل عدد زيارات المرضى غير الضرورية لقسم الطوارئ لغرض الفحص او معرفة معلومات عن المرض. ولقد لاحظنا من خلال بياناتنا انخفاضاً بنسبة ٢٧٪ في عدد الأشخاص الذين كانوا يخططون لزيارة قسم الطوارئ للشكاوى المتعلقة بفيروس كورونا المستجد في الشهر الأول. أثبتت الأبحاث السابقة أن استخدام الطب الإتصالي بشكل روتيني في الممارسة الصحية يجعل تطبيقه أسهل اثناء الكوارث أو الجوائح. في هذا المقال، نستعرض سبب انشاء هذا البرنامج والبروتوكول المستخدم و نتائج احصائيات الشهر الأول في استخدام الطب الإتصالي لفرز حالات فيروس كورونا المستجد عن بعد وتسليط الضوء على بعض العقبات التي واجهتنا.

الكلمات المفتاحية: الفرز عن بعد ؛ كوفيد ـ١٩ التطبيب عن بعد؛ الرعاية الصحية عن بعد. اكتظاظ قسم الطوارئ.