Secure smartphone application-based text messaging in emergency department, a system implementation and review of literature

Ali Pourmand, MD, MPH, RDMS *, Jeffrey Roberson, BA, Amanda Gallugi, BSN, Youssef Sabha, BS, Francis O'Connell, MD

Department of Emergency Medicine, George Washington University School of Medicine and Health Sciences, Washington, DC, United States

A R T I C L E   I N F O

A B S T R A C T

Background: The utilization of smartphone-based technology and applications to streamline patient care provides an exciting opportunity for quality improvement research. As traditional communication methods such as paging have repeatedly been shown to be susceptible to errors and inefficiency that can delay patient care, smartphones continue to be investigated as means of improving inter-hospital communication and patient outcomes.
Methods and materials: We conducted a systematic literature review in PubMed, MEDLINE using the keywords Health Insurance Portability and Accountability Act (HIPAA) Compliant Group Messaging (HCGM), text paging communication, secure hospital text message, HIPAA text message, and secure hospital communication. The search considered studies published until January 2018. Only English-language studies were included. We reviewed the reference lists of included articles for additional studies, as well. Abstracts, unpublished data, and duplicate articles were excluded.
Results: 569 studies were screened and assessed for eligibility with 35 meeting the inclusion criteria. 15 of these studies are data-driven with topics of investigation ranging from facilitation of communication (40%), security (33%), provider/patient satisfaction with communication (26%), diagnostic assistance (20%), demographics of use (13%), time spent in communication (13%), and finances (7%). Sample size per study varied from 30 to 10,000 encounters.
Conclusions: The use of smartphones can positively impact patient care; however, these benefits must be balanced with the responsibility to protect patient privacy and confidentiality. In order to continue to support HCGM's expansion and integration into daily practice, further data-driven studies into HCGM-specific interventions must be pursued.

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1. Introduction

Currently, there are limited Health Insurance Portability and Accountability Act (HIPAA) compliant methods of communication between healthcare professionals. Existing HIPAA-protected modes of communication include personal digital assistants (PDAs), digital enhanced cordless telecommunication (DECT) phones, in-hospital landlines, encrypted email services, handheld pagers, and, most recently, HIPAA compliant group messaging (HCGM) applications [1-3]. With expansion of smartphone use combined with increased cellular and Wi-Fi connectivity, there has been a significant increase in the use of smartphones in the hospital setting [1,4-6]. As of 2011, approximately 71% of all United States-based physicians use a smartphone with 85%

of resident physicians in Accreditation Council for Graduate Medical Education (ACGME) training programs reporting use of a smartphone in the clinical setting [7]. The most commonly used smartphone platforms include, but are not limited to Apple iOS, BlackBerry, and Android [4]. Nevertheless, through a national survey, 79.8% of providers report still being provided pagers by their hospitals [8].

It is hypothesized that the use of smartphone-based communication will lead to more streamlined communication between providers, especially in the setting of emergency medicine. As an institution, our urban, academic emergency department (ED) now utilizes HIPAA compliant group messaging (HCGM) applications to transmit concerning electrocardiograms (ECG) to on-call interventional cardiologists, a change from a previous reliance on a traditional one-way, fax communication system. We review technological advancements in communication and the benefits of implementing electronic communication in the clinical workspace via smartphones. We also discuss implementation and learned experiences of HCGMs into current clinical workflow in an urban, academic ED.

* Corresponding author at: Department of Emergency Medicine, George Washington University School of Medicine and Health Sciences, 2120 L St., Washington, DC 20037, United States.

E-mail address: pourmand@gwu.edu (A. Pourmand).

2. Methods and materials

A systematic literature review using PubMed, MEDLINE databases was conducted using the keywords HCGM, HIPAA compliant group messaging, text paging communication, secure hospital text message, HIPAA text message, and secure hospital communication. Studies published through January 2018, with English language restrictions, were included.

Two senior authors reviewed articles bibliographies for consideration of additional studies. Exclusionary criteria included studies that were not published in English, abstracts, unpublished data, and duplicate articles across multiple search criteria. Additionally, publications that were unrelated to physician use of various communication methods for the purpose of patient care were also excluded.

3. Results

The initial searches resulted in the identification of 569 publications. 534 of these were ultimately excluded as they were abstracts, unpublished data, and/or did not directly address the topic of provider use of communication in patient care. Non-English articles were excluded. We ultimately included 35 publications, 15 of which were data-driven and 20 of which were not data-driven. (Fig. 1) The fifteen data-driven publications that were included in our report are summarized in Table 1. These data-driven studies dealt with seven main subtopics within healthcare communication: facilitation of communication, security, provider/patient satisfaction with communication, diagnostic assistance, demographics of use, time spent in communication, and finances. These categories were not mutually exclusive, and many reports
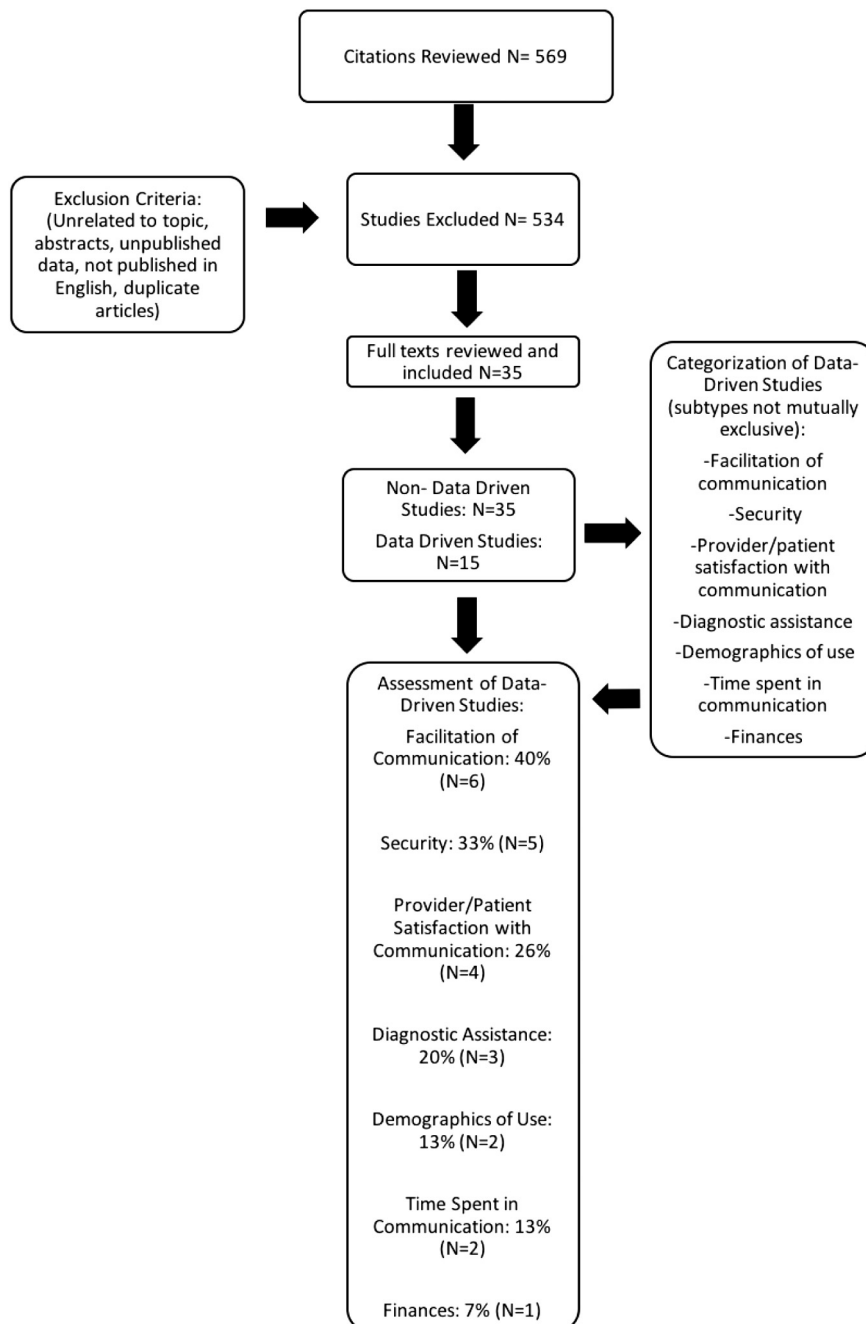

Fig. 1. Consort chart describing inclusion criteria.