

# The Role of Text Messaging and Telehealth Messaging Apps



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## KEYWORDS

• Text-based messaging • Applications • Telehealth • Legal issues • Technology

## KEY POINTS

- The rapid advancement of technology experienced worldwide in the recent past continues to leave a significant effect wherever the technology is applied.
- Currently, various telecommunication tools, such as the Internet, email, and videoconferencing, are used in the health care context to exchange information among doctors and patients regarding different health problems, ranging from acute to chronic conditions, such as minor injuries, febrile conditions, weight management, smoking cessation, medication adherence, depression, anxiety, and stress.
- One particular telecommunication tool that is gaining wider popularity is the use of text messaging, whose use comes with low costs, quick delivery, increased safety, and lower intrusiveness compared with telephone calls.

## INTRODUCTION

The rapid advancement of technology experienced worldwide in the recent past continues to leave a significant effect wherever the technology is applied. Currently, various telecommunication tools, such as the Internet, email, and videoconferencing, are used in the health care context to exchange information among doctors and

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patients regarding different health problems, ranging from acute to chronic conditions, such as minor injuries, febrile conditions, weight management, smoking cessation, medication adherence, depression, anxiety, and stress.<sup>1</sup> Indeed, “(t)he rapid expansion of mobile health (mHealth) programs through text messaging provides an opportunity to improve health knowledge, behaviors, and clinical outcomes, particularly among hard-to-reach populations.”<sup>2</sup> Rathbone and Prescott<sup>3</sup> state that “Studies have found that 31% of mobile phone owners use them to access health information; 19% have also installed a mobile app that relates to a current medical condition or to manage their health and well-being.” Another study showed that “over 56% of health-care settings use mHealth to aid clinical practice.”<sup>4</sup> One particular telecommunication tool that is, gaining wider popularity is the use of text messaging, whose use comes with low costs, quick delivery, increased safety, and lower intrusiveness compared with telephone calls.<sup>5</sup>

### TEXT MESSAGING IN TELEHEALTH

Currently, text messaging is being used in telemedicine and telehealth where patients and doctors use their different electronic gadgets, such as personal computers, tablets, or mobile phones, to communicate through text-based messaging transmitted as short message services (SMS) over networks of mobile operators or the Internet. This is where mobile and computer applications, such as WhatsApp, WeChat, FaceTime, Messenger, Line, and Viber, among others, come into use. This article examines the role of these and other text messaging apps in telehealth, with an overview on whether these apps meet HIPAA and other considerations.

As is the case with any other set-up, people will use the most efficient, convenient, and cost-effective platform available. The use of text messaging services and apps comes in with what most of their users desire, particularly concerning the cost in terms of money and time, and convenience, the latter arising from the ability of mobile devices to have several communications tools/apps in a single mobile device.<sup>1</sup> Because of their low cost and reliance, text messaging apps are widely used to share information used for various purposes, including administrative, health disease management, education, telepathology, health and behavior change, diagnoses and management, triage, home monitoring, or screening.<sup>6</sup> According to Kamel and colleagues,<sup>7</sup> telemedicine services implemented in urology, where patients perform video visits, have saved patients of Los Angeles VA Hospital considerable costs in the money and time they spent per visit. Used this way, WhatsApp, for instance, has been able to eliminate geographic constraints that are common concerning physical visits to health service providers. The use of WhatsApp and generally other telehealth apps encourage not only seeking initial clinical but also ongoing expert clinical care among health care professionals.<sup>8</sup> Hence, one of the roles of text messaging and messaging apps in telehealth is reducing the cost while improving the convenience of sharing information.

Text messaging and messaging apps also play a key role in strengthening health care systems. Besides enhancing the accessibility of health care services, text messaging and messaging apps can open up access to health care services for patients in remote areas. As health care services get closer to the people, more patients are likely to benefit from emergency referrals, whereas other groups of people, such as community workers, midwives, especially those in remote areas, are able to receive the support that is otherwise limited or absent.<sup>2,9</sup> The use of text messaging and messaging apps also makes it easier for community health workers to collect data remotely.<sup>2</sup>

The host of services and capacities of mobile devices will also benefit users in various ways, such as to support various health interventions, among them health promotion and disease prevention, treatment compliance, health information systems and point-of-care support, data collection and disease surveillance, and emergency medical response.<sup>2</sup> For instance, the messaging services and apps enhance the delivery of information related to health practices and prevention of diseases, thereby promoting healthy behaviors. Besides, patients and providers benefit from common uses of text messaging services and apps, including setting and/or passing reminders for appointments, monitoring dermatologic lesions, remote screening and diagnosis, creation of patient self-reports, storages and forwarding of results, skin self-examination and burns, health behavior reminders concerning the use sunscreen, and monitoring compliance for prevention and treatment.<sup>2,3,6,10</sup> Health professionals, such as doctors and community health workers, also benefit from clinical support that telemedicine is able to offer concerning functions, such as access to real-time data, and creating clinic and hospital records on the outbreak of diseases through monitoring of patient attendances. Concerning this role, some of the text-messaging initiatives that are in use include Text4baby, TXT4Tots, SmokeFreeTXT, QuitNowTXT, Health Alerts On-the-Go, Text Alert Toolkit, and SmokeFree Moms.<sup>2</sup>

Evidence exists on the acceptance, usage, and effectiveness of text messaging programs in telehealth. Studies on the use of SMS reminders show that the use of text messaging help improves patient-medical compliance, and that text messages make a better choice for users based on ease of use, low costs of use, and rapid and automated delivery of messages.<sup>11</sup> According to research by the US Department of Health and Human Services, descriptive studies have provided insights into not only patient preferences for text messaging concerning the receipt of health information and reminders but also retention in health interventions after enrollment,<sup>2</sup> hence the reason text messaging can safely be made a regular practice.

## APPLICATIONS IN ADULT CARE

For telehealth in the general (adult) population, messaging apps have been used to stimulate compliance and self-management in patients with chronic issues. Automatic text reminders for ambulatory visits are common, but also reminders for tests and vaccinations.<sup>12,13</sup> Maugalian and colleagues<sup>14</sup> reviewed the use of text messaging in oncology, and described examples of successful text messaging interventions, including addressing behavioral change, attendance to screening and follow-up appointments, adherence to treatment, and assessment of symptoms and quality of life.

Huo and colleagues<sup>15</sup> show how a text message intervention resulted in better glyce-mic control in patients with diabetes mellitus and coronary heart disease. Having the text messages sent by the patient's family or friends showed an increased effect on health-related lifestyle issues<sup>16,17</sup> and mental health.<sup>18–20</sup> Comparable examples are known from smoking cessation,<sup>21,22</sup> addiction,<sup>23,24</sup> and patients on hemodialysis.<sup>25</sup>

SEXINFO, an innovation developed by the US Agency for Healthcare Research and Quality Health Care Innovations Exchange with the intention of creating awareness about the high rates of spread of gonorrhea in San Francisco, proved effective in the use, sharing, and satisfaction with messages, and a high number of inquiries and referrals.<sup>26</sup> One great aspect of the SEXINFO innovation is that it capitalized on the inseparability concerning access and use of mobile technology to reach the target audience. In Australia, the use of text message interventions to teach youths about sexually transmitted infections showed greater use compared with emails; “the use

of text messages related to sexual health suggests that text messaging offers promise for reaching teens about health information, referrals, and testing reminders.”<sup>2</sup>

In New York, text messaging interventions used for delivery of immunization reminders among English- and Spanish-speaking expectant women and parents of adolescents showed an improved rate of vaccinations and that the parents of adolescents were uniformly satisfied based on simplicity, brevity, and personalization.<sup>27,28</sup> The same positive result of the interventions showed that pregnant women were interested in the programs concerning encouragement to take vaccines and talk to clinicians during pregnancy.<sup>27</sup> The same can apply for other categories of people given the ever-increasing use of mobile technology across the globe, including patients with human immunodeficiency virus/AIDS for whom evidence shows that reminders are helpful in adherence to medications and hence suppression of viral load.<sup>29</sup>

### APPLICATIONS IN PEDIATRIC CARE

As in health care in general, the use of text messaging has also been applied in pediatric care only recently. One of the first studies on text messaging was done in Denmark and indicated that SMS reminders reduced nonattendance at the pediatric outpatient clinic.<sup>30</sup>

In 2012, a systematic review studied the evidence using text messaging as a tool to deliver healthy lifestyle behavior intervention programs in pediatric and adolescent populations.<sup>31</sup> They found 37 relevant articles and concluded the high potential of text messaging–delivered health care behavior interventions that work as a reminder system for chronic disease management in these populations.

In 2013, a Harvard qualitative study using focus groups concluded that “text messaging is a promising medium for supporting and encouraging pediatric obesity-related behavior changes.”<sup>32</sup> Similarly, a Johns Hopkins survey indicated that “caregivers of children would be interested in communicating with healthcare providers following an ED visit.”<sup>33</sup> In a trauma resilience and recovery program, mental health symptoms postinjury were tracked via a 30-day text messaging program and screening for post-traumatic stress disorder via a questionnaire was completed via telephone screens.<sup>34</sup> Standardized text messages improved the 30-day follow-up for American College of Surgeons National Surgical Quality Improvement Program scores.<sup>35</sup> In pediatric tonsillectomy patients, text messaging was used to improve communication and overall experience.<sup>36</sup> In pediatric asthma, real-time capture of peak flow rate meter readings was done with SMS.<sup>37</sup>

In diabetes care, Stephens and colleagues<sup>38</sup> show how behavioral intervention technologies and artificial intelligence could help in pediatric obesity and prediabetes treatment support. Moreover, encouragement for influenza vaccines was successfully given by text messaging in a pediatric population.<sup>39–41</sup>

The role of text messaging for disease monitoring was also studied in childhood nephrotic syndrome.<sup>42</sup> Text messages soliciting home urine protein results, symptoms, and medication adherence were sent to a caregiver who responded by texting. The system reliably captured number of disease relapses and time-to-remission compared with data collected by conventional visits.

Text messaging may also play an important role in obtaining and using patient-reported outcomes. Mellor and colleagues<sup>43</sup> show that text messaging permits valid assessment of the Pediatric International Knee Documentation Committee and Pediatric Functional Activity Brief Scale scores in adolescents.<sup>43</sup> They conclude that “questionnaire delivery by automated text messaging allows asynchronous response

and may increase compliance and reduce the labor cost of collecting PRO's [patient-reported outcomes]."

In a study in patients after neonatal intensive care unit discharge, Flores-Fenlon and colleagues<sup>44</sup> concluded that smartphones and text messaging were associated with higher parent quality-of-life scores and enrollment in early intervention.<sup>44</sup>

## USE OF CROSS-PLATFORM MESSAGING APPLICATIONS

Such apps as WhatsApp, WeChat, and Line are ubiquitous cross-platform messaging and voice-over Internet protocol/Internet protocol freeware services.

Currently, WhatsApp Messenger is one of the most widely used mobile apps in telehealth; however, various sources have indicated that this application and likes have serious limitations with regard to privacy and data security. Many attribute the widespread use of WhatsApp Messenger to its extensive capabilities, such as to share high-quality photographs, videos, and voice messages, and to make voice and video calls, videos on top of text-based messages. In addition, WhatsApp Messenger uses an Internet connection that can use a mobile data plan or Wi-Fi, which makes it more affordable than the conventional SMS modality. With quality, reliability, and low cost, WhatsApp Messenger has become one of the most preferred messaging apps among patients and health professionals because the information shared (images and videos) is of sufficient detail as would be needed to make adequate diagnosis and initial treatment, leading to better efficacy compared with other modalities that can serve the same purpose.<sup>6</sup> The WhatsApp Group feature that is part of WhatsApp Messenger is also an excellent platform for text blasting/bulk messaging because it allows sharing information to 256 people at once, or by the use of the app's Broadcast Lists where information can be repeatedly shared to preselected and saved list of recipients, eliminating the need to select the recipients each time.<sup>7</sup> In this case, for instance, a health professional can create a group and add relevant members, after which the professional will instantly share a piece of educational or related information to all members, which is faster than having to share the information to each recipient individually.

Results of research examining the usefulness of WhatsApp in clinical decision-making and patient care showed that the mobile app is a "low-cost and fast technology with the potential of facilitating clinical communications, enhancing learning, and improving patient care while preserving their privacy."<sup>7</sup> When used on patients battling with smoking relapse, WhatsApp provides enhanced discussion and social support, which proved effective in helping the patients reduce relapse to rates of 2 and 6 months as the authors continue to narrate. Additionally, when used among emergency surgery teams in a London hospital, WhatsApp was attributed to a flattened hierarchy that allowed all participants (students, residents, and experienced consultants) to actively and freely contribute to the discussions. These authors also found WhatsApp to be a better platform for case discourses, increasing awareness on patient-related information, improving the efficiency of the handover process, and reducing the duration of ancient morning handover processes among orthopedic residents. These are just a few examples of the situations where the use of WhatsApp in health care has proved beneficial. Various bodies, however, suggest taking serious steps to ensure compliance with data protection laws when introducing text messaging services. To safeguard data privacy and confidentiality, mobile messaging should only take place through a secure health care messaging application, and in Europe the National Health Service has provided detailed instructions for its practice.

In Asia WeChat and Line are the WhatsApp equivalent. In China, WeChat is used to expand human immunodeficiency virus testing by reaching key parts of the

population, among them nonheterosexuals who rarely do testing.<sup>45</sup> However, there are considerable security concerns. The population whom the said study targeted were apprehensive about using the platform and participating in the intervention for fear that the information shared through the app would reach their families, which would then have exposed their sexual orientation.

## LEGAL IMPLICATIONS

Despite the increasing use and promising potential benefits, the use of text messaging and messaging apps in telemedicine is limited by whether they are compliant with US HIPAA regulations, Europe's General Data Protection Regulation, and Singapore's Personal Data Protection Act, among other bodies. For instance, HIPAA is particular about sharing of protected health information as a text message.<sup>7</sup> HIPAA's security rule includes specific security standards for the disclosure and storage of electronic health information and requires safeguarding of PHI [protected health information]. This means that before a messaging app is used, its security standards must meet some threshold. Besides, texting is shown to have a unique set of risks that without management compromise the privacy and security of the shared information. For example, this could happen if the mobile devices are lost or recycled.<sup>46</sup>

In a study reported in 2014, pediatric hospitalists were surveyed on their use of text messaging. Forty-six percent of the 97 respondents worried privacy laws can be violated by sending/receiving text messages, and 30% reported having protected health information in text messages.<sup>47</sup> However, only 11% reported their institution offered encryption software for text messaging.

In pediatric dermatology, text messaging and cell phone cameras have facilitated curbside consultations and a recent survey indicated that they increase access and promote collegiality; but they are also usually not compensated, consume considerable time, risk liability exposure for providers, and potentially compromise confidentiality.<sup>48</sup>

The information a patient discloses to a physician is confidential and should be treated as such.<sup>40</sup> Hence, before any of these apps are put into wide telemedical use, a thorough evaluation is needed to ensure consistency and compliance with ethical practices. Notably, HIPAA does not bar the use of any mode of communication, including texting, but care should be taken to enhance the safety and privacy of information shared.<sup>8,46</sup> Such apps as WhatsApp Messenger are deploying end-to-end encryption that enhances the safety of information shared, which can make them among the HIPAA-compliant messaging apps. Generally, HIPAA recommends using messaging apps under secure encrypted networks with access and audit controls.<sup>49</sup>

This paper has discussed the role of text messaging and messaging applications including technical and legal issues. The reviews of current examples of text messaging in adult and pediatric practice show uptake has been increasing substantially in the past 3 years, especially to stimulate adherence and self-management in patients with chronic diseases. In pediatric care text messaging has been used for behavior intervention and outcomes tracking. Although applications are promising, especially efficiencies and selected, the potential of nonsynchronous messaging in the formal delivery of care is still in the neonatal phase compared with its grown-up existence in day-to-day modern life.

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