An Integrative Review of Text Message Reminders for Medical Surveillance Exams

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Abstract

The purpose of this integrative review is to evaluate if the literature in relation to the use of text message (TM) reminders for promoting timely attendance at medical surveillance exams (MSE). The ability to notify employees of their scheduled appointments poses a challenge in the MSE process. The use of text messaging can be expanded to occupational health settings by sending reminders to employees when these exams need to be completed. SCOPUS was searched for relevant studies between 2005 and 2015, resulting in nine articles meeting inclusion criteria. Seven of the nine articles reported significant improvement in attendance rates with one study demonstrating no show rates would be reduced by 51% if TM reminders were used. This integrative review establishes the use of text messages as appointment reminders for medical surveillance would be an effective method to improve attendance at MSE.

Keywords

text message; appointments reminders

Introduction

The Occupational Safety and Health Administration (OSHA) health standards require employers to provide access to periodic medical surveillance exams (MSE) for employees exposed to chemical specific and situational workplace hazards. MSE are a core component of occupational health "that impacts individuals and groups whose occupation places them at significantly increased risk of a controllable disease" (Craner, 2014, p. 693). Timely attendance at MSE not only are imperative for optimizing and ensuring employee health and well-being, but also to ensure compliance with regulatory standards. However, for some on-site occupational health clinics, scheduling and notifying employees when these exams are due can be challenging and has a negative impact on the rate of attendance at MSE

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appointments. The purpose of this paper is to evaluate the literature in relation to the use of text message reminders for promoting timely attendance at MSE appointments.

Problem

In the workplace, MSEs are an important strategy for preventing occupational diseases and for early detection of adverse health effects from exposure to workplace hazards. "Early-stage disease identified through medical surveillance allows intervention through proper treatment to lessen the overall effect on the employee" (Amacher, 2007, para. 10). These exams usually include documentation of health history, physical exam findings, and lab test results specific for target organ toxicity and are mainly required yearly after the initial exam.

The scheduling of MSEs are done by the occupational health clinic staff from weeks to months, even a year in advance. The ability to notify employees of their scheduled appointments poses challenges in the MSE process. The main challenge is a "hard to reach" employee population resulting from limited or no employee contact information, lack of access to corporate infrastructure/email systems, and forgetfulness or confusion by the employee about scheduled appointment dates, times, and locations (DeKoekkoek et al., 2015). Not only can missed MSE appointments have a detrimental effect on employee health and clinic compliance, they also negatively affect clinic efficiency and productivity. This challenge, results in a cycle of attempting to contact the employee and/or supervisor about the missed appointment, re-scheduling the missed appointment, and once again attempting to notify the employee of the new date and time. In 2013, the Department of Veterans Affairs Office of the Inspector General estimated the cost of an unused appointment due to a no-show or cancellation at $198 per visit (McInnes et al., 2014). This cost may not seem significant in the short term, but if one considers that most companies have more than one MSE program and the possibility of having several scheduled exams missed in one day due to no-shows, the total cost escalates. Ultimately, these missed appointments can affect the clinic budget over the long term.

Background

The use of cell phones, coupled with rapid emergence of smartphones represents a widespread technology infrastructure that is inexpensive, convenient, accessible, and easy to use. By the end of 2012, there were 326 million active wireless subscriptions in the United States, with 2.2 trillion messages sent (U.S. Department of Health and Human Services [HHS], 2014). In 2013, 91% of the U.S. population aged 18 and older owned a cell phone, and ownership of smart phones increased from 35% in 2011 to 56% in 2013 (HHS, 2014). Text messaging has become one of the preferred methods of communication in modern society. In 2013, the most common use of cell phones among adults was text messaging with 81% of adult cell phone owners sending or receiving text messages (TM), making it the most used communication method on the planet.

Mobile health (mHealth) is an area of rapid expansion in healthcare and uses mobile computing and communication technology "for a range of functions from clinical decision support systems and data collection for healthcare professionals, to supporting health

behavior change and chronic disease management" (Free et al., 2010, p. 1). An expansion of mHealth into the occupational health setting through a text messaging reminder system provides an opportunity to improve MSE compliance, employee accountability/participation, and clinical outcomes/goals particularly among those hard-to reach employee populations. Text messaging is a more cost-effective, quicker to deliver, and a more readily responsive system than a letter and less invasive than a telephone call. Multiple messages may be dispatched simultaneously which in turn will decrease labor cost and lead to a better use of staff resources. Text message appointment reminders (TMAR) have been successfully used in a multitude of medical settings not only to improve clinic attendance, but improve vaccine adherence, health related communications, and clinical outcomes for a wide range of chronic medical conditions (Car, Ng, Atun, & Card, 2008; HHS, 2014; DeKoekkoek et al., 2015; Kannisto, Koivunen, & Valimaki, 2014).

Method

The integrative review process as described by Whittemore and Knafl (2005) was used for this literature review. Articles identified for use in this review were chosen from the peer-reviewed, online database, SCOPUS which compiles millions of peer-reviewed articles from medical and scientific journals and includes abstracts from Medline and CINAHL. Keywords used in the search for relevant articles included "text message" and "appointment reminders". Only articles published in English from 2005 to 2015 were included.

The initial search produced 122 articles, as shown in Figure 1. Titles and abstracts of the articles were reviewed for their relevance of the use of text messaging for appointment reminders. Articles excluded were those that focused on text messaging for vaccine/ immunization reminders; disease management including hypertension, diabetes, and HIV; wellness; and treatment/medication adherence. Articles focused exclusively on pediatric/ adolescent clinics also were excluded. This left 36 articles for further review in relation to the use and effects of TM as appointment reminders in outpatient or primary care clinics. Therefore, TM used as reminders for physical therapy, dental, ophthalmology, and psychiatric/mental health appointments were excluded which resulted in the elimination of 29 articles. Due to the hierarchy of evidence, a systematic and Cochrane review were chosen for inclusion. Nine articles met the inclusion/exclusion criteria and were included in this review.

Each article included in the review was critiqued. Study characteristics, purpose, intervention, timing, and key findings for the use of TMAR in outpatient or primary care clinics were extracted to describe the effect of using TM as an intervention to remind patients about scheduled appointments. Pertinent data including name of first author, year of publication, sample size, study design, intervention, and findings were compiled (see Table 1).

Results

All studies used descriptive or quantitative designs with randomized control trials (RCT) being the most common. The studies in this review represented a wide variety of countries as

illustrated in Table 1 and all clinics involved were categorized as primary care or outpatient. Target population was adults ranging in age from 18–59. One study included a hard-to-reach patient population of homeless veterans (McInnes et al., 2014) and another study offered TM to its participants in English or Spanish (Arora et al., 2015). The study by Perron et al. (2013) sent all TMAR content in French only.

For many of the studies, TMARs were delivered using different platforms. Arora et al. (2015), Fairhurst and Sheikh (2008), McInnes et al. (2014), and Perron et al. (2013) delivered TM via a web-based platform. Da Costa, Salomao, Martha, Pisa, and Sigulem (2010) sent TM automatically after an appointment was scheduled. The average timing for TMAR ranged from 1–2 days before the scheduled appointment. McInnes et al. (2014) sent staggered TMAR at 5 and 2 days before scheduled appointments. Arora et al. (2015) sent TMAR at 7, 3, and 1 day before scheduled appointments.

The number of appointments using TM as reminders ranged from 20–7,890. TMAR contained the following content: name, appointment date, appointment time, and location. Arora et al. (2015) gave patients an opt-out option and Perron et al. (2013) allowed patients to cancel their appointment by replying no. TM that were sent for McInnes et al. (2014) and Fairhurst and Sheikh (2008) provided patients with a call back number to reschedule.

The primary outcome for each study was attendance rate measured by assessing the impact that a TMAR would have on decreasing non-attendance. Other outcomes measured were cost-effectiveness, acceptability, satisfaction, usefulness, and usability. TMARs were compared to other reminder methods, such as, phone calls, letters, email, and open scheduling. For a few studies (McInnes et al., (2014); Perron et al., (2013); Hogan et al., (2008)), data on outcomes were collected using surveys/questionnaires while the other studies used computer-based clinic software to track attendance.

Discussion

To our knowledge, this is the first review of literature to assess TMAR feasibility in occupational health for MSE. All studies except for two ((Fairhurst & Sheikh, (2008); Perron et al., (2013)) found that sending TMARs were an effective method of ensuring attendance at scheduled appointments. TMARs also were shown to be more cost-effective, acceptable, and user-friendly out of all reminder methods. Compared with no reminders, "text message reminder would encourage 51% of those surveyed to attend or cancel in advance" (Hogan, McCormack, Traynor, & Winter, 2008, p. 355). Attendance rates for the TM intervention ranged from 59%–70.2% (median=64.5%) compared with 48%–62.1% (median=54%) for no intervention/reminders in this review. These results signify the benefit of TMARs for MSEs in the occupational health clinic.

Besides improving attendance rates, TMARs are more cost-effective when compared to other reminder methods. The acceptability of TMARs have the potential to increase employee involvement thereby increasing compliance and early identification of work related exposure risks. It also should be noted that TMAR received positive marks when its usability, usefulness, likability, and satisfaction were assessed. These factors make it the

preferable choice even though TMARs were shown to be at least as effective as calls at decreasing no-show rates.

Many reasons explain why appointments are missed, the most commonly cited is forgetfulness. All studies reviewed sent TMAR within one week of the scheduled appointment time which is ideal at decreasing forgetfulness. A text message reminder system gives the occupational health clinic the ability to circumvent this issue. According to Arora (2015), TMs were superior to mail or written reminders and less intrusive than phone calls. This factor influences the acceptance of the use of TMs as appointment reminders and its assimilation into the MSE process.

Limitations

A limitation for this review was the absence or lack of published studies testing TMARs for MSEs. Without these studies, the generalizability of TMAR use in the occupational health clinic cannot be properly predicted. Second, the review only included studies occurring in adult primary care or outpatient clinics. Lastly, no study significantly addressed or investigated applicability issues for TM intervention, such as confidentiality, data usage, and outdated cell number information.

Conclusion

The results from this review indicate use of TMARs would be advantageous in ensuring timely MSE attendance. TMAR would increase employee participation in the MSE process resulting in better compliance with regulatory standards. Future studies about the use of TMAR usage in the occupational health clinic is warranted.

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In Summary

- The purpose of this paper is to evaluate the literature in relation to the use of TM reminders for promoting timely attendance at MSE appointments. Timely attendance at MSE are not imperative for optimizing and ensuring employee health and well-being, but also to ensure compliance with regulatory standards.

- Notifying employees of their scheduled appointments poses challenges in the MSE process. Text messaging has become one of the preferred methods of communication in modern society with 81% of adult cell phone owners sending or receiving TM.

- An integrative review using the keywords "text message" and "appointment reminders" was initiated resulting in nine articles meeting inclusion criteria. Studies from this review demonstrated the median attendance rate for TMAR was 64.5% compared to 54% for no reminders.

- Results for this review signal that the use of TMAR would be beneficial, cost-effective, and an effective reminder method in the occupational health clinic for MSEs.
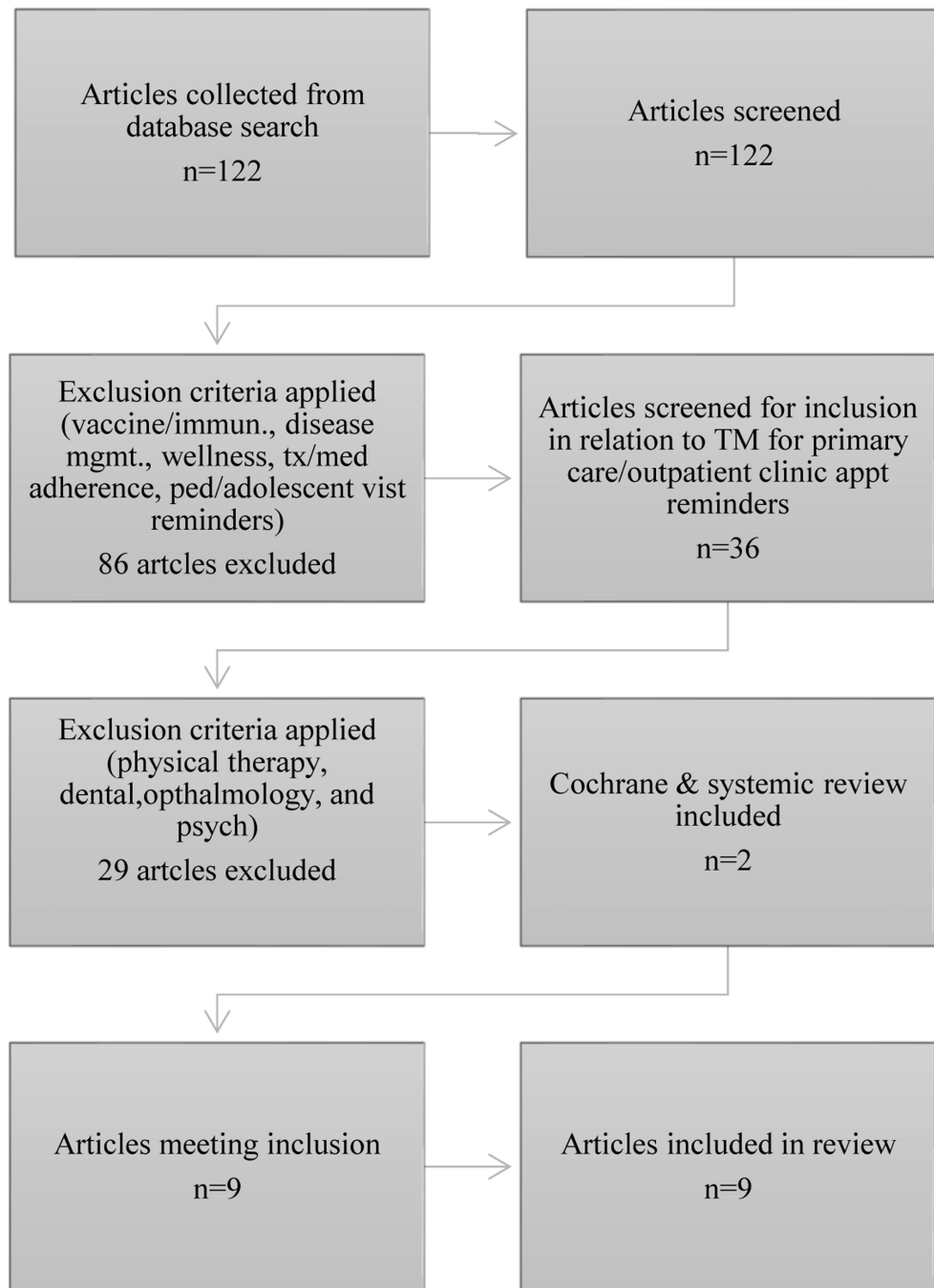
Figure 1.
Search strategy for inclusion/exclusion criteria for articles included in this review

Table 1.

Findings of TM Appointment Reminders to Improve Attendance

1st Author, year (country)	Sample Size	Design	Intervention	Findings
Leong, 2006 (Malaysia)	n=993 TM=329, Mobile phone=329, Control=335	Seven center, Randomized controlled trial (RCT)	Three arms were established: TM reminder (intervention), mobile phone reminder (intervention), & control (no intervention). The intervention arms received TM or phone reminders 24–48 hours prior to scheduled appointment	The attendance rate for TM reminders was significantly higher than the control group (59.0% vs. 48.1%, p=0.005), but there was no significant difference noted between TM & mobile phone reminders (59.0% vs. 59.6%, p=0.874). However, TM reminders were more cost-effective compared to mobile phone reminders.
Hogan, 2008 (Ireland)	n=97	Questionnaire	After a FTA, participants were called prospectively over a 3 month period and asked to reason for missing appointment, awareness of failure to attend appointment, if appointment was rescheduled, & if a text message would have encouraged attendance.	TM reminders would reduce the outpatient clinic FTA rates by 51%.
Fairhurst, 2008 (United Kingdom)	n=173 (415 appointments)	RCT	Patients that had FTA 2 or more appointments were randomized for this study. They were placed in intervention group (189 received TM reminders) or control group (226 received no reminder). TM for morning appointments were sent from 4 pm – 5 pm the day before the appointment. For afternoon appointments, TM were sent from 8 am – 9 am the day before the appointment.	TM reminders showed promise, but study failed to demonstrate a non-significant reduction of 5% in non-attendance rates for patients who have persistent issues with FTA (p=0.13). Control group had 39 FTA (17%) & the intervention group had 22 FTA (12%).
Costa, 2010 (Brazil)	29,000 appointments from four outpatient clinics scheduled from July 2007-May 2008. Of those, 7,890 patients were sent TM reminders after obtaining consent.	Quasi-Experimental Design	The total number of scheduled appointments were grouped into two categories: attended & not attended. These two groups, were sub-grouped into those patients who received TM reminders and those who did not. TM were sent 24 hours prior to appointment. The rates for nonattendance were compared to those patients who received TM reminders and those who did not.	TMs have the potential to be an effective method to reduce rates of non-attendance for outpatient clinics. Reduction rate for non-attendance in all clinics ranged from 0.82% −14.49%. This averaged to a 6.15% reduction in non-attendance.
Stubbs, 2012 (USA)	42 articles TM=88,547 appointments Phone=40,164 appointments Letters=6,621 appointments Email=17,334	Systematic Review	Compared the cost-effectiveness & attendance rates between the use of telephone, letters/postcards, email/open access, and TM as appointment reminders. Calculation of the weighted average effect for each intervention was used to determine cost-effectiveness.	Twelve studies from this reviewed evaluated text messaging. Nine of these studies resulted in an average 8.6% reduction in non-attendance. One study demonstrated a non-significant reduction of 5.3% in habitual non-attendees, another showed no significant improvement in attendance, & additional study resulted in a significant decrease in no-shows rates for new patients only. Overall, telephone, letters, & TM were all shown to improve attendance at outpatient clinic appointments. However, TM was shown to be the most cost effective of the three methods.
Perron, 2013 (Switzerland)	n=6450 TM=3285, Telephone=3165	RCT	Compared the use of TM vs. telephone reminders to reduce rates of non-attendance in a primary care clinic between November 2010 & April 2011. Clinic patients were randomly chosen daily to receive either a TM or telephone reminder 24 hours before their appointment. All text messages were sent in French. At the end of the study, a telephone survey was used to assess the acceptability & usefulness & measure the outcomes of both interventions.	TM appointment reminders were as effective in decreasing FTA & as acceptable as telephone reminders. The FTA rate for the TM group was 11.7% & for the telephone group was 10.2% (p=0.07). Of the two groups, TM reminders were the more cost-effective & more useful than phone reminders.

1st Author, year (country)	Sample Size	Design	Intervention	Findings
Gurol-Urganci, 2013 (United Kingdom)	8 studies involving 6,615 participants	Cochrane Review	Evaluated RCT's for use of TM reminders for outpatient clinics comparing them to no reminders & phone call reminders.	Overall, the attendance rate for no reminders was 67.8%, TM reminders was 78.6% & phone reminders was 80.3%. In three studies, text message and phone reminders had similar results on attendance. Two studies indicated that even though these two interventions had similar results on attendance, TMs were more cost-effective (55%–65%) than phone reminders. One study found the acceptability of TM was high with 98% of participants willing to receive routine phone messages.
Arora, 2014 (USA)	n=374 Intervention=146, Control=182	RCT	Intervention group received TM reminders in English or Spanish at 7, 3, and 1 day(s) prior to scheduled follow-up date. Control group received written follow-up instructions.	The difference in the overall attendance rate was 70.2% for the intervention group vs. 62.1% for the control group after intention-to-treat analysis was performed (p=0.100). At baseline, Spanish speakers already had high follow-up attendance rates (69% primary care & 75% specialty clinics). This showed no significant difference in their attendance rates.
McInnes, 2014 (USA)	n=20	Pilot Study	Homeless veterans were sent 2 TM reminders at 5 & 2 days prior to each outpatient appointment. A baseline survey was administered. After the 8 week intervention period, participants received a follow-up survey & semi-structured interview assessing usefulness, privacy & confidentiality, overall satisfaction, and if additional features should be added.	There was 30% reduction in patient cancelled appointments and a 19% reduction in the rate of no-shows. Potential for a total net savings of 2.3-$115.7 million. The usability & usefulness of TM reminders were confirmed by participants due to ease of use & likability of having the appointment info readily available. Participants rated their satisfaction of this intervention as high.