ORIGINAL ARTICLE

Mobile Telephone Short Message Service Reminders Can Reduce Nonattendance in Physical Therapy Outpatient Clinics: A Randomized Controlled Trial

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ABSTRACT. Taylor NF, Bottrell J, Lawler K, Benjamin D. Mobile telephone short message service reminders can reduce nonattendance in physical therapy outpatient clinics: a randomized controlled trial. Arch Phys Med Rehabil 2012;93:21-6.

Objective: To investigate whether short message service (SMS) reminders reduce nonattendance in physical therapy outpatient clinics.

Design: Prospective single-blinded randomized controlled trial.

Setting: Two physical therapy outpatient departments in metropolitan acute public hospitals.

Participants: Participants with an appointment in a physical therapy outpatient clinic and who provided a contact mobile telephone number were included. Participants were excluded if their appointment was scheduled for the same day on which they made the appointment.

Intervention: Participants allocated to the intervention group received an SMS reminder before their next appointment; participants allocated to the control group did not receive a reminder.

Main Outcome Measures: The primary outcome was rate of nonattendance without cancellation. Secondary outcomes were cancellation and attendance rates and exploration of other factors associated with nonattendance.

Results: Patients (N=679) were allocated to receive either an SMS reminder (n=342) or no reminder (n=337). The nonattendance rate for patients who did not receive a reminder (16%) was more than nonattendance for patients receiving the SMS reminder (11%; odds ratio, 1.61; 95% confidence interval [CI], 1.03–2.51; number needed to treat, 19; 95% CI, 9–275). There were no differences in cancellation or attendance rates between groups. Exploration of other factors found that patients who were younger with a neck and trunk musculoskeletal or a neuromuscular disorder and who were scheduled to have an initial appointment or an appointment on a Monday or Friday were significantly predictive of increased nonattendance.

Conclusions: SMS reminders can reduce nonattendance in physical therapy outpatient clinics.

Key Words: Appointments and schedules; Musculoskeletal system; Patient appointment; Physical therapy; Rehabilitation.

NONATTENDANCE at appointments is a problem for health services. If a large number of patients do not attend appointments, it means that clinical and administrative staff are not efficiently employed. Nonattendance also can result in longer waiting times for other patients that may increase the risk for further morbidity. The extent of the problem has been estimated to cost £790 million per year in the United Kingdom.[1] Nonattendance rates in hospital outpatient clinics were reported to be 10% to 20% for orthopedic, diabetic, and ophthalmology clinics[2-4] and more than 30% for psychiatric, dermatology, and pediatric clinics.[5-7] There is less information about the extent of the nonattendance problem in allied health outpatient services. However, a nonattendance rate of 13% was reported at occupational therapy outpatient clinics.[8]

A number of strategies have been implemented to try and reduce nonattendance at outpatient clinics. Some strategies, such as charging patients for missed appointments[9] and providing patients with a copy of their referral letter, have had no effect on reducing nonattendance.[10] The strategy that proved most effective was providing patients with some form of reminder. The review of Henderson[11] concluded that telephone and postal reminders were effective at reducing nonattendance, particularly if administered within days of the scheduled appointment.

More recently, observational studies provided preliminary evidence that giving patients appointment reminders through the short message service (SMS) on mobile telephones can help reduce the nonattendance rate.[4,12-14] An advantage of using an SMS reminder system is that it is relatively low cost and time efficient because the process can be automated. Also, there now are very high rates of mobile telephone ownership in many countries.[15] SMS patient reminders in an ophthalmology outpatient clinic were reported to reduce nonattendance from 18% to 11%.[4] It was calculated that 14 SMS reminders needed to be sent to prevent 1 missed appointment. Other trials reported that implementing SMS reminders reduced nonattendance rates from 23% to 14%[12] and 10% to 5%[13] in pediatric outpatient clinics and from 24% to 10% in outpatient dental clinics.[14] Although these results are promising, a limitation of the studies investigating SMS reminders is that they used observational designs; thus, it is not certain whether the observed reductions were due to the intervention, the SMS reminder, or influenced by other factors that may have biased results. Limitations of these studies could be addressed by conducting a randomized controlled trial.

Therefore, our main aim was to conduct a randomized controlled trial to evaluate whether SMS reminders can reduce the

List of Abbreviations

CI	confidence interval
NNT	number needed to treat
OR	odds ratio
SMS	short message service

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nonattendance rate in physical therapy outpatient clinics. Secondary aims were to evaluate the effect of SMS reminders on cancellation and attendance rates and explore factors associated with nonattendance.

METHODS

Design

The trial was conducted as a single-blinded randomized controlled trial. The trial was approved by health service and university ethics committees, and all participants gave verbal consent to participate.

Participants

Participants were included if they had an appointment in a physical therapy outpatient clinic at 1 of the participating clinics and provided a mobile telephone number on which they could be contacted. Participants were excluded from the trial if they had an appointment scheduled on the same day on which they made the appointment (eg, filling a cancellation) or they already had participated in the project by being allocated for a previous appointment during the trial.

Setting

The trial was conducted in 2 physical therapy outpatient departments in a metropolitan area. Both physical therapy departments were located in acute public hospitals and accepted referrals from within their hospital and from other public hospitals. In addition, 1 department (clinic 1) also accepted referrals from the community. Physical therapy services at both clinics were provided from Monday to Friday during usual business hours. A small charge for physical therapy was applied at both clinics, with a number of patients, such as those with pension cards, charged a lower fee. At both clinics, patients made appointments for physical therapy either by telephone or in person.

Intervention

Eligible patients were randomly allocated to the intervention (SMS reminder) or the control group receiving usual care for their next available appointment. The randomization sequence was prepared by an independent researcher by using random number tables stratified for site in permuted blocks of 10 using a concealed method in a computer file with group allocation concealed. An administration assistant opened the preprepared computer file and selected the next participant in sequence, revealing their allocation by changing the text color in the cell from white to black.

Patients allocated to the SMS reminder group were sent an SMS reminder 2 days before their appointment if the appointment was made more than 3 days before the appointment or the day before the appointment if the appointment was within 2 days. Timing of the SMS reminder was to allow time for the appointment spot to be offered to another patient and filled in the event of cancellation. The SMS reminder was sent by using an automated system at 1 clinic (clinic 1) and manually by an administrative assistant at the other clinic (clinic 2).

The content of the SMS reminder was "Reminder: Physical therapy appointment at [site] on [day], [date] at [time]. Please call [number] ONLY if you cannot attend."

Patients randomly allocated to the usual-care group did not receive an appointment reminder, consistent with the present practice at participating clinics.

Outcomes

The primary outcome was the nonattendance rate, the number of scheduled appointments not attended as a proportion of the total number of scheduled appointments. Secondary outcomes were (1) cancellation rates, (2) attendance rates, and (3) description of patients who did not attend compared with those who attended in terms of age, sex, health condition, referral source, and timing of appointment (day of the week, morning or afternoon, waiting time between when appointment was made and appointment).

Data were retrieved in a blinded manner (ie, without reference to group allocation) by a member of the research team by using the hospital's data management system or were recorded manually by outpatient physical therapists at the time of the next scheduled appointment. Treating physical therapists were blinded to group allocation.

Data Analysis

Sample size estimation indicated that a sample of N=553 in each group would be required to show a decrease in nonattendance rate from 8% to 4% at α level of .05 and power of 0.8. Therefore, we aimed to recruit a total sample of approximately 1200 participants. The estimate of 8% nonattendance rate was based on an audit of participating clinics before the trial began.

The primary outcome measure comparing nonattendance rates between the intervention and control groups was evaluated by using odds ratios (ORs) and number needed to treat (NNT) with 95% confidence intervals (CIs). Data were analyzed according to intention-to-treat principles.

Cancellation and attendance rates between the 2 groups also were evaluated by using ORs. Characteristics of patients who did not attend compared with those who attended or cancelled in terms of age, sex, health condition/diagnosis (categorized as upper-limb musculoskeletal, lower-limb musculoskeletal, neck and trunk musculoskeletal, neuromuscular, other), referral source, and timing of appointment (day of the week, morning or afternoon, waiting time between when appointment was made and appointment) were compared by using independent *t* tests or chi-square statistic, as appropriate. The contribution of factors significantly associated with nonattendance without cancellation rates was modeled by using binary logistic regression.

RESULTS

Six hundred ninety-six patients consented to participate in the trial. Attendance data were collected for 679 patients (97%) (fig 1). Reasons for exclusion were having already participated in the trial (n=6), data not collected (n=8), and trial data collection stopping before appointment (n=3). Adherence to trial protocol was high, with 675 of 679 (99%) participants receiving their intervention (SMS reminder or no SMS reminder) as allocated (see fig 1).

Of 679 patients, 342 were allocated to receive an SMS reminder for their next appointment and 337 were allocated to not receive a reminder. There were more women than men (416 of 679; 61%), the most common health condition/diagnosis was neck and trunk musculoskeletal disorder (223 of 679; 33%), and the most common referral source for physical therapy appointments was within the hospital (315 of 679; 46%) (table 1). As listed in table 1, the groups were well matched for demographic characteristics after randomization.

Effect of Intervention

There was a significant reduction in nonattendance rate for patients who received an SMS reminder for their next appoint-