Effectiveness of Telephone Reminders in Improving Rate of Appointments Kept at an Outpatient Clinic: A Randomized Controlled Trial

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Background: **Clinic appointments in which patients do not appear (no-show) result in loss of provider time and revenue. Previous studies have shown variable effectiveness in telephone and mailed reminders to patients.**

Methods: **We conducted a randomized controlled trial of telephone reminders 1 day before the scheduled appointments in an urban family practice residency clinic. Patients with appointments were randomized to be telephoned 1 day before the scheduled visit; 479 patients were telephoned and 424 patients were not telephoned.**

Results: **The proportions of patients not showing up for their appointments were 19% in the telephoned and 26% in the not-telephoned groups ($P = .0065$). Significantly more cancelations were made when telephoning patients before their visit, 17% compared with 9.9%. The opened scheduling slots were used for appointments for other patients. This additional revenue offset the cost of telephone intervention in our cost analysis.**

Conclusion: **Reminding patients by telephone calls 1 day before their appointments yields increased cancelations that can be used to schedule other patients. Telephone reminders provide substantial net revenue, but the results may be population specific. (J Am Board Fam Pract 2001;14:193–6.)**

Outpatient clinics that rely on scheduled appointments lose valuable time and resources when patients do not arrive for their scheduled visits. Various strategies have been suggested to improve the rate of appointments kept, including telephone and mail reminders.[1,2] Automated computer-generated telephone reminders have also been examined.[3] Other studies have focused on reminders for special services, such as for immunizations[4–7] and mammography,[8,9] and for disease management, such as tuberculosis treatment[10] and cervical cancer-screening follow-up.[11,12] Studies on telephone reminders have shown variable results in improving the rate of appointments kept.[13–17] Most studies show a reduction in the no-show (appointments missed by patients) rate with improvements of up to 50%.

Because telephoning patients is a staff-intensive process, cost considerations are relevant in assessing any benefits in increased rate of appointments kept. Although some studies have shown overall benefit, this benefit has not been shown consistently. We designed a randomized controlled trial of telephone reminders to study their effectiveness in reducing the no-show rate in our clinic population and to evaluate the costs of this intervention.

Methods

Population

The study was conducted at the family practice residency clinic serving a mostly urban population in Rochester, New York. Data collection was completed in October 1998. All appointment types (new, follow-up, and prenatal) were included in the study.

Measures

The result of the telephone call was recorded as confirmed, unable to leave a message, appointment canceled by patient or family, appointment rescheduled by patient or family, or patient does not have an active telephone number. Patient data about age and sex, as well as the main outcome measure of the patient seen in clinic, were collected from the billing computer.

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Table 1. Sex and Age distribution in the Intervention and Control Groups.

Characteristic	Group Telephoned	Group Not Telephoned
Female, No. (%)*	264 (66)	258 (68)
Mean age, years (SD)†	21 (15)	19 (14)

SD–standard deviation.
*No significant difference, $P = .54$, Fisher exact test.
†No significant difference, $P = .90$, χ^2 test, 2×5 percentiles.

Table 2. Results of Telephoning Patients 1 Day Before Appointments.

Arrival Status	Not Telephoned No. (%)	Telephoned* No. (%)
Arrived	260 (65)	267 (63)
No-show	103 (26)	83 (19)
Canceled	40 (9.9)	70 (17)
Total (n = 823)	403 (100)	420 (100)

*Includes all patient visits randomized to be telephoned (including those telephoned and confirmed, those telephoned and a message left at home, and those without a telephone.) χ^2 test 2×3 table, $P = .0065$.

Procedures

Approval for the study was obtained from the clinic's quality assurance committee, and no external funding was obtained. A sample size of at least 219 in each group was determined using Arcus QuickStat statistical software (CamCode, England) with pretrial estimates of 10% and 20% no-show rates in the telephoned and not-telephoned groups, respectively (α level 5%, power 0.80). The estimated rates were based on previously collected clinic data. The random number function in Microsoft Excel software (Microsoft Corp, Redmond, Wa) was used to randomly allocate 50% the patients on the next day's appointments list to be called 1 day before their office visit. Patients were telephoned at their home number (if available) by the office medical assistants. The other 50% of the patients (control group) were not telephoned. Data were collected on 823 consecutive appointments prospectively. Cost data were collected by the clinic's administrative staff.

Analysis

Statistical analysis with chi-square tests was conducted using StatsDirect statistical software (CamCode, England). The data were analyzed based on intention-to-treat. Patients who were randomized to be telephoned, but who could not be contacted for any reason, including lack of telephone, were kept in the intervention group in the analysis to address concerns about influence of telephone ownership on results.[18,19]

Results

Comparison of the telephoned and not-telephoned groups showed adequate randomization with fairly equal sex and age distributions (Table 1). Among the 420 patients randomized to be telephoned, 99 could not be reached by telephone because they lacked a listed number or their number was changed to a new number that was not available. Comparable data were not obtained for the control group.

Impact on No-Show Rate

The proportion of patients not keeping their appointments (no-show rate) was 26% in the not-telephoned group, whereas for the patients who were reminded with telephone calls, the rate was 19% (Table 2). The reduction in no-show rate resulting from telephoning was 6.9%, 95% confidence interval (CI), 1.5%–12%. Although the proportion of patients arriving was the same (63%), appointment cancelations before the appointment day were higher in the group telephoned (17% vs 9.9%, χ^2 test, 2×3 table, $P = .0065$).

Cost Analysis

Cost analysis is presented in Table 3 with extrapolation to the clinic practice. The analysis assumes

Table 3. Cost Analysis of Telephone Reminders.

Characteristic	Study	Practice
Patients telephoned, No.	479	71,250
Hours spent (1 min per call)	7.98	1,188
Medical assistant salary per hour, $	12.10	12.10
Cost to telephone patients, $	96.60	14,369
Cancellation rate due to call (%)	6	6
New appointments fill rate for cancellations (%)	43	43
Show rate (%)	78	78
Total incremental arrivals, No.	10	1,425
Net revenue per patient visit, $	60	60
Benefit of telephoning patients, $	575	85,500
Less cost to telephone patients, $	(96.60)	(14,369)
Total benefit, $	478	71,131

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a 6% higher cancelation rate in the telephoned group. About 40% of canceled appointment slots could be filled by the next day, yielding additional revenue. Estimates of time needed to telephone (one call per minute), medical assistant salary ($12.10 per hour), and average net incremental revenue per patient ($60) were used to find the cost and revenue generated from this intervention. Based on these assumptions, net revenue generated by the incremental number of patients seen offset the cost of telephoning patients.

Discussion

The results of this study show a decrease in the no-show rate from 26% to 19%, which is consistent with the effectiveness of telephone reminders in previous studies.[1,2] Although the proportion of patients arriving for their appointments was similar in both groups (63% and 65%), there were significantly more cancelations in the group telephoned and consequently fewer no-shows. This reduction in no-shows translated into slots opened for patient scheduling, for an overall cost benefit (Table 3). The window for scheduling patients was short (less than 24 hours), but with a 43% fill rate, the otherwise lost appointment times were at least partly used. This modest improvement in number of patients seen compensated for the cost of telephoning patients in our study. The calculations, when extrapolated to the annual capacity of the clinic, indicate substantial net revenue (Table 3).

Although some studies show the effect of reminders to be the same whether by mail or telephone,[13,20] mailed reminders were found to be more cost-effective when no-show rates were low.[21] As suggested by our study, however, the primary benefit from telephoning patients is not that reminders increased arrival rates, but that they helped establish appointment cancelations (Table 2). Increased numbers of cancelations have been documented in at least one other study.[22] Telephoning provided benefit in addition to mailed reminders, while less expensive to administer, might not have this advantage.

The arrival rate (63%) was unchanged by telephoning patients before appointments. Although it appears that telephone reminders simply do not promote keeping visits in this population, other reasons might have influenced results. Factors including number of patients directly contacted, patient's familiarity with the contact person, and timing of the telephone call relative to the appointment might change arrival rates. The effectiveness of such interventions as reminders could be population and problem (eg, prevention vs disease care) specific.

Our study could have been biased as a result of a preexisting routine of telephoning all patients, which might have created an expectation among patients to be reminded; however, a waning effect of reminders has been documented.[23] The study was limited by low statistical power and lack of concealment of randomization. Application of the findings to other settings might be restricted because of the population-specific nature of the intervention and different response rates observed in similar studies.

Our study showed that telephone reminders can be effective in establishing appointment cancelations, which can be used to schedule other patients, resulting in a net revenue-generating intervention. This finding is of relevance to outpatient clinics, because use of reminders systems has been found to vary in clinic surveys.[24,25] Further studies are needed to investigate which factors, such as socioeconomic status, insurance type, geographical location, staff-person known to patient, or patient's previous history of no-shows, can determine which patients to be called selectively. Finally, appointment reminders are of limited value and might not work well for many patients because of the different reasons why patients do not keep appointments. A comprehensive approach might include other strategies, such as overbooking appointments and establishing cancelations by telephone (our study), and innovative approaches, such as open scheduling.

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