Promotion of Patient Appointment Compliance in Indigent Pediatric Medical Care by Use of a Microcomputer


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PROMOTION OF PATIENT APPOINTMENT COMPLIANCE IN INDIGENT PEDIATRIC MEDICAL CARE BY USE OF A MICROCOMPUTER

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A computerized system for appointment scheduling, medical record keeping, medical billing, patient tracking, and epidemiologic data generation was developed and applied in an indigent pediatric otologic clinic. Functions used to augment appointment compliance are 1) notifying the referring physicians, agencies, and health department coordinators of failed appointments and sending medical information on the attended appointments, 2) listing patients who failed appointments, 3) production of mailings for failed appointments, 4) automatic rescheduling of failed appointments, and 5) automatic calculation of patient attendance ratios. The attendance ratio can be used to help identify patients for referral to social service workers and to implement rewards designed to promote medical compliance. The automatic rescheduling of failed appointments resulted in 21% of new patients and 30% of return patients above controls returning for a medical visit. The recalled patients had a much lower economic status than our average clinic patient, i.e., the system was effective in reaching the target population.

KEY WORDS - audiology, compliance, computer, medical records, otology, pediatrics.

INTRODUCTION

Patient medical compliance is one of the most serious problems in health care delivery. Sackett and Snow have found that 50% of appointments initiated by health care professionals are missed by the patient and that approximately 50% of patients attending appointments do not comply with long term medical regimens. Appointment compliance for pediatric preventive care may be higher. However, families of lower socioeconomic status have been found to have a significantly poorer rate of appointment attendance than families with a higher socioeconomic status. Parrish et al reported the appointment failure rate in a pediatric psychiatric clinic serving indigent patients to be 58%. The compliance rates are even lower for children with an asymptomatic disorder or those referred for preventive care. Hardy found that only 32.5% of patients referred for medical follow-up after auditory screening at school attended their visit.

This paper will present methods of increasing patient medical appointment compliance in an indigent pediatric otology clinic serving the Mid-South region of western Tennessee, northern Mississippi, and eastern Arkansas. This region represents one of the poorest areas in the nation, with 25% of all individuals living below the poverty level. Availability of health care is a major problem. Most area public health care centers are understaffed and have a 35% to 45% appointment failure rate for their pediatric patients (Table 1). This very high appointment failure rate has a profound impact both on health care delivery and on the economic viability of clinics that already suffer from discounted Medicaid payments and a large medically indigent population that is not covered by any third party reimbursement system.

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REPRINTS - Kevin T. Kavanagh, MD, Dept of Otolaryngology, University of Tennessee, 956 Court, Rm B224, Memphis, TN 38163.
There are many strategies that can be used to increase appointment attendance. The most commonly used is to increase the appointment availability to the patient, not only by reducing medical and transportation costs, but by providing effective case management and social service. Although highly effective, social service/case management techniques cannot possibly address all the families who have poor appointment compliance, for in many clinics this amounts to hundreds of families per month (Table 1). Patient and family education is also very important at the time of referral (orientation statement), as are appointment prompters (reminders). The use of postcards to remind patients of their appointments has been found to increase total appointment attendance 11% to 25% compared to controls.6-9 Reminders delivered by phone have produced mixed results, with several studies reporting a 10% to 19% increase in total attendance compared to controls,6,10,11 and others finding no significant difference.12,13 Behavioral techniques (based upon patient appointment attendance) involving reduction in patient waiting time, financial penalties, and eligibility to participate in lotteries also have been shown to be effective in augmenting medical compliance.6,14,15

One also must consider the complex educational and sociologic factors ingrained into the various cultures from which patients come. Short communications by phone or a few home visits from "foreign" health care workers are unlikely to change these factors. Glogow16 compared several interventions designed to augment appointment compliance and concluded that it was not the information conveyed but the perception of caring on the part of the health care worker toward the patient that was the most important factor. It should be noted that many interventions designed to motivate families to seek health care actually may have a negative effect. Letters may be viewed as confrontational and be less effective than postcards. For example, Boswell et al17 reported a negative effect using letters to reschedule psychiatric patients who failed their medical appointments. Patient acceptance of the appointment is also dependent upon the acuteness of the illness, as well as educational and sociologic factors that determine the ability of family members to comply without professional intervention. An increase in family contacts by mail, phone, or home visits will heighten the perceived importance of the medical appointment and lead to an increase in parental compliance. Patient medical compliance may be increased by a two-pronged attack. The first is to reduce the barriers to health care, and the second is to increase the perceived importance of the health care visit so that the patient or parent will be motivated to overcome these barriers.

In an attempt to mitigate the problem of poor patient appointment compliance, the University of Tennessee, Memphis, has developed a computerized patient management system. The system currently is used to schedule appointments, store medical data, perform epidemiologic and demographic studies, and to manage patient medical appointment compliance. This report will outline a protocol for use with the patient management system and discuss the system's effectiveness in recalling patients who have failed to attend their medical appointments.

**METHOD**

In order to evaluate the effectiveness of the patient management system in augmenting appointment compliance, a prospective study was performed to determine the impact that automatic rescheduling of failed medical appointments has on subsequent patient attendance.

**Clinical Setting.** This study was conducted at a pediatric otolaryngology clinic with an average baseline patient attendance rate of 62%. Seventy one percent of the patients were black, and 59% were from families with single parents. The average yearly income of the families being served was $9,724. The majority of families were from inner city Memphis. Many of the medical visits were for newborn auditory screening.

**Hardware and Software.** A Macintosh Plus with a 20-megabyte hard drive was used for the initial part of the project. This system was upgraded to a seven-terminal multi-user network during the second half of the study.

The software used to implement the project was the Delta Patient Management/Billing System, a multi-user relational data base written in Omni 3+. The program is a turnkey application that uses screen buttons and menus for a user interface (Fig 1). It has appointment scheduling, medical data storage, medical billing, and patient tracking capabilities. The patient tracking functions include

1. Generation of appointment reminder postcards and downloading of mail-merge files.
2. Calculation of appointment attendance ratios.
3. Listing of patients who have failed their appointments.
4. Notification of referrers on whether the patient attended or failed the appointment.
5. Automatic rescheduling of patients who have failed their appointments.

The Delta Project's Patient Management/Billing System is shareware (free of charge to federal and state government projects and institutions, and to nonprofit indigent care clinics) that can be downloaded from the Delta Medical Shareware Forum on MacNet (Connect, Inc, Cupertino, Calif).

Clinical Protocol. The patient management/billing system was evaluated over a 12-month period. All patient appointments were defined as attended, failed, or canceled; and as new, return, or special. A canceled appointment was defined as an appointment canceled by the patient on or before the clinic visit date. A new appointment was defined as an appointment given to a patient who had never attended an ear, nose, and throat clinic visit. A return appointment was defined as an appointment given to a patient who had attended at least one ear, nose, and throat clinic visit. A special appointment was defined as a rescheduled failed appointment.

Four to 6 days before each clinic visit, all patients were sent a computer-generated appointment reminder (prompter) postcard that listed the appointment date, time, clinic doctor, and appointment type. Patients who failed to attend their medical appointments were divided into control and experimental groups based on the month of attendance. The experimental group was rescheduled by the computer for another appointment in 2 to 3 weeks, the control group in 6 to 7 weeks. Patient attendance at any otolaryngologic clinic held during weeks 1 through 4 and weeks 1 through 8 (measured from the date of the original failed appointment) was determined for all groups. All comparisons involving experimental and control groups were for an equal time span. Patients in both groups could attend at any time within this time window and be counted as having attended. If a patient canceled the rescheduled appointment, the next appointment was still defined as a rescheduled failed appointment for income analysis. If a patient canceled the rescheduled failed appointment and attended a clinic visit more than 4 weeks after the original failed appointment, the patient still was classified as failed in the 1- to 4-week analysis. A separate analysis of the attendance data for the last 4 weeks was not done, since some of the patients in the control groups would attend in the first 4 weeks (on their own), making their rescheduled visit during weeks 6 and 7 unnecessary.

Both groups received a computer-generated postcard (Fig 2). A yellow card was chosen, because people tend to remember colored material more than white.18 These notifications were sent 1 to 2 weeks before the scheduled clinic appointment (just after the failed appointment for the experimental group and after a 1-month delay for the control group). Four to 6 days before the appointment, the patients were sent the standard appointment reminder postcard. Rescheduled failed appointments were defined as "special" by the computer, and if the patient failed, he or she was not rescheduled a second time. Rescheduled failed appointments and canceled appointments were not used in the calculation of the patient's clinic attendance ratio (number of total attended visits divided by number of total attended plus failed visits).

The time schedule for the management system was as follows. During week 1, on Monday, patients with failed appointments from the previous week (experimental group) and the fifth previous week (control group) were listed and automatically rescheduled for the following week (week 2). Postcards telling the patients of their rescheduled appointments were mailed. On Thursday/Friday, clinic appointment reminder cards were sent to all patients with appointments scheduled for the next week (week 2). These cards were timed to arrive 3 to 5 days before the scheduled appointment.

During week 2, on Tuesday and Thursday, an ENT clinic was held. The attendance ratio report was generated for all patients. Patients with a history of poor medical compliance were referred to social service workers.

The above cycle was repeated. At the end of the month, referrer reports were mailed, sending medical and attendance information to referring doctors, agencies, and the health department coordinator. Patient attendance rates were determined for the clinic. These rates aid in the determination of the maximum number of patients who can be scheduled for a clinic.

A portion of the new patients who failed to attend within a period of 2 months from their initial...
failed appointment were contacted by letter, and a home visit was conducted.

Three hundred seventeen patients were rescheduled by means of a postcard. A total of 159 patients were in the control group and 176 patients were in the experimental group. Five patients were excluded from the control group because of transfer of medical care to another provider. Six patients were excluded from the experimental group and seven patients were excluded from the control group because of incomplete addresses.

Attendance rates then were determined for the control (n = 147) and experimental groups (n = 170), for new and return patients, and for both the 1- to 4- and 1- to 8-week time windows (measured from the date of the original failed appointment). Many of the rescheduled patients attended at times other than their rescheduled clinic date. However, in order to be counted as attending, they had only to attend within the studied time window. All comparisons then were analyzed by use of $X^2$ tests or Z tests.

The economic status was compared for patients with rescheduled failed and regular appointments. Also, we analyzed the attendance rates of rescheduled failed appointments for return patients in the experimental group to determine if the number of times a patient had failed an appointment and was rescheduled had an effect on attendance.

RESULTS

The efficacy of recalling patients who failed their appointments by computer generated postcard prompters is shown in Table 2. This intervention resulted in a 21% increase in attendance of new patients and a 30% increase of return patients compared to controls. There were two new patients in the experimental group who canceled their rescheduled appointments and attended just after the 4-week time window. These patients were counted as failed in the analysis. Rescheduling patients 6 to 7 weeks as compared to 2 to 3 weeks after the failed appointment did not cause a statistically significant difference in patient attendance (Table 3). However, there was a trend toward better attendance in the return patients who were rescheduled in the 2 to 3 week time period.

Many patients failed several different new and return appointments over the course of the study. All of these failed appointments were rescheduled. The possibility exists that the repeated rescheduling of patients selected a group of individuals who were more responsive to this rescheduling technique. Table 4 shows attendance as a function of the number of times a patient had been rescheduled. It can be seen that there was no statistically significant difference between patients rescheduled once or twice and that there was a nonsignificant tendency toward reduced attendance for patients rescheduled three or more times. Thus, patient selection was not responsible for the efficacy of this technique in return patients.

Another concern is that this technique might be effective only for higher-income patients and that it does not recapture patients with a lower socioeconomic background. Table 5 shows the average income of patients, in all subject groups, who attended regular and rescheduled failed appointments. Income for patients from the rescheduled failed appointment group was only 62% of that for patients attending regular appointments. This difference is actually greater than it appears, because recalled patients are returned to regular follow-up, and will thus lower the average income of the regular appointment group. The system is, thus, effective. However, in clinics that have a borderline financial status, lowering the private-pay-to-indigent patient ratio may not be economically desirable.

| TABLE 2. ATTENDANCE RATES WITH USE OF POSTCARD RESCHEDULING TECHNIQUE FOR WEEKS 1 THROUGH 4 |
| No. of Patients | New | Return | Total |
| Control         |     |       |       |
| Attended        | 5   | 16    | 21    |
| Failed          | 52  | 74    | 126   |
| Total           | 57  | 90    | 147   |
| Experimental    |     |       |       |
| Attended        | 19  | 51    | 70    |
| Failed          | 43  | 57    | 100   |
| Total           | 62  | 108   | 170   |

$X^2 p < .0001 p < .0001 p < .0001$

| TABLE 3. ATTENDANCE RATES WITH USE OF POSTCARD RESCHEDULING TECHNIQUE FOR 8-WEEK FOLLOW-UP |
| No. of Patients | New | Return | Total |
| Control*        |     |       |       |
| Attended        | 19  | 39    | 58    |
| Failed          | 38  | 51    | 89    |
| Total           | 57  | 90    | 147   |
| Experimental t  |     |       |       |
| Attended        | 21  | 55    | 76    |
| Failed          | 41  | 53    | 94    |
| Total           | 62  | 108   | 170   |

$X^2 p < .951 p < .287 p < .345$

| TABLE 4. EFFECT OF REPEATED RESCHEDULING OF RETURN PATIENTS IN EXPERIMENTAL GROUP |
| No. of Rescheduled Appointments | Attendance Rate |
| Patients | % |
| Rescheduled once                   | 59 | 49% |
| Rescheduled twice                  | 31 | 52% |
| Rescheduled three or more times     | 18 | 33% |

*By Z test, none of rates were significantly different from each other.
In order to recapture patients who do not attend their medical visits, the patient must be contacted and an attempt at appointment rescheduling made. This contact may be made by mail, phone, or home visit; and initiated either by the agency referring the patient or by that providing the health care. Also, nonaffiliated social service resources may be involved in this process.

The Delta Project’s computer system will reschedule automatically all new and return patients who have failed their appointments and contact these patients by postcard. This method has been found to be both effective and cost-efficient. Twenty-one percent of new patients (above control levels) and 30% of return patients (above control levels) attended appointments following this process. The overall cost of rescheduling a new patient was $3.00, and a return patient, $2.00. This operational cost does not include a $2,500 start-up investment for hardware (Macintosh Plus, hard disk drive, and run-time version of Omni 3+). If the system is used for billing, then only a portion of the start-up cost needs to be applied to the patient tracking activities. The technique was most effective in recalling return patients the first and second times they failed an appointment (Tables 2 and 4). The economic status of patients who attended rescheduled appointments was significantly lower than that of patients attending regular appointments (Table 5). Thus, the system is effective in reaching its target population. However, in clinics that have a borderline financial status, lowering the private-pay-to-indigent patient ratio may not be economically feasible. It would be expected that a lower ratio will result in a decrease in revenue collection regardless of the fee structure used in patient billing.

Four methods have been used to reschedule patients who have failed their appointments: letters, postcards, phone calls, and, to a lesser extent, home visits. In our protocol we used postcards and home visits. A letter, although more informative, may be more confrontational and is more costly for the clinic to generate. Using postcard prompts, Hulka rescheduled failed appointments of new patients for cervical cancer screening. She found that 28.7% of the patients could be made to attend appointments by the first rescheduling attempt, and only 7.9% by a second (no controls). The success reported in this study is comparable with our reported new patient attendance of 31% (Table 2).

Home visits also were found to be effective, even though these visits occurred months after the appointment, and on a group of patients who did not attend appointments after repeated prompting by postcards. Twenty-three percent of those contacted eventually called for an appointment and attended a follow-up visit. The cost of each home visit was $24. If one assumes that patients are only home in approximately 50% of the home visits attempted (35% in our patients and 37% of those of Banco and Segarra), and if one assumes 50% of the contacts result in an attended medical appointment, the cost of home visits per recovered patient approaches $100. This demonstrates the economic problem of solely using primary case management and social service techniques in this population, and also illustrates the need for triaging of the available social service resources to families that need them the most.

Another technique used by the patient management system to recoup patients who had failed their appointments was the automatic notification of the referring health care professional regarding the patient's appointment attendance or lack thereof (along with a brief summary of the medical findings and treatment plan). We found this technique to be useful not only in promoting patient medical compliance, but also in forming linkages between our agency and the referring physician. Referring physicians often assume that patients who failed to attend their appointments actually were seen and the medical findings were not sent to them.

Finally, attendance ratios were automatically calculated for all patients. Patients whose ratios were low had their medical records reviewed. When repeated contacting of these families did not bring satisfactory results and the illness was felt to be potentially threatening to the child, the family was referred to the Department of Human Services for further intervention.

**DISCUSSION**

In order to recapture patients who do not attend their medical visits, the patient must be contacted and an attempt at appointment rescheduling made. This contact may be made by mail, phone, or home visit; and initiated either by the agency referring the patient or by that providing the health care. Also, nonaffiliated social service resources may be involved in this process.

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