USING COSTAR TO ASSIST NURSES IN HYPERTENSION SCREENING AND EDUCATION

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Abstract

COSTAR, a Computer-Stored Ambulatory Medical Record system, has been in use in the Family Practice/Primary Care Clinic, Pease Air Force Base, N.H., since November 1981. This paper describes a computer-based program to assist nurses in managing a hypertension screening and education program for known and suspected hypertensives. The program includes: 1) a data record for five day blood pressure screening and patient education data; 2) a patient-specific instruction sheet containing information about the patient's medications and diet; 3) a drug interaction check list advising the nurse of potential interactions of drugs active for that patient. Patients' evaluations of the computer-generated instruction sheet are included.

Introduction

The computer is an underutilized resource as an aid to patient teaching. This may be because of the image that immediately comes to mind when one hears the words "computer" and "teaching" in the same sentence. That image is of a person sitting at a terminal interacting with the computer, with winged dollar signs flying overhead as one tallies up the expense of the hardware and software involved (not to mention the patient's time).

There have been some notable efforts to use this approach to patient teaching (1,2,3,4,5), but there is an intermediate way that is much more attainable for those who do have access to a computer, but do not have resources to support direct patient-computer dialogue; computer-generated patient-specific instruction sheets that are reviewed with the patient and sent home as a reminder.

Background

The Pease Air Force Base Primary Care and Family Practice Clinics serve potentially all base-assigned active duty personnel and their dependents as well as all retired personnel in the area and their dependents. They also treat transient patients in the above categories from other military bases and cities across the nation.

The COSTAR system has been in place in the FP/PC Clinics since November, 1981 as part of a TRIMS project with the Department of the Air Force.

COSTAR is an automated medical record system designed to serve at once the administrative, medical and financial recording needs of ambulatory practices (6). At Pease, patients are registered into the system by clerical personnel. The scheduling module is used to schedule appointments. Providers record all clinical data on computer-generated, self-encoding checklist forms called "encounter forms". These data are entered by clerical personnel.

Once entered, the patient information is used for a number of purposes:

1. As the basis for the medical record.

The medical data are displayed in three basic formats: Encounter Report, which displays all medical information collected during an individual patient visit; Status Report, a current summary of the patient's diagnoses, physical findings, medications, laboratory tests, etc.; Flowcharts, either pre-specified ones like Hypertension and Diabetes, or one-time flowcharts specified ad hoc by the user. These reports are printed automatically just prior to the patient's scheduled visit; they can also be generated on demand via CRT or on the printer.

2. As the basis for administrative reports and quality assurance.

Both routine and ad hoc administrative reports can be specified via the Medical Query Language (MQL) (7). There is an active Quality Assurance program in the Pease FP/PC Clinic in which MQL is used both for routine patient-specific reminders (e.g., when last recorded blood sugar occurred greater than three months ago on diabetic patients) and for ad hoc inquiries (e.g., examining the records of patients on certain potent drugs). The Hypertension Teaching Sheet and the Hypertension Drug Interaction Guide described in this paper are generated via queries written in MQL.
COSTAR is programmed in Standard MUMPS, a compact, high level interpretive data management system supported by several computer manufacturers. COSTAR can be implemented on a wide range of sizes of computer configurations, and can grow modularly via hardware expansion as data processing requirements increase. Pease operates (with other systems) on a DEC 11/70 with 4 megabyte of memory and three 65-megabyte RM03 disks.

**Description Of The Program**

There are approximately 13,000 patients registered in the COSTAR system in the Family Practice/Primary Care Clinics at Pease who have medical data in their records. Of these, approximately 900 (7%) have an active recorded diagnosis of hypertension.

All known and suspected hypertensive patients in the clinic are assigned to the screening/education program. A patient suspected of being hypertensive is asked to report to the clinic for five consecutive days to substantiate the finding. When the patient presents to the clinic, a brief history is taken and compared with the status report received from the computer about the patient. Blood pressure is taken left and right arm in sitting, standing and lying positions. The blood pressure is recorded on a preprinted Blood Pressure Record. This single form is used to document all five visits to the screening clinic. On the second or third visit, education about the effects of smoking, alcohol, and sodium on blood pressure begins. Handouts from the American Heart Association and the National Institutes of Health are often given to the patients to reinforce this information.

When the five-day screening period is completed, the results are reviewed with the patient's provider, i.e. doctor, physician assistant, or nurse practitioner. If the blood pressure has returned to normal, the patient may be instructed to follow general directions about smoking, diet, exercise, etc., and s/he may be advised that no treatment is required. If the blood pressure remains elevated in the screening period, the patient is instructed to make an appointment with the provider.

The form used to record the week's activities is given to a data inputter. The blood pressure readings and education documentation are put into the COSTAR system and printed as an encounter report to become part of the patient's permanent record. This information is also stored permanently in the computer system so that if a patient presents to the clinic without his record, it can easily be accessed via CRT.

When a provider confirms the diagnosis of Hypertension, s/he prescribes treatment (recording this on a computer-generated Patient-Specific Encounter Form which is immediately input by the clerk), and instructs the patient to see the nurse for follow-up blood pressure monitoring and further specific education.

The nurse then calls up from the printer a Hypertension Drug Interaction Guide, Figure 1, and a Hypertensive Teaching Sheet, Figure 2. (The Drug Interaction Guide and Teaching Sheet are generated under a special DISPLAY MEDICAL DATA option in COSTAR.)

![FIGURE 1. DRUG INTERACTION GUIDE](image)

She first scans the Interaction Guide to see whether there are any interactions that should be brought to the provider's attention before proceeding. If not, she goes on to review the provider's orders with the patient. She reviews the medications prescribed, reason for taking each drug, how each drug should be taken, (e.g. with or without food), side effects, special precautions, etc. Dose, time for taking medication, effect of medication alone or combined with other medications are also discussed with the patient. If laboratory tests have been ordered at certain intervals due to the medications being taken, they are explained to the patient and scheduled by the nurse.

Next, the nurse informs the patient about the diet prescribed. The Teaching Sheet contains a list of high sodium foods to avoid and potassium-rich foods for those on diuretics. The reasons for restricting sodium and increasing potassium are explained. If additional education is required, the patient is referred to the diettian.
The nurse usually suggests that the patient keep the Teaching Sheet on his/her refrigerator at home as a quick reference guide. This has proved to be practical and highly useful, according to the patients' comments.

We surveyed some of the patients who received the Teaching Sheet to find out whether they perceived the sheet to be useful. (This was a convenience sample—whenever a patient had previously received a Teaching Sheet returned for a blood pressure check, s/he was asked to fill out the Evaluation Form, Figure 3, before leaving the clinic). Twenty-six forms have been filled out at this writing, and the survey will continue.

Table 1 summarizes the results. Only one of the twenty-six patients surveyed thought the sheet was "NOT USEFUL." Nineteen of them thought the sheet was "VERY USEFUL." We were surprised by the number of patients who commented in the "Other Comments" section on their appreciation of the extra time and attention given by the nurses.

We believe the quality of patient care is improved with this educational aspect of the nurse/patient relationship. More time is spent with the patient; the nurse is more aware of the patient's level of understanding of his/her illness, and how much supplemental teaching is needed. Many of our patients in this program are retirees. Treated in a clinic setting, they are not always able to see the same provider for each visit. Because of this, it is very important for the clinic nurse to be a...

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**FIGURE 2. TEACHING SHEET**

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liaison with the patient and provider. Any patient can call the clinic at any time and speak with the nurse directly, who can view the patient's medical record on the CRT and answer pertinent questions regarding care and follow-up exam.

With the COSTAR system in effect, a periodic query can be printed quickly on the hypertensive patients in the clinic, number of patients receiving treatment, and number of patients not keeping scheduled appointments. This allows the nurse to make follow-up calls to check on the patient's condition and status of care.

The patients are impressed with this program, and the special time given to them by the clinic staff. Our goal of assisting patients with continued health maintenance is being achieved by improving the system of care offered.

References


