Medication Education of Acutely Hospitalized Older Patients

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OBJECTIVES: To determine the amount of time spent providing medication education to older patients, the impact of medication education on patients' knowledge and satisfaction, and barriers to providing medication education.

DESIGN: Telephone survey of patients within 48 hours of hospital discharge and direct survey of physicians and pharmacists.

SETTING: Internal medicine ward in a tertiary care teaching hospital.

PARTICIPANTS: Patients 65 years of age and over regularly taking at least one medication.

MEASUREMENTS: Patient demographics, medication use, time spent receiving or providing medication education, and satisfaction scores.

MAIN RESULTS: Forty-seven respondents with a mean age of 77.1 years reported that physicians spent a mean of 10.5 minutes (range, 0–60 minutes) and pharmacists spent a mean of 5.3 minutes (range, 0–40 minutes) providing medication education. Fifty-one percent reported receiving no education from either physician or pharmacist, and only 30% reported receiving written medication instructions. Respondents were generally quite satisfied with their education. Physicians identified one or more barriers to providing education 51% of the time and pharmacists 80%. Lack of time was the most common barrier (18%) identified by physicians, but pharmacists cited lack of notification of discharge plans (41%) and lack of time (39%) as the main barriers. Respondents made many medication errors and knew little about their medications.

CONCLUSIONS: Although older hospitalized patients received little medication education or written information and made many medication errors with and without medication education, approximately one half of physicians perceived no barriers to providing education.

KEY WORDS: drug therapy; patient education; medication errors; medication education.

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People aged 65 years and older have a high prevalence of chronic illnesses, are hospitalized frequently, and are often taking several prescription and nonprescription medications.^{1–4} During hospitalizations for acute illness, drugs are often added or discontinued and dosages are frequently changed.^{2,4} Therefore, patients who are discharged from the hospital require education about the medication regimen they must continue after discharge.

Some evidence suggests that education by health care professionals improves patients' understanding of their medication,^{5–16} and adherence to their regimens,^{7,10,12,16–21} which may lead to reduced morbidity and hospital readmissions.^{7,12,18,19,21,22}

Much of the medication education received by patients is provided by their physicians^{9,23,24} and pharmacists.^{7,23–25} Although most studies have looked at outpatient settings, they point out the lack of education received by older patients.^{7,9,11,13,24–27} It is unknown how much time various health professionals actually spend educating hospitalized older patients and what barriers they perceive in providing medication education. It is also unclear how satisfied patients are with this education, and how much knowledge they have about their medications after discharge.^{7,8}

This study looked at a group of older patients who were hospitalized on an internal medicine ward for acute medical illness. The primary objectives of the study were: to determine the medication education the patient received from physicians, nurses, and pharmacists prior to discharge; to determine barriers to providing education reported by health professionals; and to determine patient satisfaction with the education received. The secondary objective was to assess patients' basic knowledge about their medications.

METHODS

Patient Recruitment

Consecutive patients 65 years of age or older who were admitted to the internal medicine ward of The Toronto Hospital were eligible for the study. The Toronto Hospital is a 1,100-bed, tertiary care teaching hospital. There are four internal medicine teams at each of two physical sites that admit patients directly from the emergency room on a rotating basis. Each team consists of a staff physician, several housestaff, and a team pharmacist.

One of two investigators spoke with each medical team and the nurse manager on each ward daily on weekdays to identify any patient aged 65 years or older who was likely to be discharged within 48 hours. The inclusion criteria were as follows: inpatient on an internal

medicine ward; 65 years of age or older; requiring at least one medication on a regular basis after discharge; fluent in English; no significant hearing impairment; and discharged to a private dwelling within the catchment area with a telephone. Patients who were discharged to places other than private dwellings were excluded. Written informed consent was obtained from each patient. For patients who were not considered capable of participating in the study by either the physician or the investigator, family caregivers, if available, were approached instead.

Data Collection

Demographic and admission data (date of birth, date of admission, date of discharge, admission diagnoses, admission medications, and discharge medications) were abstracted from the patient's chart. Admission diagnoses and medications were divided into broad categories by organ system.

Based on a review of the literature, we designed and pilot tested a questionnaire. The final version of this questionnaire was administered via telephone by one of two investigators to the patient or family caregiver. The questionnaire asked for demographic information, time hospital health care professionals spent providing medication education, satisfaction with the education process, and medication information including the name of the medication, dose, frequency, the purpose of the medication, and potential side effects. This information was solicited for each prescription and nonprescription drug the patient was taking.

The patient's report of medications being taken was compared with the discharge medications listed in the discharge orders or, when they were not available, with the medications listed in the medication record on the day of discharge. Our previous experience suggested that medications are rarely altered on the day of discharge. Medication errors were classified as follows: (1) addition of a medication; (2) deletion of a medication; (3) inability to name a medication; (4) naming a medication by class name only (e.g., water pill, heart pill); (5) naming a medication by description only (e.g., blue pill, little round pill); (6) unable to state dose; (7) incorrect dose; (8) incorrect frequency; (9) changing regular dosage to as needed basis (PRN); (10) changing PRN dosage to regular dosage; (11) inability to state purpose of medications; (12) inability to state side effects of medications. Errors 1 through 5 were grouped as "naming errors" and errors 6 through 10 were grouped as "dosing errors." In order to be given credit for avoiding the errors of purpose and side effects of each medication, patients had to state at least one purpose or side effect of that medication.

One of the investigators administered separate questionnaires to the house officer on the team who was directly looking after the patient and to the pharmacist. If either the patient or the physician indicated that a nurse may have been involved in providing education, a sepa-

rate questionnaire was also administered to the nurse. Questions were asked about the education that was provided to the patient about medications, how much time was spent providing the education, and the health care provider's satisfaction with the education process. The physician and pharmacist were asked to list any barriers to providing medication education to the patient.

Satisfaction scores were measured on a Likert-type scale from 1 to 5 (1 representing "not at all satisfied" and 5 representing "extremely satisfied"). Satisfaction scores were reported by patients for overall medication education and for medication education provided specifically by each health professional. Only patients who reported receiving education from specific health care professionals were asked to give satisfaction scores for their education. Similarly, only physicians and pharmacists who provided patient education were asked to rate their satisfaction with the education they provided.

Whenever possible, questionnaires were administered within 48 hours after the patient's discharge. Patients and health care professionals were unaware of each other's responses to the questionnaires but were aware of the general purpose of the study.

Data Analysis

Data were entered and analyzed using SAS version 6.12 (Cary, NC). For the purpose of the analysis, we combined the responses of patients with the responses of family caregivers of incapable patients. The responses of patients who answered "don't know" to questions about time spent providing medication education or satisfaction were censored from binary variable analyses. The Student's *t*-test was used to compare continuous variables, and χ^2 analysis was used for categorical variables. *Kappa* statistics were calculated as measures of agreement between patients and health professionals.

RESULTS

Over a 4-month period in 1997, 255 patients were screened for the study and 49 patients (19%) were enrolled. Patients were excluded primarily because they were not discharged to a private dwelling (37%) or were not fluent in English (37%). Other reasons for exclusion were not being seen prior to discharge (11%), refusal to participate (6%), living outside the catchment area (3%), and lacking capacity to consent (2%).

Forty-seven patients and two family caregivers met inclusion criteria and agreed to participate, but at the time of the telephone interview, two patients declined further participation, leaving 47 respondents. The physician and pharmacist for each of these 49 patients were also interviewed. Four nurses identified by the patient or physician as having provided medication education were interviewed.

Selected patient baseline characteristics are shown in Table 1. Patients were taking a median of six medications per day (range, 1–13) at discharge. A median of two new medications (range, 0–7) were started in hospital. The majority of patients had at least one cardiac diagnosis (80%) and were taking at least one cardiac medication (74%).

Medication Education

Twenty patients reported receiving no medication education, whereas 19 patients reported receiving education

Table 1. Baseline Characteristics of Study Patients (n = 49)

Characteristic	Value
Mean age, years (range)	77.1 (65–97)
Men, n (%)	25 (51)
Mean length of stay, days (range)	7.5 (2–21)
Median number of medications, n (range)	6 (1–13)
Median number of new medications, n (range)	2 (0–7)
Living arrangements, n (%) [*]	
Alone	22 (47)
Spouse	16 (34)
Relatives	6 (13)
Other/omitted	3 (6)
Education, n (%) [*]	
Grade school or less	6 (13)
Some high school	17 (38)
High school graduate	4 (9)
Beyond high school	18 (40)
Able to take own medications by self-report, n (%) [*]	42 (89)
Number of patients with given diagnosis, n (%) [†]	
Cardiac	39 (80)
Respiratory	22 (45)
Musculoskeletal	17 (35)
Endocrine	16 (33)
Gastrointestinal	15 (31)
Renal	9 (18)
Hematologic/oncologic	8 (16)
Ophthalmologic	8 (16)
Classes of medication taken by patients, n (%) [‡]	
Cardiac	36 (74)
Endocrine	21 (43)
Aspirin	18 (37)
Antibiotic	18 (37)
Respiratory	16 (33)
Gastrointestinal	16 (33)
Psychiatric	10 (20)
Other analgesic	7 (14)

^{*}Two patients declined participation and were excluded from self-reported baseline characteristics (living arrangements, education, ability to take own medications).

[†]Diagnoses were generally grouped by major organ systems. Patients who had more than one diagnosis in a category (e.g., cardiac) were considered to have one diagnosis in that category.

[‡]Medications were generally grouped by major organ systems. Patients were considered to be taking at least one medication in a given class if it was indicated in the medication record as being taken regularly. The proportion of patients taking at least one medication in a given class is reported.

from at least one health professional. Eight patients responded “don’t know.” Patients reported that physicians spent a mean of 10.5 minutes, pharmacists spent a mean of 5.3 minutes, and nurses spent a mean of 4.9 minutes (range, 0–120 minutes) providing education (Table 2). Physicians and pharmacists reported spending a mean of 13.0 minutes and 14.3 minutes, respectively, providing education.

For the analysis about the amount of agreement between patients and health care professionals regarding the provision of education, education was treated as a dichotomous variable (any education vs no education), and patients who responded “don’t know” were excluded. The agreement between patients and physicians was poor ($\kappa < 0.10$), whereas patient-pharmacist agreement was moderate ($\kappa = 0.54$). Most cases of disagreement occurred when patients indicated no education had been provided whereas health professionals indicated education had been provided.

Thirty percent of patients reported having received written information in hospital about their medications. This written information contained the name of the medication and when to take it 82% of the time, and special instructions (for example, take with meals) 64% of the time. Major side effects of the medication were rarely described (11%).

For the analysis about the amount of agreement between patients and health care professionals regarding the provision of written information, written information was treated as a dichotomous variable (yes/no), and a “yes” was scored for a health professional if a physician or pharmacist (or both) indicated that they had provided written information to the patient. The agreement between patient and health professional was moderate ($\kappa = 0.45$).

Satisfaction

Patients were generally satisfied with the medication education that they received (Table 2). Patients reported a mean satisfaction of 3.4 and 4.3 for overall medication education and written information, respectively. Patients, physicians, and pharmacists were generally quite satisfied with the verbal education that was provided.

Barriers

Physicians claimed that there were barriers to providing medication education in 25 (51%) of the patient encounters. The most commonly cited barriers were lack of time ($n = 9$), cognitive impairment ($n = 4$), lack of fluency in English ($n = 4$), no new medications or no need to provide education ($n = 3$), other patient factors ($n = 6$), and other ($n = 2$). Pharmacists claimed there were barriers in 39 (80%) of the patient encounters. The most common barriers they identified were not being informed about discharge plans ($n = 20$), lack of time ($n = 19$), cognitive

Table 2. Reported Characteristics of Medication Education*

Characteristic	Patient Report	Physician Report	Patient Report	Pharmacist Report
Mean duration in minutes (range)	10.5 (0–60)	13.0 (0–60)	5.3 (0–40)	14.3 (0–180)
Mean satisfaction score [†]	3.9	3.7	4.1	3.7

*These values are based on responses by as many as 49 physicians and 49 pharmacists but only 47 patients, because two patients declined to continue participating during the postdischarge interview. For the comparison with physicians, responses from only 33 of these patients were available to calculate the mean duration in minutes because the other 14 patients responded "don't know" when asked to estimate the duration. In this comparison, the mean satisfaction score is based on responses from 14 patients and 38 physicians because 33 patients and 11 physicians responded that there was no education. In the comparison with pharmacists, responses from 40 patients were available to calculate the mean duration in minutes because the other 7 patients responded "don't know" when asked to estimate the duration. In this comparison, the mean satisfaction score is based on responses from 10 patients and 20 pharmacists because 37 patients and 29 pharmacists responded that there was no education.

[†]The satisfaction score is based on a scale from 1 ("not at all satisfied") to 5 ("extremely satisfied").

impairment ($n = 3$), no new medications or no need to provide education ($n = 3$), lack of English fluency ($n = 1$), other patient factors ($n = 2$), and other ($n = 4$).

Medication Knowledge and Use

We examined several aspects of patient medication knowledge and medication use. These are summarized in Table 3. Less than half (43%) of the patients in our study were able to name all their medications. No patients were able to name at least one side effect for each of their medications.

Patients who reported receiving medication education from at least one health professional were compared with those who reported receiving no education and those who reported "don't know." The results are shown in Table 4. All three groups were relatively similar in baseline characteristics and made comparable numbers of medication errors. When patients were classified by whether or not health professionals reported providing medication education to them, similar results were found (data not shown).

Table 3. Patient Knowledge and Use of Medication

Characteristic	n (%)
Able to name at least one medication	44 (93)*
Able to name all of the medications listed in the medication record	20 (43)
Omitted at least one medication listed as being taken regularly in the medication record	25 (57)
Added at least one medication not listed in the medication record	18 (41)
Able to name purpose of at least one medication	42 (96)
Able to name purpose of each medication	16 (36)
Able to name side effect of at least one medication	10 (23)
Able to name side effect of each medication	0 (0)

*Two of the 49 patients declined participation at the time of the telephone interview and were excluded from all analyses. Three patients were unable to name any of their medications and were excluded from subsequent analyses.

DISCUSSION

We found that approximately one half of older patients reported receiving no medication education while in the hospital, despite changes in most patients' medication profiles. Both physicians and pharmacists claimed to provide, on average, less than 15 minutes of education. Patients perceived this to be even less, especially in the case of education provided by pharmacists. Patients, physicians, and pharmacists were generally quite satisfied with the medication education that was provided. The patients made numerous and potentially significant medication errors and rarely knew the purpose or side effects of each of their medications.

How much time should be spent by health professionals educating patients? The answer is unclear. No previous studies have examined the minimum time physicians should spend providing education to improve patient knowledge and adherence. However, several studies have attempted to address the minimum time that pharmacists should spend to improve patient knowledge and adherence. De Young reviewed a number of studies that examined the amount of time pharmacists spent providing education. In six of seven studies that were conducted in various settings and found improvement in knowledge or adherence with education, the mean time spent ranged from 3.5 to 25 minutes per patient.⁷ Several other authors have reported that 15 minutes of pharmacist education decreased medication errors^{5,6,20,28} and improved adherence.^{6,28} In our study, pharmacists reported spending a mean of 14.3 minutes providing education, but patients reported that less time was spent. This discrepancy may be partially explained by pharmacists having included in their estimates time spent preparing information to present to patients. Informal questioning of the pharmacists in our study suggested that this was often the case.

Does adding written information help? A number of studies have suggested that providing written information improves understanding and adherence and decreases medication errors.^{6,10,12,17,22,29} In our study, a minority of patients (30%) reported receiving written information

Table 4. Characteristics of Patients Who Reported Receiving or Not Receiving Medication Education from Any Health Professional*

Characteristic	Education (n = 19)	No Education (n = 20)	Unsure or Don't Know (n = 8)
Mean age, years	76.5	76.3	80.8
Mean length of stay, days	7.8	7.4	6.9
Mean number of medications (range)	5.8 (1–13)	5.2 (1–13)	6.0 (2–10)
Mean number of new medications (range)	2.2 (0–4)	1.8 (0–7)	1.8 (0–5)
Omitted at least one medication, n (%)	11 (58)	12 (60)	8 (100)
Added at least one medication, n (%)	6 (32)	10 (50)	N/A
Made at least one dosing error, n (%)	6 (32)	5 (26)	N/A
Mean overall satisfaction score	4.1	2.8	3.3

*Two of the 49 patients declined participation at the time of the telephone interview.

about their medications, which is similar to findings in previous studies.^{11,13,24} Even among those in our study who received written information, only 11% were given any instructions about potential side effects, which is in keeping with results from previous investigations.^{11,13}

When responses were compared, physicians and pharmacists reported providing education more often than patients reported receiving it. According to our analysis,³⁰ there was moderate agreement between patients and pharmacists regarding verbal education and between patients and health care professionals regarding written information. Conversely, agreement between patients and physicians regarding verbal education was poor. One possible explanation is that patients less often recognize when physicians are providing verbal education than when pharmacists provide medication education. Alternatively, physicians may overestimate the amount of time they spend educating patients. In the one study that used videotaped interviews, the authors reported that both physicians and patients overestimated how often medication risks and potential side effects were discussed.²⁵ Our study did not attempt to validate the times reported by patients and health professionals except through cross-comparisons of responses.

We were unable to find any previous studies in which physicians and pharmacists reported barriers to providing medication education for inpatients. A study of community pharmacists found that lack of time was reported to be the most common barrier to providing outpatient counseling.³¹ In our study, most health professionals reported providing relatively little formal medication education, and despite this, almost one half of physicians and one fifth of pharmacists claimed that there were no barriers to providing medication education. Health professionals may be underestimating the importance of providing drug information to patients. Our findings also suggest that physicians may be discharging patients without involving pharmacists in the discharge planning process.

Patients in our study reported, on average, quite high satisfaction scores with all aspects of the education they

received. We believe there are several possible explanations for this. For one, patients may want to avoid the perception that they are criticizing the hospital staff involved in their care (i.e., “social desirability bias”).³² Patients may have been reluctant to ask for medication education,^{6,19,25,28} or may have viewed their physicians as “all-knowing,” placing trust in the physician’s judgment rather than asking for drug information. Alternatively, patients in our study may not have realized the potential benefits of improved knowledge about their medications.¹⁹ However, numerous studies have found the majority of patients want to know more about their medications^{6,26,28,33–35} and want more written information^{10,26,29,35,36} than they are currently being provided.

There are several limitations to our study. First, more than 76% of potential subjects were excluded from the study, primarily because of language barriers or being discharged somewhere other than to a private dwelling. Although this feature may limit the generalizability of our findings, we specifically chose to interview the seniors we thought would be most likely to receive medication education. Health care professionals are less likely to provide medication education to patients returning to a long-term care facility, as individuals in these institutions rarely administer their own medications. It is also probable that older patients who are not fluent in English would receive less medication education, especially written information, than English-speaking patients. This area merits further research.

Second, our study population is restricted to patients in a teaching hospital, and we were able to collect little information about the role of nurses in providing education. Thus, our findings may not be generalizable to community hospitals or to centers where nurses play a greater role in patient education.^{37,38}

Third, we did not blind the health professionals to the nature of our study. It is possible that this awareness increased the amount of time they spent educating their patients. Therefore, our results are conservative estimates of the actual problem.

Fourth, we had no true standard for the patient's medication regimen. We used the information in the medication record on the day of discharge as a proxy for the patient's discharge medications. The medication record is updated daily and is based on physicians' written orders. It is thus representative of the medications the physician has prescribed for the patient while in hospital, and this proxy has been used in previous studies as the standard.^{9,21,28,39} Despite this limitation, we believe that the medication additions and omissions, dosing errors, and lack of knowledge that we demonstrated are clinically important and warrant further study.

How can we improve the medication education process? From the results of our study, we believe that physicians and pharmacists need to be made aware of the medication education needs of older inpatients and of communication strategies that may improve patient knowledge about their medications.^{18,20,23,40,41} Specifically, health professionals need to know that spending approximately 15 minutes in one sitting providing medication education to each patient improves drug knowledge and adherence to the medication regimens, both of which may lead to improved patient outcomes. Health professionals should strive to provide written medication information to all discharged older patients, and patients need to be given the opportunity to ask for more information. Finally, improved communication between physicians and pharmacists may facilitate pharmacists being able to provide medication education to a greater proportion of older patients prior to discharge.

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REFLECTIONS

About Your Child

She's wild, and so is he.
Me, I would just tell them the facts
and leave. Take security with you.
When they step forward, you step back.

About your child. . . come in here please.
They pace around (plan their attack?),
then weave a path back to the room
but only the father goes in, sits down and says,
He's dead, isn't he?
(The doctor is thinking, He's big. I'm glad we called
in security).

He's dead. Yes. I'm so sorry.
We did everything that we could to save him.

(But he was as stiff as
three-day-old chicken in the fridge.
In your bed, didn't his hungry
gasps for breath, his slow-cooling blood
awaken you? You bring this horrific child,
pulseless and gray as bad cheese, and you're surprised
to hear that he's dead?
He's been dead a long time. What aren't you telling me?)

But all that's said is:

Ma'am? Ma'am! as the mother
drifts out, leaving behind the scent
of smoke and unwashed clothes and cheap
booze.

CHANDY C. JOHN
Cleveland Heights, Ohio