Depression, Cognitive Impairment, and Understanding of Medication Directions in Hospitalized Elderly Patients

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Purpose. The objectives of this study were 1) to assess understanding of medication directions of drug therapy in a group of hospitalized elderly who were not receiving assistance with medication administration; and 2) to determine whether depression, cognitive impairment, age, and other characteristics are associated with patient understanding of medication directions.

Methods. The sample consisted of 117 hospitalized elderly patients aged 70 years and older who were taking two or more medications prior to hospitalization and reported medication self-administration. Data collection included demographic characteristics, mood, cognition, and pre-admission medication use and knowledge.

Results. Thirteen (11%) patients did not understand directions for two or more pre-admission medications. Being 80 years or older was associated with not understanding medication directions (OR = 6.2, p = .017). There was a trend for depressive symptoms to be associated with not understanding medication directions, however, this was not significant (OR = 3.9, p = .058).

Conclusions. Although all individuals should be assessed for comprehension of their medication regimens, those over 80 years of age with depressive symptoms deserve increased attention. Alternative strategies may need to be developed to improve medication knowledge in the older, depressed hospitalized patient.

KEY WORDS: aged; drug therapy; self administration; depression.

INTRODUCTION

Understanding directions for medication use is one of many factors that is important for promoting adequate drug taking behavior. Several studies have shown that elderly individuals often have poor medication knowledge, including difficulty reciting the name, purpose, dosage and frequency of administration (1–3). However, the consequences of poor medication knowledge in the elderly are not entirely clear. In a study by Col *et al.*, poor recall of medications was a significant risk factor in elderly patients who had a hospital admission due to drug noncompliance (4). Hospitalization because of medication noncompliance is not uncommon in the elderly, representing approximately 6.0% to 11.4% of hospital admissions (4,5). However, studies have not consistently found a strong relationship between poor medication knowledge and noncompliance with prescribed regimens (1,6,7).

In spite of the high use of medications by the elderly and the well recognized problems with compliance to treatment regimens, we know little about the association of cognitive and emotional factors with poor medication knowledge. This information might allow for the identification of high risk patients who may have different educational requirements. Previous investigators have reported a relationship between cognition and various aspects of medication knowledge (3,6,8). However, study limitations make it difficult to draw definitive conclusions. First, studies have included individuals who receive assistance with medication administration (e.g. from a spouse, child, nurse) (6,8). Although one could argue that knowledge of medication directions is important for all individuals, it may not be as vital for those patients who are not responsible for taking their own medications. Including this subset of individuals has been shown to overestimate the relationship between cognition and medication knowledge (3). For example, patients with poor cognition are more likely to have assistance with medications because of their deficits (6), thus these patients would also be more likely to have problems with medication knowledge. Another limitation is that multivariate techniques were not used to control for possible confounders, such as age and number of medications (3,6). Mental status has been shown to be related to age (3,6), and number of medications (3). Furthermore, a relationship has been shown between increasing age and poor medication knowledge (1). Lastly, one study used a non-standard method of assessing cognition (8). No investigators have examined the relationship between depression and medication knowledge.

We evaluated 117 elderly persons who were hospitalized for medical illness and who reported self administration of medications prior to hospitalization. The objectives of this study were: 1) to assess understanding of medication directions of drug therapy in a group of hospitalized elderly; and 2) to determine whether depression, cognitive impairment, age, and other characteristics are associated with patient understanding of medication directions.

METHODS

Study Population

Data were collected as part of a larger clinical trial evaluating the effectiveness of an interdisciplinary team in preserving physical functioning of hospitalized elderly (9). Patients who were age 70 years and older and consecutively admitted to a medical floor of St. Mary's Hospital Medical Center, Madison, Wisconsin were eligible for study inclusion. Patients were excluded from the study if they were scheduled for a surgical procedure, were expected to be discharged within 48 hours, were considered terminally ill, had been admitted from a nursing home or had a diagnosis of dementia.

A total of 432 patients were approached regarding participation in the project; 130 (30%) refused. Of the 302 individuals eventually enrolled, 55 patients were withdrawn as described

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previously (10). Patients (n = 247) were randomized to a control group or to one of two intervention groups using a randomized block procedure. Only the patients randomized to the intervention groups (n = 157) had an in-depth assessment of medication use and knowledge and comprise the sample for the current analyses. We further excluded patients who reported having assistance with medication administration and were taking less than 2 medications prior to hospitalization (n = 40) for reasons described previously.

Measurements

Informed consent was obtained from all study patients. Patients were enrolled and interviewed by trained researchers within 48 hours of hospital admission. The entry assessment included collection of demographic data (age, gender, living arrangement), evaluation of cognitive function using the Mini-Mental State Examination (MMSE) (11), and assessment of depression using the Geriatric Depression Scale (GDS) (12). The MMSE is a widely used tool that measures orientation, attention, registration, calculation, recall, ability to follow a three-part command, and the use of language. A score of 23 or less is suggestive of cognitive impairment (11). The GDS assesses depressive symptomatology and a score of 11 or above is suggestive of depression (12).

The study pharmacist interviewed patients to determine medication use prior to admission and whether they received assistance with medication administration. Pre-admission medications were verified using the following sources: caregiver, medical chart and patient medication vials. Two components of medication knowledge were assessed: 1) understanding of directions for medication use, and 2) understanding of medication purpose. Understanding of directions for use was determined by asking the patient "How many times a day do you take your medication?" and "What dose do you take at each time?" If patients did not know the dose, they were asked "How many pills do you take at each time?" Patients had to give correct frequency and dose (or number of pills). If a patient gave an incorrect response, the pharmacist asked further questions to determine if the physician had recently changed the dose or if the patient was taking the medication wrong intentionally. Patients who really did not know the correct directions or gave a reply of "I don't know" for two or more medications were classified as not understanding directions for use.

A correct answer for understanding purpose of medication consisted of: identifying the organ or body system, describing the disease or symptom, or describing the function of the medication (e.g. "water pill" was accepted for diuretics).

Statistical Analysis

Statistical Package for Social Sciences was used to perform all statistical analyses (13). The dependent variable was understanding directions for medication use at hospital admission (dichotomous). Differences in group means of patient characteristics were performed using Wilcoxon rank sum for independent samples. Fisher's exact test was used for nominal data. Differences were judged significant if $P < 0.05$. The variables that were significant in univariate analyses were entered into a logistic regression to determine predictors of not understanding directions, adjusting for number of prescription medications (n = 115; 2 had missing information). Independent variables entered were age (0 = age < 80 yrs, 1 = age ≥ 80 yrs), depression score (0 = GDS < 11, 1 = GDS ≥ 11), and cognitive score (0 = MMSE < 24, 1 = MMSE ≥ 24).

RESULTS

Table I shows the characteristics of the study sample who reported no assistance with medication administration. The average age was 78.2 years, the majority were female (68.4%) and all were Caucasian. The MMSE scores ranged from 17 to 30, with 21.4% having a MMSE score less than 24. Twenty-nine percent of patients had a GDS score of 11 or greater which is suggestive of depression.

Table I shows the characteristics of patients according to their understanding of directions for pre-admission medications. Thirteen (11%) patients did not understand directions for two or more of their pre-admission medications. Patients who did not understand medication directions were significantly older, had lower MMSE scores, had higher depression scores and were more likely not to understand purpose of medications. There was not a statistically significant difference between number of prescription medications prior to admission among the two groups.

We conducted logistic regression to determine independent predictors for not understanding directions for pre-admission medication use (Table II). The variable associated with not understanding directions for use was being 80 years of age or older (OR = 6.2, p = .017). Patients who were depressed were also at increased risk, however this was not significant (OR = 3.89, p = .058). Cognitive impairment was not found to be associated with understanding medication directions after controlling for other factors.

DISCUSSION

In this group of hospitalized elderly, 11% of patients were found not to understand directions for two or more of their pre-admission medications. It is difficult to compare our results to those reported by other investigators because of the various methods used to define poor understanding of medication directions. Col. *et al.* found that 31% of hospitalized patients had only partial or no recall of medication instructions, whereas Mahdy *et al.* found that 60% of patients made at least one error in reciting frequency of administration (3,4). We would anticipate a lower percentage not understanding directions for use since we excluded patients who had assistance with medication administration and who had a diagnosis of dementia.

A major strength of this study is that we used multivariate analysis to examine the association of several patient characteristics with understanding directions for medication use. Only older age was significantly associated with not understanding directions for medication use in this group of hospitalized elderly. Presence of depressive symptoms was also associated with poor understanding of medication directions (OR = 3.9), but this finding did not reach statistical significance (p = .058). This may be an example of a Type II error because of the small sample size, and therefore, we feel this issue deserves further study.

The possibility that depression may be associated with poor medication knowledge is especially important in light of

Table I. Patient Characteristics According to Understanding Medication Directions

Demographics	Total sample (n = 117)	Understand medication directions? No (n = 13)	Yes (n = 104)	*P* value[a]
Age, mean (SD)	78.2 (6.1)	82.8 (5.9)	77.6 (5.9)	0.006
Gender, n (%)				
female	80 (68.4)	10 (76.9)	70 (67.3)	0.753
male	37 (31.6)	3 (23.1)	34 (32.7)	
Living alone, n (%)	62 (53.0)	7 (53.9)	55 (52.9)	.948
MMSE, mean (SD)[b]	25.9 (3.0)	23.2 (3.2)	26.2 (2.9)	0.0016
MMSE < 24, n (%)	25 (21.4)	6 (46.2)	19 (18.3)	0.032
GDS, mean (SD)[c]	7.7 (4.5)	10.3 (4.7)	7.4 (4.3)	0.029
GDS ≥ 11, n (%)	33 (28.7)	7 (53.9)	26 (25.5)	0.049
No. of pre-admission Rx drugs, mean (SD)	5.2 (2.6)	5.0 (2.2)	5.3 (2.7)	0.982
No. of pre-admission OTC drugs, mean (SD)	1.2 (1.5)	1.1 (1.6)	1.2 (1.5)	0.543
Not understanding purpose for medication, n (%)	11 (9.4)	7 (53.9)	4 (3.9)	<0.0001

[a] Fisher's exact test or Wilcoxon rank sum.
[b] Mini-Mental State Examination (score <24 suggestive of cognitive impairment).
[c] Geriatric Depression Scale (score ≥11 suggestive of depression); n = 115 for total; n = 102 for column 4.

Table II. Multivariate Analysis for Understanding Medication Directions[a]

	Odds ratio	95% Confidence intervals	*P* value
Age ≥ 80 yrs	6.21	1.39–27.67	0.017
GDS ≥ 11[b]	3.89	0.96–15.80	0.058
MMSE < 24[c]	1.64	0.38–7.06	0.506

[a] Adjusted for number of prescription medications.
[b] Geriatric Depression Scale.
[c] Mini-Mental State Examination.

evidence suggesting that depressed patients may have poor medication compliance (14,15). In a study conducted by Carney *et al.* in elderly patient with coronary artery disease, depressed patients were significantly less likely to be compliant to a prescribed regimen of prophylactic aspirin than nondepressed individuals as assessed by an electronic medication monitor (15). These investigators further postulated that poor adherence may be partially responsible for the increased morbidity and mortality seen in older depressed cardiac patients (16–18). It is possible that poor adherence to medication treatment regimens in depressed patients is a consequence of multiple factors, including a poor understanding of directions for medication use, however further study is necessary.

Unexpectedly, we did not find cognitive impairment to be associated with poor understanding of directions for medication use. Other investigators have found a relationship with cognitive impairment and poor knowledge as defined by being able to recite the name of medications (3,6,8), purpose of medications (3,6,8), dosage (3), and frequency (3). One possible explanation for this finding is that we employed multivariate statistical techniques and were able to adjust for the potential confounding effects of depression and age on cognitive impairment. In addition, we excluded patients with a diagnosis of severe cognitive impairment (e.g. a diagnosis of dementia) who would be more likely not to understand directions for medication use and those who may have been cognitively impaired but reported receiving assistance with medication administration prior to admission. Thus, the failure to find a relationship between cognitive impairment and medication knowledge may reflect a selection bias in this study sample. The possibility does exist that the MMSE is not sensitive to changes in cognition that are important for understanding medication-related information. We would still encourage a thorough assessment of medication knowledge and management at the time of discharge in patients with mild cognitive deficits especially if they are self-administering medications.

Although these findings may not be generalizable to the outpatient setting, there is evidence to suggest that older depressed patients should be a focus of future research efforts. The high prevalence of both depression and cognitive impairment in this sample of hospitalized elders suggests that it will be difficult to provide adequate medication information and improve medication understanding. Strategies need to be developed to improve knowledge in the older, depressed hospitalized patient who frequently experiences multiple alterations in medication regimens at hospital discharge.

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