

# Characterizing Caregiver-Mediated Medication Management in Patients with Memory Loss

## ABSTRACT

Increasingly, family members are assisting with the complex task of medication management when patients are experiencing cognitive decline. To date, limited published research addresses caregiver-mediated medication management of patients with impaired cognition. Thus, the purpose of this study was to describe the characteristics and correlates of caregiver-mediated medication management in community-dwelling patients with memory loss. We used baseline data from the 91 patient-caregiver dyads participating in a randomized controlled trial designed to assist caregivers of patients with memory loss with medication management. The patient's level of cognitive impairment was not related to medication errors; however, the number of medications that patients were prescribed and taking was related to medication errors. Important factors to consider when discussing medication management with caregivers of patients with memory loss include the caregiver's age, cognitive ability, and depressive symptoms, as well as the caregiver's perception of the impact of the patient's behavioral problems.

A critical component of chronic illness management for many older adults is medication management, a process that often becomes increasingly complex due to the number of drugs that are prescribed because of multiple comorbid conditions, different routes of administration, and variable times when the drugs are to be taken. For individuals with dementia, medication management becomes more problematic as their cognitive impairment

increases. Others, often family members, are required to assist these individuals with medication management (Winblad et al., 2007). Caregivers become responsible for administering and managing the patient's medications; however, both caregivers and patients can make medication errors potentially leading to adverse events, including unplanned physician visits, visits to the emergency department, and hospitalizations (Orwig, Brandt, & Gruber-Baldini, 2006).

Medication errors or other deficiencies in medication management can occur because of incorrect knowledge about the medication and its purpose, including the correct dose, the time(s) of administration, and how to safely administer the drug. Additionally, deficiencies occur because someone forgets, pills are dropped or hidden in pockets, or pills are not taken, among other issues (Mager & Madigan, 2010). Patients may take drugs that have not been prescribed or are no longer prescribed, resulting in errors that potentially lead to adverse events.

Research shows that many older community-dwelling adults manage their own medications; some live alone with little support for medication management and some have varying degrees of cognitive decline (Ruscini & Semla, 1996). They may not understand the information that they have received concerning their medications. When asked, older adults who are managing their own medications believe that they are doing this correctly. However, remembering to take one's daily medications can be taxing (Hughes, 2004). In a Swedish study of medication taking

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among community-dwelling adults older than 77, 61.4% had physical, visual, or cognitive impairments that were statistically significantly related to their self-reported ability to manage medications (Beckman, Parker, & Thorslund, 2005). Having help from a spouse did not preclude difficulties in managing medications. Although caregivers could assess how well the patient with cognitive impairment managed medications and adherence was at an acceptable level, caregivers are not always able to select other effective strategies for promoting adherence (Cotrell, Wild, & Bader, 2006).

Continuums of trust and control occur between caregivers and patients with memory loss during the process of medication management (Erlen & Happ, 2006). When caregivers trust that patients are taking their medications correctly, they exert little, if any,

control over that situation. Similarly, Kaasalainen et al. (2011) found that the severity of the patient's dementia influences medication management. Research is needed to more comprehensively address the complex nature of medication management in patients with cognitive decline and support the theoretical basis for interventions (Banning, 2009).

The purpose of this study was to describe the characteristics and correlates of caregiver-mediated medication management. Specifically, we examined the characteristics of a sample of patients with memory loss residing in the community and the caregivers who manage their medications. We described the medication deficiencies that occurred within the patient-caregiver dyad. We also examined potential predictors of medication-taking deficiencies.

## METHOD

This report includes baseline data collected as part of a larger randomized controlled trial designed to assist caregivers of patients with memory loss who were experiencing medication management problems. This study was supported by a program project grant (National Institutes of Health/National Institute of Nursing Research P01 NR010949, J. Dunbar-Jacob, principal investigator). We received approval from the participating university's Institutional Review Board prior to beginning the study. All caregivers provided informed consent; all patients who were able gave informed consent; and those who were unable to provide consent gave their assent to participate in the study following a discussion of the study with a member of the research team. We

collected data from the patients and caregivers in the home setting.

### Study Procedure

Participants were recruited from multiple community sites, geriatric practices, a memory disorders clinic, targeted mailing lists, and the patient registry through the participating university's Clinical and Translational Science Institute. We placed flyers advertising the study in pharmacies, libraries, and community centers. Interested caregivers contacted the research office to receive additional information about the study. We arranged a home visit to those caregivers and patients who met the initial screening criteria.

Our community outreach recruitment activities resulted in 183 individuals seeking information about the study. Of these, 173 patient-caregiver dyads were screened by telephone for possible inclusion. Ultimately, we enrolled 91 patient-caregiver dyads. Patients meeting the following criteria were included: have self- or caregiver-reported memory loss, reside in the community, have a family/informal caregiver, have a minimum of two comorbid conditions for which they are prescribed medications, and be unable to self-manage their medications. Family/informal caregivers of the patient needed to assist with medication management, speak English, and have access to a telephone. Patients not meeting the inclusion criteria had no caregiver who managed the medications, had paid caregivers, or were in a residential care setting. Refusals occurred because the study required too much time, the patient declined or would not assent, or the patient's health declined rapidly prior to screening.

Caregivers—and patients when possible—completed questionnaires and interviews during the home visit. Caregivers also completed an additional booklet of questionnaires, returning it to the research office via mail. Telephone follow up by one of

the research staff was done in an attempt to collect any missing data. The data collected during this first visit and the questionnaires that were returned by mail comprised the baseline data.

### Measures

The Mini-Mental State Examination (MMSE, Folstein, Folstein, & McHugh, 1975) was used to assess the level of cognitive functioning of the patients. The MMSE has demonstrated concurrent validity with the Wechsler Adult Intelligence Scale and test-retest reliability at 24 hours ( $r = 0.89$ ) and at 29 days ( $r = 0.98$ ) (Folstein, Folstein, McHugh, & Fanjiang, 2001).

Sociodemographic information was collected on both patients and caregivers using a questionnaire developed for the University of Pittsburgh School of Nursing Center for Research in Chronic Disorders (CRCD) (Sereika & Engberg, 2006). The Co-Morbidity Questionnaire, also developed for the CRCD, was used to assess the number and type of comorbidities and the impact of those conditions on quality of life, as well as symptom information. For this study we only report the total number of comorbid conditions of the patient and the caregiver.

Health literacy was assessed using the Newest Vital Sign (Weiss et al., 2005), a brief health literacy screening instrument that has a correlation of 0.59 with the Test of Functional Health Literacy in Adults and uses a nutrition label with six questions to assess numeracy and comprehension. The reported Cronbach's alpha coefficient is 0.76.

The working memory of the caregiver was assessed using the Blessed Orientation–Memory–Concentration Test (Katzman et al., 1983), a 6-item version of the Blessed Dementia Scale (Blessed, Tomlinson, & Roth, 1968). The tool has shown good test-retest reliability and convergent validity (Langley, 2000). Scores of 0 to 8 suggest normal or minimal impairment, 9 to 19 moder-

ate impairment, and 20 to 33 severe impairment (Katzman et al., 1983).

The Hassles Subscale of the Combined Hassles and Uplifts Scale (Lazarus & Folkman, 1989) was used to assess daily hassles that are considered sources of stress. The Combined Hassles and Uplifts scale has 53 Likert scale items of *none* or *did not occur* to *extremely severe*. Reliability assessed by the stability of the measure from Month 1 to Month 5 has been reported as 0.72 ( $p < .001$ ) (DeLongis, Folkman, & Lazarus, 1988).

The 24-item Revised Memory and Behavior Problems Checklist was used to assess the frequency of any patient aggressive/disruptive behaviors as identified by the caregiver and the caregiver's reactions to those behaviors (Teri et al., 1992). Higher scores indicate that the patient is demonstrating more disruptive behaviors. The Cronbach's alpha coefficient ( $n = 201$  caregivers) for the total behavior problems scale is 0.84 and 0.90 for the total reaction score.

The Chronic Disease Self-Efficacy Scale (P. Ritter & K. Lorig, personal communication, September 10, 2009) was used to assess the caregiver's confidence in completing selected activities. This 7-item scale includes the original six items (Lorig et al., 1989), plus one item on communication with providers from the original scale. A 10-point scale ranging from *not at all confident* to *totally confident* is used to rate each item. Test-retest reliability coefficients range from 0.82 to 0.89 for the 6-item version. Internal consistency is 0.89 for the 7-item version (P. Ritter & K. Lorig, personal communication, September 10, 2009).

The Beck Depression Inventory-II (Beck, Steer, & Brown, 1996) was used to assess the caregiver's level of depressive symptoms. Scores of 10 to 15 reflect mild depressive symptoms, 16 to 23 reflect moderate depressive symptoms, and 24 to 63 reflect severe depressive symptoms. Internal consistency ranges from 0.73 to 0.92 with a mean of 0.86.

TABLE 1

## CHARACTERISTICS OF THE SAMPLE

Variable	Patients	Caregivers		
	(n = 91)	Total (n = 91)	Spouse n = 52 (57.1%)	Non-Spouse n = 39 (42.9%)
	Mean	Mean	Mean	Mean
Age (years)	80.11	66.97	74.21	57.31
Formal education completed (years)	13.11	14.91	14.46	15.51
Number of medications	10.46	NA	NA	NA
Number of comorbidities	8.72	6.95	7.56	6.13
Health literacy <sup>a</sup>	NA	4.02	3.52	4.69
Cognitive assessment	17.58 <sup>b</sup>	2.97 <sup>c</sup>	3.10 <sup>c</sup>	2.79 <sup>c</sup>
Variable	n (%)	n (%)	n (%)	n (%)
Gender				
Women	54 (59.3)	64 (70.3)	32 (61.5)	32 (82.1)
Men	37 (40.7)	27 (29.7)	20 (38.5)	7 (17.9)
Race/ethnicity				
White	77 (84.6)	77 (84.6)	48 (92.3)	29 (74.4)
Black	7 (7.7)	9 (9.9)	1 (1.9)	8 (20.5)
Asian	2 (2.2)	1 (1.1)	1 (1.9)	0 (0.0)
Multi-racial	5 (5.5)	4 (4.4)	2 (3.8)	2 (5.1)

Note. NA = not assessed. There were statistically significant differences between spouse and non-spouse caregivers with respect to caregiver's gender ( $p = 0.039$ ), race ( $p = 0.009$ ), age ( $p < 0.001$ ), total number of people in household ( $p < 0.001$ ), and health literacy ( $p = 0.002$ ). There were marginally significant differences between spouse and non-spouse caregivers with respect to number of diagnosed comorbidities ( $p = 0.065$ ) and vigilance (hours on duty) ( $p = 0.059$ ).

<sup>a</sup> Assessed via Newest Vital Sign (Weiss et al., 2005).

<sup>b</sup> Assessed via Mini-Mental State Examination (Folstein, Folstein, & McHugh, 1975).

<sup>c</sup> Assessed via Blessed Orientation–Memory–Concentration Test (Katzman et al., 1983).

The Caregiver Vigilance Scale (Mahoney et al., 2003) assessed caregiver perceived oversight demand that was validated using findings from the Resources for Enhancing Alzheimer's Caregivers' Health project (Schulz et al., 2003). We included only scores for Item C reflecting what caregivers reported as the total number of hours on duty per day.

The total score from the 35-item Problem Solving Inventory (Hepner & Peterson, 1982) assessed the caregiver's perceptions of his or her capabilities with regard to problem-solving behaviors and attitudes. Lower scores on this measure suggest better problem-solving skills. The Cronbach's alpha

coefficient is approximately 0.90 for the total inventory.

The total score from the Interpersonal Support Evaluation List (Cohen & Hoberman, 1983) was used to evaluate the impact of perceived availability of social support resources. Higher scores equate with better social support. Cronbach's alpha coefficients range from 0.88 to 0.90.

The outcome of medication deficiencies was assessed using three measures. The Medication Management Instrument for Deficiencies in the Elderly (MedMaIDE) assesses three areas: knowledge of medications, how to take medications, and how to procure medications (Orwig et al., 2006). The maximum total de-

ficiency score is 13. The Cronbach's alpha coefficient has been reported as 0.71 in a sample of 50 older adults, with a test-retest reliability of 0.93 (Orwig et al., 2006). The medications the patient was taking or was prescribed were identified as part of the MedMaIDE. The total number of medications—both prescribed and over the counter—reported by the caregiver was used in this study.

The Medication Deficiency Checklist, an investigator-developed instrument, was used to identify specific deficiencies. The total number of errors and the specific errors reported by the caregiver were used in this study. Examples of items included "chewing pills or capsules," "wrong

TABLE 2

## ASSOCIATIONS WITH MEDICATION DEFICIENCIES

Variable	n (%)	Deficiencies Assessed by MedMalDE	Deficiencies Assessed by Medication Deficiency Checklist	Deficiencies Assessed by Reconciliation	
				Pearson <i>r</i>	Spearman <i>r<sub>s</sub></i>
Caregiver's relationship to patient		<i>r</i> = 0.044 <i>p</i> = 0.683	<i>r</i> = -0.080 <i>p</i> = 0.454	<i>r</i> = 0.048 <i>p</i> = 0.674	<i>r</i> = 0.005 <i>p</i> = 0.966
Spouse, Mean (SD)	52 (57.1)	0.75 (0.79)	2.79 (1.79)	1.52 (2.26)	1.0 (2.00) <sup>a</sup>
Non-spouse, Mean (SD)	39 (42.9)	0.68 (0.70)	3.08 (1.84)	1.32 (1.77)	1.0 (2.00) <sup>a</sup>
	<b>Mean (SD)</b>				
MMSE	17.58 (7.50)	<i>r</i> = 0.004 <i>p</i> = 0.967	<i>r</i> = 0.067 <i>p</i> = 0.531	<i>r</i> = 0.198 <i>p</i> = 0.086	<i>r</i> = 0.180 <i>p</i> = 0.120
Number of hassles	24.12 (10.14)	<i>r</i> = -0.080 <i>p</i> = 0.476	<i>r</i> = 0.110 <i>p</i> = 0.324	<i>r</i> = -0.190 <i>p</i> = 0.110	<i>r</i> = -0.076 <i>p</i> = 0.526
Severity of hassles	1.50 (0.44)	<i>r</i> = 0.038 <i>p</i> = 0.737	<i>r</i> = 0.045 <i>p</i> = 0.685	<i>r</i> = -0.040 <i>p</i> = 0.737	<i>r</i> = -0.105 <i>p</i> = 0.382
Hours on duty	16.50 (9.14)	<i>r</i> = -0.124 <i>p</i> = 0.245	<i>r</i> = 0.044 <i>p</i> = 0.678	<i>r</i> = 0.038 <i>p</i> = 0.744	<i>r</i> = -0.061 <i>p</i> = 0.596
RMBPC total—reaction	25.12 (16.74)	<i>r</i> = 0.031 <i>p</i> = 0.777	<i>r</i> = 0.250 <i>p</i> = 0.018	<i>r</i> = 0.172 <i>p</i> = 0.133	<i>r</i> = 0.197 <i>p</i> = 0.083
RMBPC total—frequency	34.49 (13.82)	<i>r</i> = 0.105 <i>p</i> = 0.331	<i>r</i> = 0.191 <i>p</i> = 0.073	<i>r</i> = 0.225 <i>p</i> = 0.048	<i>r</i> = 0.153 <i>p</i> = 0.182
Self-efficacy <sup>b</sup>	7.25 (2.03)	<i>r</i> = 0.014 <i>p</i> = 0.903	<i>r</i> = -0.175 <i>p</i> = 0.113	<i>r</i> = 0.179 <i>p</i> = 0.132	<i>r</i> = 0.095 <i>p</i> = 0.427
Depressive symptoms	9.81 (7.79)	<i>r</i> = 0.006 <i>p</i> = 0.953	<i>r</i> = -0.025 <i>p</i> = 0.817	<i>r</i> = -0.202 <i>p</i> = 0.076	<i>r</i> = -0.094 <i>p</i> = 0.413
Problem solving total	87.40 (23.37)	<i>r</i> = 0.103 <i>p</i> = 0.362	<i>r</i> = 0.025 <i>p</i> = 0.789	<i>r</i> = 0.135 <i>p</i> = 0.267	<i>r</i> = 0.094 <i>p</i> = 0.437
ISEL total	84.34 (18.16)	<i>r</i> = -0.131 <i>p</i> = 0.243	<i>r</i> = -0.103 <i>p</i> = 0.357	<i>r</i> = 0.255 <i>p</i> = 0.032	<i>r</i> = 0.119 <i>p</i> = 0.322
Working memory of the caregiver <sup>c</sup>	2.97 (2.93)	<i>r</i> = 0.291 <i>p</i> = 0.005	<i>r</i> = -0.038 <i>p</i> = 0.718	<i>r</i> = 0.112 <i>p</i> = 0.329	<i>r</i> = 0.103 <i>p</i> = 0.368
Caregiver age (years)	66.97 (12.17)	<i>r</i> = 0.049 <i>p</i> = 0.644	<i>r</i> = -0.228 <i>p</i> = 0.030	<i>r</i> = 0.008 <i>p</i> = 0.945	<i>r</i> = -0.026 <i>p</i> = 0.821
Caregiver educational level (years)	14.91 (3.31)	<i>r</i> = -0.124 <i>p</i> = 0.245	<i>r</i> = 0.101 <i>p</i> = 0.342	<i>r</i> = -0.173 <i>p</i> = 0.129	<i>r</i> = 0.039 <i>p</i> = 0.732
No. of medications taken by the patient	10.47 (5.30)	<i>r</i> = 0.073 <i>p</i> = 0.494	<i>r</i> = 0.233 <i>p</i> = 0.026	<i>r</i> = 0.311 <i>p</i> = 0.006	<i>r</i> = 0.337 <i>p</i> = 0.003
Health literacy <sup>d</sup>	4.02 (1.81)	<i>r</i> = -0.124 <i>p</i> = 0.244	<i>r</i> = 0.119 <i>p</i> = 0.260	<i>r</i> = -0.173 <i>p</i> = 0.130	<i>r</i> = -0.071 <i>p</i> = 0.536
MedMalDE deficiencies	0.72 (0.75)				
Medication Deficiency Checklist deficiencies	2.91 (1.81)	<i>r</i> = -0.160 <i>p</i> = 0.132			
Reconciliation deficiencies	1.44 (2.06)	<i>r</i> = 0.315 <i>p</i> = 0.005	<i>r</i> = 0.226 <i>p</i> = 0.047		

Note. MedMalDE = Medication Management Instrument for Deficiencies in the Elderly; MMSE = Mini-Mental State Examination; RMBPC = Revised Memory and Behavior Problems Checklist; ISEL = Interpersonal Support Evaluation List.

<sup>a</sup> Denotes median and interquartile range; <sup>b</sup> 7-item version of Chronic Disease Self-Efficacy Scale; <sup>c</sup> Assessed via Blessed Orientation–Memory–Concentration Test; <sup>d</sup> Denotes number of correct answers.

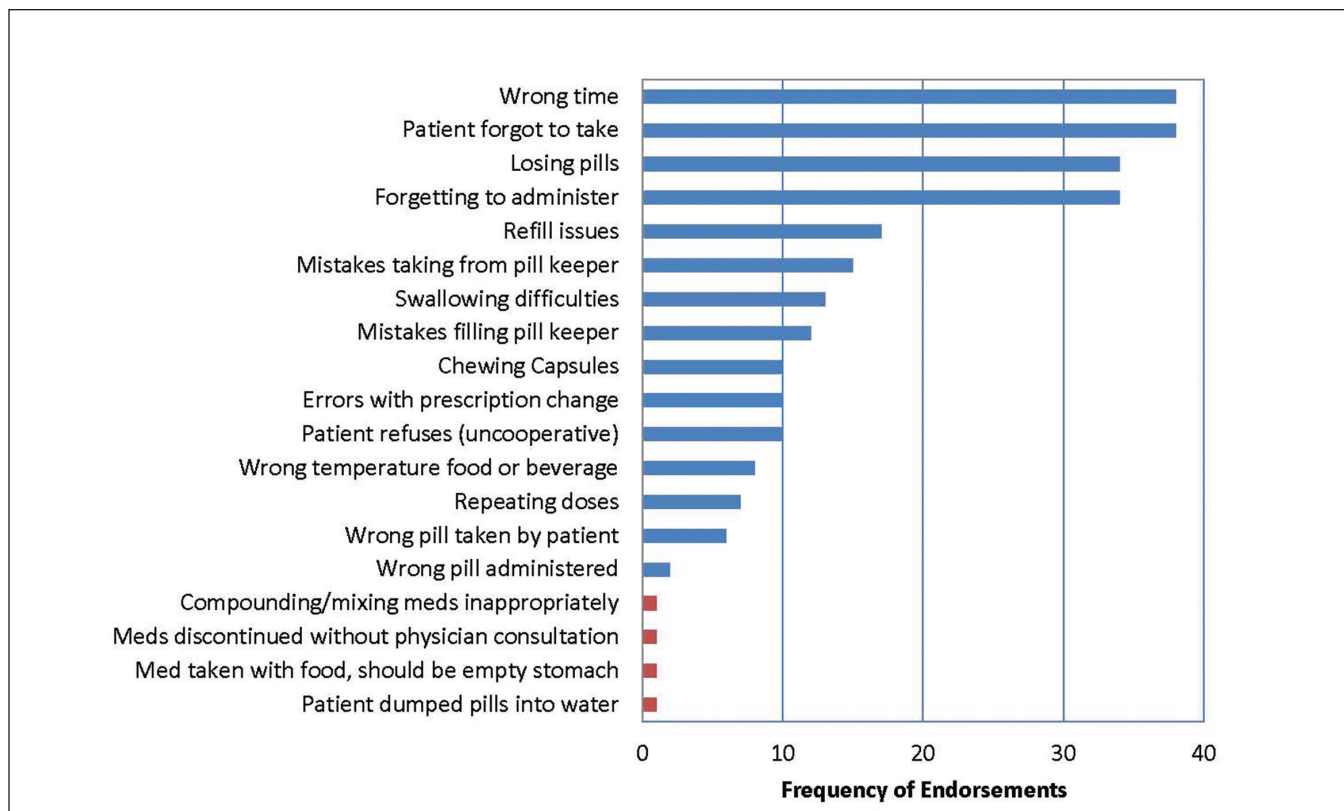


Figure. Reported medication deficiencies.

Note.  $N = 91$  caregivers, 258 deficiencies endorsed overall. Caregivers were to report all applicable items. Items in red denote additional items reported but not listed on the checklist.

time,” “repeating doses,” and “patient refuses/uncooperative.”

We used an investigator-developed Medication Reconciliation Form to compare medications reported by the caregiver with the patient’s health record. This process identified medications that were prescribed and not being taken by the patient, medications that were being taken and not prescribed by the primary care provider, and whether the dosing was correct. The total number of reported inaccuracies was used in this study.

#### Data Analysis

SPSS version 20.0 was used for data analysis; the level of significance was set at 0.05 for two-sided hypothesis testing. Data were described for the total sample, by participant type (i.e., patient or caregiver), and for caregiver by type of caregiver (i.e., spouse or non-spouse) using standard descriptive statistics considering the variable’s level of measurement and observed data distribution.

Group comparative statistics (two sample  $t$  tests and Mann-Whitney  $U$  tests) were used to compare spouse and non-spouse caregivers on selected caregiver characteristics. Bivariate correlational analyses (i.e., Pearson product-moment correlations, Spearman rank-order correlations) were performed to examine associations among the outcome variables based on the MedMaIDE, Medication Deficiencies Checklist, and Medication Reconciliation Form and with the selected predictors of interest. Regression analyses were performed using a backward elimination algorithm with the  $p$  value for removal of candidate predictor variables set at  $p = 0.10$ .

#### FINDINGS

This study included baseline data from all patients ( $n = 91$ ) and caregivers ( $n = 91$ ). Patients were primarily White (85%); approximately 60% were women. Patients on average were 80 years old, had 13 years

of formal education, and had an average MMSE score of 17.58. Patients had an average of 9 comorbid conditions and took slightly more than 10 medications (Table 1). A total of 63 patients (69%) were prescribed a cognitive-enhancing medication, with half ( $n = 32$ ) taking two cognitive-enhancing medications. Only 6 patients used the patch form of the medication.

Caregivers were 70% women with an average age of 67 and nearly 15 years of education. More than half were spouses who were nearly 20 years older than non-spouse caregivers. Caregivers had an average of 7 comorbid conditions. Overall health literacy was good; the health literacy of non-spouse caregivers was higher than spouse caregivers (Table 1).

Caregivers identified an average of 24.12 (range = 1 to 44) hassles and an average of 34.49 (range = 11 to 84) memory and behavioral problems experienced when caring for a patient with memory loss. They re-

TABLE 3

## MULTIPLE LINEAR REGRESSION RESULTS FOR THE OUTCOME VARIABLE OF INTEREST

Predictor Variable	Outcome Variable		
	Deficiencies assessed by MedMaIDE (n = 90)	Deficiencies Assessed by Medication Deficiency Checklist (n = 89)	Deficiencies Assessed by Reconciliation (n = 70)
Working memory of the caregiver <sup>a</sup>	b = 0.074, SE = 0.026 95% CI = [0.023, 0.126] beta = 0.291 p = 0.005		
RMBPC total—reaction		b = 0.027, SE = 0.011 95% CI = [0.005, 0.049] beta = 0.246 p = 0.018	
Caregiver's age (years)		b = -0.033, SE = 0.015 95% CI = [-0.062, -0.003] beta = -0.221 p = 0.033	
Number of medications taken by the patient			b = 0.165, SE = 0.049 95% CI = [0.067, 0.263] beta = 0.370 p = 0.001
Depressive symptoms <sup>b</sup>			b = -0.054, SE = 0.026 95% CI = [-0.105, -0.003] beta = -0.214 p = 0.040
Problem solving			b = 0.028, SE = 0.011 95% CI = [0.005, 0.051] beta = 0.289 p = 0.016
Model summary statistics			
R <sup>2</sup>	0.085	0.111	0.220
Adjusted R <sup>2</sup>	0.074	0.091	0.185
s	0.72	1.73	1.89

Note. b = unstandardized regression coefficient; SE = standard error for b; CI = confidence interval; beta = standardized regression coefficient; s = standard error of the estimate; MedMaIDE = Medication Management Instrument for Deficiencies in the Elderly; RMBPC = Revised Memory and Behavior Problems Checklist.

<sup>a</sup> Assessed via total score of Blessed Orientation–Memory–Concentration Test.

<sup>b</sup> Assessed via total score of Beck Depression Inventory-II.

ported being on duty with the patient for slightly more than 16 hours each day; some caregivers stated they were on duty 24 hours per day. Overall, caregivers expressed a minimal level of depressive symptoms and a moderate level of social support. Caregivers reported a moderately high level of self-efficacy and a moderate level of problem-solving ability (Table 2).

The number of deficiencies identified using the MedMaIDE was small;

however, 55.6% (n = 50 of 90) of the sample had at least one error. An average of three deficiencies were reported using the Medication Deficiency Checklist with 84 dyads (92.3%) identifying at least one deficiency. Errors were identified during medication reconciliation in 44 of 78 dyads with completed data (56.4%) (Table 2). The most frequent errors reported by caregivers included taking medications at the wrong time, the patient forgetting

to take the medication, losing the pills, and issues related to refilling prescriptions. Infrequently reported errors were mixing medications inappropriately, discontinuing medications without physician consultation, not taking medication on an empty stomach, and patient dumping the pills into water (Figure).

Our analysis of potential predictors of medication deficiency outcomes revealed few small to moderate

statistically significant associations. Poorer caregiver cognitive functioning was related to more errors reported on the MedMaIDE. Caregiver age was negatively related to deficiencies on the Medication Deficiency Checklist. Number of medications was positively related to the number of deficiencies on the checklist and errors identified through medication reconciliation; taking more medications was related to more errors. Reconciliation deficiencies were positively associated with deficiencies on the MedMaIDE and on the Medication Deficiency Checklist (Table 2).

Regression analysis demonstrated that caregiver cognitive functioning predicted deficiencies identified using the MedMaIDE and explained 8.5% of the variance. Caregiver age and behavioral problems total reaction score predicted 11.1% of the errors reported on the Medication Deficiency Checklist. Caregiver depressive symptoms, number of medications taken by the patient, and problem solving explained 22% of the variance when assessing errors through medication reconciliation (Table 3).

## DISCUSSION

Our study addressed both the characteristics and correlates of caregiver-mediated medication management when patients living in the community are experiencing memory loss. On average, patients were 80 years old and had moderate cognitive impairment. Given that patients had nearly nine comorbidities, it is not surprising that they were taking an average of 10 different medications. As expected, caregivers were primarily women with more than half being spouses. Caregivers were managing their own multiple comorbidities, as well as those of the patient. The burden of providing care and medication management was clearly evident, given the number of daily hassles and patient behavior problems reported. Additionally, caregivers indicated that they were “on duty” for much of the day.

## KEYPOINTS

Erlen, J.A., Lingler, J., Sereika, S.M., Tamres, L.K., Happ, M.B., & Tang, F. (2013). *Characterizing Caregiver-Mediated Medication Management in Patients with Memory Loss*. *Journal of Gerontological Nursing, 39*(4), 30-39.

- 1 Medication management poses a range of challenges and contributes to burden among caregivers.
- 2 Comprehensive assessment of medication management deficiencies requires multiple means of measurement.
- 3 Comprehensive assessment can serve to prioritize areas for nursing intervention to promote safe and effective medication management.
- 4 When addressing medication management deficiencies, nurses should consider not only the health status of patients but of caregivers as well.

Given these findings, along with the frailty of the patients and the number of medications that patients were taking, our caregivers demonstrated that medication management—when patients have memory loss—is burdensome and complicated by the patient’s physical, behavioral, and cognitive problems, supporting work by Kaasalainen et al. (2011).

We also found that more than one instrument is needed to accurately portray the occurrence of medication errors. The MedMaIDE is primarily a tool that can be used to assess the process of medication management with limited information used in the scoring of errors. Although the MedMaIDE provides information about the caregiver’s knowledge of the patient’s medications, there is no information about specific types of errors or whether the medications that the patient is taking are the correct medications. Thus, our research team developed two instruments to collect this additional information that is critical to managing a patient’s medications: the Medication Deficiency Checklist and the Medication Reconciliation Form. More comprehensive descriptive information was identified using the Medication Deficiency Checklist in the form of specific errors endorsed by caregivers.

Consistent with prior research, taking medications at the wrong time, forgetting to take medications, and losing pills were frequently cited errors (Erlen & Happ, 2006; Mager & Madigan, 2010). Errors of filling prescriptions and taking medication at the wrong time could be related to the increasing caregiver burden. Although not explaining much of the variance of medication deficiencies, the predictors that we identified are key elements to target for intervention when assisting caregivers who are managing the medications of a family member with memory loss.

## LIMITATIONS

Our study has several limitations. First, there may be a potential bias inherent in the sample of patient-caregiver dyads in this study. We recruited our sample through community venues relying on self-report rather than clinical diagnosis as the determination of memory loss. Without a clinical diagnosis, we cannot confirm the absence of confounding conditions such as delirium and depression. In addition, it is possible that our response rate was hindered because individuals may have been reluctant to endorse memory problems and/or medication concerns. Consequently, our sample may have



been biased toward caregivers who have already experienced what we have previously described as a “triggering” event, suggesting the need to change medication management strategies (Erlen & Happ, 2006).

Second, the study was descriptive and cross-sectional using only baseline data from a randomized controlled trial. Thus, the data provide only a snapshot of caregiver-mediated medication management.

Third, the investigators had to develop measures to more fully describe the range of medication errors occurring in this patient population. These instruments have content validity; however, they have not yet undergone extensive psychometric testing. Lastly, there are instances where data are missing, so number of participants may be different. We did not impute data for these participants.

## DIFFUSION INTO PRACTICE

Our findings underscore the need to use multiple methods to comprehensively assess medication management in patients with memory loss. Each of our measures assessing medication errors or deficiencies provided information about only one component of medication management. For example, the MedMaIDE provided information about the knowledge component of managing medications: knowing what the drug is and why it is being administered. Although important and necessary, knowledge is insufficient. Errors occurring during medication administration are another important component. Thus, using a checklist of different types of errors also provides valuable information to guide care.

Similarly, when reconciliation does not regularly occur, caregivers could be giving incorrect drugs or doses. Some prescriptions may not have been filled or refilled and the patient is not receiving a medication that was prescribed. We learned that reconciliation needs to include both the prescribed and over-the-counter medications that patients may be taking. Without a com-

prehensive review, patients could be taking medications that interfere with the action or potentiate the effect of a prescribed drug, with both of these actions resulting in possible adverse outcomes for the patient. Assessing medication deficiencies using multiple measures provides information about the various components of medication taking among patients with memory loss—prescription, acquisition, organization, preparation, and administration (Erlen & Happ, 2006)—and goes beyond just asking whether the patient is taking his or her pills.

Given the frailty of the caregivers, particularly those who are spouses, thoroughly assessing the caregiver’s physical and mental level of functioning is important. Caregivers have their own health issues for which they also may be taking medications. This increases the complexity of medication management and may limit the caregiver’s ability to manage the patient’s medications. Caregivers may be reluctant to talk about the totality of issues that they are experiencing, feeling that others expect them to do this work as it is the role of the spouse or the adult child to provide such care (Beckman et al., 2005).

National efforts to decrease medication errors exist within health care organizations because of the adverse effects of these errors on patient outcomes. The Agency for Healthcare Research and Quality (<http://www.ahrq.gov>) has directed considerable attention toward preventing and reducing medication errors. Health care organizations are developing educational programs for their staff, as well as protocols for the safe administration of medications. Taking this initiative one step further suggests that nurses can implement clinical guidelines, such as those put forth by the American Geriatrics Society (AGS Beers Criteria, [http://www.americangeriatrics.org/health\\_care\\_professionals/clinical\\_practice/clinical\\_guidelines\\_recommendations/2012](http://www.americangeriatrics.org/health_care_professionals/clinical_practice/clinical_guidelines_recommendations/2012)) to assess and promote safe medication management in the home when patients have cog-

nitive impairment and work toward evaluating the appropriateness and reducing the number of medications that are prescribed.

Similar attention also needs to be directed toward family caregivers of community-dwelling patients with memory loss. Caregivers may not be well informed about safe medication management. Thus, nurses need to begin the conversation about medication management with family caregivers when patients are being seen in primary care, as well as when patients are being discharged from an acute care facility. All too often, assumptions are made that caregivers will know what to do and how to help their family member with medication taking. That may be true if the person does not have any significant cognitive impairment. However, as our findings showed, caregivers experience their own cognitive decline, as well as burden associated with caregiving given their own comorbidities and increasing age, with the result that errors can occur.

Our study demonstrated that there is a range of medication deficiencies, suggesting that nurses need a multi-pronged approach to assist caregivers, including establishing a supportive relationship with the caregiver and the patient and assessing the caregiver’s situation related to the medication management of a patient with memory loss. Sufficient time needs to be provided to identify and understand the patient-caregiver dyad’s specific issues and concerns. Together, the nurse and caregiver need to develop a plan of action, which is more than the provision of information. By demonstrating specific interventions that caregivers can use to help patients with medication taking, nurses can assist caregivers to increase their problem-solving skills and level of confidence in managing medications.

## CONCLUSION

Our study shows that the severity of the patient’s memory loss was unrelated to medication deficiencies; however, the number of medications

that patients were prescribed and taking was associated with medication deficiencies. The greater the number of medications that were being taken, the greater the likelihood of an error occurring. Important factors to consider when discussing medication management with caregivers of patients with memory loss include the caregiver's age, cognitive ability, and depressive symptoms, as well as the caregiver's perception of the impact of the patient's behavioral problems.

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