Reduced Ability to Self-Administer Medication Is Associated With Assisted Living Placement in a Continuing Care Retirement Community

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Objective: To examine whether reduced ability to self-administer medication can accurately classify living placement (independent or assisted living) in a continuing care retirement community (CCRC).

Design: Convenience sample of consecutive patients seen in a medical clinic.

Setting: An outpatient medical clinic at a CCRC.

Participants: A group of 78 consecutive patients (aged 68–98 years) scheduled for a geriatric medical evaluation between May 1, 2001, and August 31, 2001, residing in an independent (IL) or assisted living (AL) apartment.

Measurements: Ability to self-administer medication was assessed by asking residents to respond to a medication administration question based on a 5-point Likert scale. Residents were also given measures of cognitive status (MMSE), activities of daily living (ADL), and depression (GDS). Further, age of residents as well as number of falls within the previous 6 months were recorded.

Results: A discriminant function analysis accurately classified living placement (IL or AL) in 89.7% of the cases based on the ability of residents to self-administer medication. The additions of MMSE score, ADL performance, GDS score, number of falls, and age of the residents to the analyses did not improve the number of cases that were correctly classified.

Conclusion: Ability to self-administer medication emerged as the main predictor of current living environment within the CCRC in the present study. These results underscore the importance of considering a resident’s ability to independently manage his or her medications when placement decisions are being made within CCRCs. (J Am Med Dir Assoc 2005; 6: 246–249)

Keywords: Assisted living; continuing care retirement community; medication self-administration

Over the past decade, continuing care retirement communities (CCRC) have grown in popularity among older adults because of the broad range of living options and health care services that the facilities offer. CCRCs typically provide a lifelong assurance for care along a continuum of living environments including independent living (IL), assisted living (AL), and nursing home care (NH); this range of care allows for residents to move from one setting to another within the community based on their healthcare needs. AL commonly provides personal care services such as help with medication management, meal preparation, housekeeping, and transportation for people who live in their own apartment within a CCRC.

Placement decisions within CCRCs can be difficult for all individuals involved, including potential residents and their families as well as facility administrators, primary physicians, social workers, and other health care personnel. In addition to the multitude of emotions such choices can evoke, establishing the appropriate level of care can be a complicated task because of the lack of clear and consistent guidelines and objective measures for determining such placements. Although modest attention has been given to predictors of NH placement within the literature, there has been little to no research on factors associated with AL placement.

Residents in assisted living are often provided supervision and care as a result of some loss in functional capacity, such as difficulties with medication management. Our clinical observations indicate that the ability to self-administer medication is reduced in AL residents as compared with IL residents. Further, there is a body of literature suggesting that medication
management skills deteriorate with age among older adults both with and without documented cognitive decline.11–17

Thus, the primary goal of this study was to determine the degree to which ability to self-administer medication accurately classifies level of care (IL or AL) in a CCRC. In addition to medication management skills, the authors examined the influences of cognition, function, depression, age, and number of falls within the previous month on a resident’s living placement. It was hypothesized that medication management skills, over and above the additional independent variables, would emerge as the best predictor of current living placement.

METHODS

Participants

Seventy-eight consecutive outpatients (aged 68 to 98 years) scheduled for a geriatric medical evaluation between May 1, 2001, and August 31, 2001, were included in the study. Participants were residents in a CCRC and inhabiting either an independent (n = 34) or assisted living (n = 44) apartment. All participants were white, 71.8% were female, and 75.6% were widowed. The average number of daily prescription pills taken by participants was 8.2. This study was approved by the Institutional Review Board at the University of Medicine and Dentistry of the New Jersey School of Osteopathic Medicine prior to data collection.

Measures

Independent Variables

A trained geriatric nurse who was blind to placement (IL or AL) and the study’s main hypothesis administered all study measures. Ability to self-administer medication was assessed by asking residents to respond to a medication administration question (MAQ) based on a 5-point Likert scale (Table 1). To ensure the accuracy of the residents’ responses, the trained nurse also reviewed each participant’s chart and read all notes pertaining to medication management. If a resident’s response conflicted with the medical chart notes, the response was changed to correctly reflect their medication management skills. Cognitive status was evaluated with the Mini-Mental State Exam.18 Katz’s Index of Activities of Daily Living (ADL) was used to assess 6 activities of daily living (bathing, dressing, toileting, transfer, continence, and feeding) based on a 3-point scale (1 = full function, 2 = moderate impairment, 3 = severe functional impairment); thus, total scores on the ADL can range from 6 (independent) to 18 (dependent). Depressive symptoms were screened with the 15-item Geriatric Depression Scale (GDS).20 Further, the nurse recorded each resident’s age in years as well as his or her reported number of falls within the previous month.

Dependent Variable

Living placement (IL or AL) was based on an interdisciplinary team assessment including a geriatric physician, clinical social worker, physical therapist, and nurse. Because there were a few residents residing in an IL apartment who did not want to move the recommended AL setting, the interdisciplinary team’s placement recommendation was used as the dependent variable as opposed to a resident’s actual living environment.

Statistical Analyses

Descriptive statistics, including mean scores and standard deviations, were calculated for each of the 6 independent variables. Student t tests were then run to test for differences in scores between IL and AL across the 6 independent variables. Next, 6 discriminant function analyses (DA) were run to identify which of the 6 independent variables best predicted current living placement; a separate DA was run for each predictor variable. Independent variables that correctly classified living placement in more than 75% of the cases were then placed into a single stepwise discriminant function analysis to determine the overall predictability of the combined independent variables. SPSS 9.0 (SPSS, Chicago, IL) for Windows was used for all data entry and analyses.

Table 1. Medication Administration Question

| 2. Needs reminding to take medications and/or requires assistance with medication reordering. | 2. Needs reminding to take medications and/or requires assistance with medication reordering. |
| 3. Is able to take medications from a prepared weekly medication box (prepared by self, family, or pharmacy). | 3. Is able to take medications from a prepared weekly medication box (prepared by self, family, or pharmacy). |
| 4. Requires 100% assistance with medication administration and has illness occasionally monitored by a registered nurse (ie, blood pressure checks, PRN pain medication). | 4. Requires 100% assistance with medication administration and has illness occasionally monitored by a registered nurse (ie, blood pressure checks, PRN pain medication). |
| 5. Requires 100% assistance with medication administration and has a condition that requires 24-hour supervision of by healthcare personnel |

Table 2. Descriptive Statistics by Living Placement and Results of Student t Tests

<table>
<thead>
<tr>
<th>Living Placement</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAQ</td>
<td>IL</td>
<td>1.09</td>
<td>0.38</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>3.59</td>
<td>1.02</td>
</tr>
<tr>
<td>MMSE</td>
<td>IL</td>
<td>28.06</td>
<td>2.03</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>22.36</td>
<td>4.87</td>
</tr>
<tr>
<td>ADL</td>
<td>IL</td>
<td>7.53</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>11.48</td>
<td>4.14</td>
</tr>
<tr>
<td>GDS</td>
<td>IL</td>
<td>2.18</td>
<td>1.90</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>3.59</td>
<td>3.08</td>
</tr>
<tr>
<td>Age</td>
<td>IL</td>
<td>85.61</td>
<td>6.85</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>86.34</td>
<td>5.40</td>
</tr>
<tr>
<td>No. of falls in past 6 months</td>
<td>IL</td>
<td>.38</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>AL</td>
<td>.82</td>
<td>1.13</td>
</tr>
</tbody>
</table>

IL, independent living; AL, assisted living; MAQ, Medication Administration Question; MMSE, Mini-Mental State Examination; ADL, Index of Activities of Daily Living. GDS, Geriatric Depression Scale. NOTE: For IL, n = 34; for AL, n = 44.

† P < .001.

* P < .01.
Table 3. Predictability of Living Placement by Independent Variables: Results of Discriminant Function Analyses

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Cases Correctly Classified Out of the 78 Cases</th>
<th>Cases Correctly Classified, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAQ</td>
<td>70</td>
<td>89.7</td>
</tr>
<tr>
<td>MMSE</td>
<td>60</td>
<td>76.9</td>
</tr>
<tr>
<td>ADL</td>
<td>59</td>
<td>75.6</td>
</tr>
<tr>
<td>GDS</td>
<td>48</td>
<td>61.5</td>
</tr>
<tr>
<td>Age</td>
<td>52</td>
<td>66.7</td>
</tr>
<tr>
<td>No. of falls in past 6 months</td>
<td>48</td>
<td>61.5</td>
</tr>
</tbody>
</table>

MAQ, Medication Administration Question; MMSE, Mini-Mental State Examination; ADL, Index of Activities of Daily Living; GDS, Geriatric Depression Scale.

RESULTS

Table 2 summarizes the means and standard deviations by living placement (IL or AL) for all independent variables: MAQ score, MMSE score, ADL score, GDS score, age, and number of falls within the previous 6 months. It should be noted that the mean MAQ score for IL residents was 1.09, whereas the mean MAQ score for AL residents was 3.59. Thus, the descriptive statistics revealed more impairment on the MAQ in AL residents as compared with IL residents.

The results of the Student t tests revealed significant differences between IL and AL residents with respect to the MAQ, MMSE, and ADL scores (Table 2); AL residents displayed more impairment in medication administration, cognition, and everyday function than IL residents.

DA results for the 6 independent variables are presented in Table 3. When performance on the medication administration question was entered into the DA as a single predictor variable, 89.7% of the participant cases were correctly classified (70 of the total 78 participant cases). MMSE correctly classified 76.9%, and ADL was an accurate predictor in 75.6% of the cases. GDS, age, and number of falls within the previous 6 months were not identified as significant predictors of living placement based on the relatively small number of cases (<75%) that were correctly classified.

All independent variables classifying more than 75% of the cases (MAQ, MMSE, and ADL) were then entered into 1 stepwise DA analysis; this equation resulted in 89.7% of the cases being correctly classified. The most parsimonious way to classify current living placement in our sample was based solely on MAQ scores, as the additions of MMSE and ADL scores to the DA equation did not increase the number of residents who were correctly classified. When a MAQ score of 2 was used as a cutoff for IL, a minimum number of misclassifications occurred: 8 misclassifications out of a total 78 cases.

DISCUSSION

Our findings suggest that medication management skills (over and above cognition, function, depression, age, and number of falls) are associated with current living placement within a CCRC. Residents requiring assistance with medica-

tion administration were more likely to be residing in an AL apartment as opposed to an independent residence. Moreover, a discriminant function analysis revealed that responses on the MAQ can be used to correctly classify approximately 90% of IL and AL cases.

It is not surprising that the ability to self-administer medication decreases as level of care increases based on our clinical observations of residents within CCRCs as well as in the current literature suggesting that medication management skills decline with age. In comparison with IL individuals, most AL residents require some degree of assistance with their medications, ranging from organizing weekly pillboxes to 100% administration by health care staff. Functional decline with respect to medication management, however, has not emerged as a common predictor of nursing home placement; this is likely a result of the severe functional impairments and constant health care needs of NH residents as opposed to the AL population. Although AL services provide for the supervision and care of people who have lost some degree of self-care capacity, AL settings maximize independence by filling a niche between IL situations and the high degree of care required by NH residents. Thus, AL environments occupy a unique position in the long-term care continuum that is distinct from NH care.

Given the paucity of research on AL in general, the findings from this project may serve to promote future studies within AL settings. For example, can the MAQ or some sort of medication administration task be used as an entrance interview/assessment to successfully place residents in a CCRC? In addition to the predictor variables used in this study, do other variables exist (eg, ethnicity, degree of medical illness) that predict AL placement? What variables differentiate AL residents from individuals requiring NH care? Additionally, the results of this study should be replicated within other CCRCs and with various resident populations (eg, Hispanic individuals, African Americans).

The authors are aware that the present study is preliminary in nature and has a number of limitations. First, the MAQ may not be the most optimal way to assess medication management skills. For instance, a follow-up study might observe residents attempting to administer their medications. Further, a trained geriatric nurse was permitted to change participants’ responses to the MAQ when participant self-reports conflicted with medical chart notes. The authors are aware of the potential for unintentional bias; it is possible that the nurse inadvertently observed information related to level of care within the chart. In addition, this project did not include an exhaustive list of predictor variables; it may be that additional variables will emerge as significant predictors of AL placement. Last, all participants were recruited from a single CCRC, and thus the results of this study cannot yet be generalized to all AL residents residing within CCRCs.

CONCLUSION

In conclusion, we have demonstrated that the most robust predictor of current AL placement within a CCRC is reduced ability to self-administer medications. These results emphasize the importance of evaluating a resident’s ability to indepen-
ently administer medications before placement decisions within CCRCs.

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REFERENCES