Variation in medication understanding among the elderly

MARY V. SPIERS, DAVID M. KUTZIK, AND MELISSA LAMAR

The elderly are not necessarily less adherent to drug regimens than younger people, but they are at higher risk of adverse health effects as a consequence of nonadherence. Poor medication adherence has significant economic and social consequences in terms of increased morbidity and mortality. Considering that 75% of the population over the age of 65 years takes at least one prescription medication and that the average number of medications being taken by those over 65 ranges from two to four, the issue of nonadherence affects a majority of elderly people.

Although age itself is not consistently a predictor of medication adherence or the ability to remember to take medications, the range of cognitive variation among those older than 65 is wide. Many people can be described as “successful agers,” with relative cognitive stability and high adherence to medications. In contrast, those in cognitive decline may show a very different profile and require targeted interventions. The sheer number of medications being consumed by older adults, coupled with possible declines in cognitive function, suggests that cognitive variables play a large part in adherence in the elderly.

Individual demographic, medical, and behavioral predictors of nonadherence are well documented. Decreases in adherence are associated with both larger numbers of medications taken and more complex medication regimens. Surveys of personal medication use have consistently found that about 10% of older individuals do not understand the purpose of their medications. Studies concerned with everyday knowledge of dosages and dosage

**Purpose.** Types of medication misunderstanding among community-dwelling elderly people were studied.

**Methods.** Community-dwelling people who were at least 65 years of age and who volunteered to participate in a medication-review program were recruited for the study. A structured interview including a background interview, attitudinal questions, and questions related to dosage, frequency, timing, and what to do if a dose was missed was conducted.

**Results.** A total of 375 people were included in the study. Of these, 232 (62%) showed perfect understanding of their medication regimens. Twenty-eight (7.5%) of the subjects with less than perfect understanding misunderstood a limited aspect of their regimens across multiple medications, most frequently what to do if a dose was missed. These subjects had the least complex regimens, could name their medications and describe their purpose, and rated themselves as having few medical problems. Their lack of knowledge was not attributed to cognitive problems. Twenty-seven subjects (7%) did not know multiple aspects of at least one medication and appeared to be at high risk for nonadherence. These individuals had the most complex regimens, had difficulty naming and explaining the purpose of their medications, and rated themselves as less adherent. Eighty-eight subjects (23.5%) demonstrated mixed problems with understanding; they did not show a defined pattern attributable to cognitive or noncognitive factors.

**Conclusion.** A majority of people over the age of 65 years had good understanding of the drugs they were taking.

Index terms: Compliance; Comprehension; Dosage schedules; Geriatrics

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frequencies have found even worse understanding.13,17

While individual predictors provide general clues to possible nonadherence, they do not reveal specific patterns related to groups of individuals that may be useful to clinicians. Certain types of medication misunderstanding may be more prevalent than others. To better design disease management programs with targeted interventions for older adults who are likely to be nonadherent to medications, these subgroups must first be explored. Also, identification of the factors determining different types of misunderstanding is important because accurate knowledge of drug regimens has been reported to be one of the best predictors of adherence across all age groups.13,18

The purpose of this study was to examine medication misunderstanding in a community-dwelling population of elderly medication takers. We compared those who perfectly understood and could recall their own medication regimen with those who demonstrated any level of misunderstanding or forgetfulness. On the basis of clinical considerations, those who showed any misunderstanding were further divided into subgroups with different types of misunderstanding and compared with each other and with the group with perfect understanding. We also explored factors associated with the various types of misunderstanding.

Methods
The sample consisted of community-dwelling persons who were at least 65 years of age and who volunteered to participate in a medication-review program targeting senior-citizen centers and independent-living apartments in Philadelphia. The program was conducted by the Philadelphia Corporation for Aging (PCA). Recruitment occurred through educational outreach programs sponsored both by PCA and by the individual senior centers in which the medication reviews took place. All participants were treated in accordance with the ethical standards of the American Psychological Association and Drexel University’s investigational review board for the treatment of human subjects, and informed consent was obtained from them. The aim of the outreach efforts was to target a wider sample of individuals than the relatively active and healthy people who typically attend senior health fairs. Recruitment and testing occurred over two consecutive years. Individuals who returned the second year were interviewed; however, only their initial data were included in the analysis. No other exclusionary criteria were imposed.

The medication review was a structured interview consisting of a background interview, attitudinal questions, and the medication review itself. Pairs of senior-year pharmacy and nursing students conducted the interviews under the supervision of faculty members. A total of 75 pharmacy students, trained in group sessions by the investigators to conduct the interviews, participated. Before coming to the interview, subjects watched a video presentation of a staged medication-review session and received a written request to bring all of their prescription and nonprescription medications (including vitamins and supplements). The interviews averaged about 45 minutes each. The background interview included questions about age, sex, ethnicity, living situation, education, and medical history. Participants were asked about perceived medical conditions, such as arthritis, high blood pressure, heart problems, and blood sugar problems. We closely examined the number of medical problems (out of 19 potential problems), frailty, and self-rated seriousness of problems. Frailty that might directly affect the ability to reliably self-administer prescription medications was specifically addressed.

The attitudinal questions included three sets of questions about attitudes toward medications and physician-patient communication (appendix). Responses were scored 2 for yes, 1 for sometimes, and 0 for no, and scores were summed for each of the scales.

The medication review evaluated each prescription and nonprescription drug brought in by participants in an individual-interview format. As part of the medication review, each participant went through a personal medication regimen understanding assessment (PMRUA) for each prescription medication taken. Also, we evaluated general experience and self-reported compliance with the drugs and estimated risk of adverse health effects due to medication problems. To determine a subject’s understanding of individual prescription medications, he or she was asked the following questions about each drug: How many times a day are you supposed to take this medicine? When are you supposed to take this medicine? How much or how many [dosage units] should you take each time? What should you do if you miss a dose? These four questions constituted the PMRUA. The interviewer judged responses to be correct or incorrect by comparing them with the prescription label corresponding to the drug in question. Each response was given a score of 1 if correct and 0 if incorrect.

Subjects identified as having less than perfect understanding of their medications were divided into those who misunderstood a single or limited aspect of their regimens (such as dosage or timing) across multiple medications (type L misunderstanding), those who had significant problems in understanding multiple aspects (at least three of four) of at least one medication regimen (type M misunderstanding), and those with misunderstanding not clearly belonging to one of the two other types of misunderstanding (type X misunderstanding).
We hypothesized that a failure to understand one regimen component might reflect poor physician–patient communication rather than a primary cognitive deficit. In contrast, a failure to understand multiple components of a regimen might reflect unfamiliarity with a new prescription or poor instructions, if the problem occurred for one drug alone. We also hypothesized that any failure in regimen knowledge shown by type L misunderstanders would be consistent within one person, but not necessarily across people. On the other hand, we thought that type M misunderstanders might misunderstand one particular drug because of unfamiliarity with a new prescription or because of poor instructions. Not understanding one drug would not necessarily imply poor understanding of all medications.

General experience and adherence were examined by asking participants how long they had been taking each medication, whether there were adverse effects, how well the medication was working, and how often they did not take the medication as directed (never [score = 1], once a month [2], once a week [3], up to three times a week [4], four or more times a week [5], or “not applicable” [6]). The frequency scores for nonadherence were averaged across medications and excluded any ratings of not applicable. Those who admitted to nonadherence for any particular drug were asked if they were more likely to take too little, take too much, or not take that medication at all.

To assess the complexity of drug regimens, participants were asked how many medications they took each day and how many times a day they took them. Complexity was later corroborated with the reviewer’s assessment. Participants were also asked to state whether the regimen was easy to follow, describe their strategies for medication taking, and rate their general success at remembering to take medications on time.

Validation of the medication review was carried out by correlational analysis of the responses with earlier forms of the instruments, as well as by cross-validating the results for approximately 25% of the subjects with the results of expert reviews of the assessments by geriatric nurses and community pharmacists.

All analyses were conducted with the Statistical Package for the Social Sciences (SPSSX, SPSS, Inc., Chicago, IL). Between-group analysis of variance was used with the Student–Newman–Keuls procedure for follow-up comparisons of between-group data, and chi-square tests were used for analyzing categorical data when appropriate. The level of significance was set at ≤0.05.

The number of prescription medications multiplied by the dosage frequency was used as an indicator of regimen complexity.

Frailty was evaluated as the sum of difficulties identified in the following areas: seeing, hearing, walking, memory, opening medication containers, splitting pills, and administering medications.

Results

A total of 375 people were included in the study. The mean ± S.D. age of the sample was 77 ± 7 years (range, 65–93 years) (Table 1). Participants used a mean ± S.D. of 4.0 ± 2.1 prescription medications (range, 1–12) and 1.4 ± 1.3 nonprescription medications (range, 0–9). Participants were largely women (84%) and people living alone (57%). African-Americans made up 63% of the sample, with Caucasians and Latinos accounting for 33% and 3%, respectively. Eighteen percent had a 6th-grade education or less, 68% were educated through grade 11, 24% had graduated from high school, and 8% had a college or graduate education.

Of the 375 subjects, 232 (62%) had perfect understanding of their drug regimen, as measured by the PMRUA, and 143 (38%) had less than perfect understanding. These two groups did not differ in terms of sex, age, race, education, or degree of medical disability.

Twenty-eight (7.5%) of the 143 medication misunderstanders were classified as type L misunderstanders, 27 (7.0%) as type M, and 88 (23.5%) as type X.

Table 1.
Demographic Characteristics of Study Groupsa

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Perfect Understanders (n = 232)</th>
<th>Misunderstanders</th>
<th>All Subjects (n = 375)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± S.D. age (yr)</td>
<td>Type L (n = 28)</td>
<td>Type X (n = 88)</td>
</tr>
<tr>
<td></td>
<td>78 ± 7b</td>
<td>75 ± 7b</td>
<td>76 ± 7b</td>
</tr>
<tr>
<td></td>
<td>No. (%) female</td>
<td>198 (85)</td>
<td>22 (79)</td>
</tr>
<tr>
<td></td>
<td>Race, no. (%)</td>
<td>African-American</td>
<td>141 (61)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Caucasian</td>
<td>80 (34)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other</td>
<td>11 (4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>High school graduates, no. (%)</td>
<td>78 (34)</td>
</tr>
<tr>
<td></td>
<td>Mean ± S.D. no. prescription drugs</td>
<td>3.7 ± 2.0c</td>
<td>2.5 ± 1.5b</td>
</tr>
<tr>
<td></td>
<td>Mean ± S.D. no. nonprescription drugs</td>
<td>1.4 ± 1.2</td>
<td>1.4 ± 0.9</td>
</tr>
</tbody>
</table>

a,bValues in the same row that do not have like superscripts differ significantly (p < 0.05, Student–Newman–Keuls procedure).
The total PMRUA score for all medications for the entire sample was 92% (Table 2). Except for knowledge of what to do if a dose was missed (85% correct), all other scores for the PMRUA were over 90%. In addition, the sample achieved a 68% correct naming score and an 87% correct score for knowledge of medication purpose.

The subjects with perfect medication understanding by definition answered the four PMRUA questions with 100% accuracy for all their medications. While those subjects knew how to take their medications, they showed lapses in drug naming (70%) and knowledge of purpose (90%).

In contrast, the group with type M misunderstanding showed consistently depressed understanding, with an average total PMRUA score of 61% correct. They had significantly lower understanding of all aspects of medication taking than the perfect-understanding group and reliably lower levels of understanding than the subjects with the other types of misunderstanding for dosage frequency (F[3, 371] = 113.3, p < 0.001), timing (F[3, 371] = 75.69, p < 0.0001), amount (F[3, 371] = 50.21, p < 0.001), and medication purpose (F[3, 371] = 10.37, p < 0.0001).

The type L group attained a mean total score of 75% correct. Its mean score of 20% for correct knowledge of what to do if a dose was missed was far worse than for any other group (F[3, 371] = 152.0, p < 0.001). These subjects also performed somewhat worse than the type X group (87%) for correctly knowing the proper dose (F[3, 371] = 50.21, p < 0.001). Nevertheless, they had the same 100% score as the perfect-understanding group for knowledge of dosage frequency (F[3, 371] = 113.3, p < 0.001) and were only somewhat worse than the perfect-understanders (93%) in knowing when to take their medications (F[3, 371] = 75.69, p < 0.0001). There were also no significant differences between type L subjects and perfect understanders in knowledge of drug name or purpose.

The type X group had a total PMRUA score of 87% correct and generally showed a pattern of understanding between the perfect-understanding group and the type L group. Except for knowledge of dosage frequency (89%), in which the type X group performed below the level of the type L group (F[3, 371] = 113.3, p < 0.001), the type X group had a level of knowledge at or above that of the type L group. Also, the type X group did reliably better than the type M group in all aspects of understanding except what to do if a dose is missed (type X = 71%, type M = 63%; difference not significant).

The groups did not reliably differ in sex, race, or education. The type M group, however, was older, with a mean ± S.D. age of 81 ± 6 years (F[3, 371] = 3.39, p = 0.18).

All groups with less than perfect understanding admitted to more frequent nonadherence than the perfect-understanding group (Table 3). Type M subjects were the most frequently nonadherent (F[3, 371] = 11.79, p < 0.0001). While this measure revealed group differences, subjects in all groups rated themselves relatively adherent.

Subjects who admitted to nonadherence for any particular drug were questioned about their type of nonadherence. Across groups, 80% of the instances of nonadherence were due to underdosing, 6% to overdosing, and 14% to drug discontinuation. The most frequently reported single reason was forgetting that a dose was due (34%), followed by a perceived adverse reaction (9%) and a perception that the drug was no longer needed (9%). Although, descriptively, there appeared to be no differences among groups, these could not be fully analyzed because of low reporting for the type L group.

The four groups differed in the absolute number of prescription medications being consumed (F[3, 371] = 13.10, p < 0.0001). Type L subjects were taking an average of 2.5 prescriptions, perfect-understanding subjects nearly 4, and type M and type X subjects nearly 5 (Table 3). The type M group had the most complex regimens (computed as number of medications being consumed, 100% correct).

### Table 2. Medication Understanding by Study Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Perfect Understanders (n = 232)</th>
<th>Misunderstanders</th>
<th>Type L (n = 28)</th>
<th>Type X (n = 88)</th>
<th>Type M (n = 27)</th>
<th>All Subjects (n = 375)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Medical Regimen...</td>
<td></td>
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<tr>
<td>Understanding Assessment...</td>
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<tr>
<td>Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dosage frequency</td>
<td>100b</td>
<td>100b</td>
<td>89 ± 19c</td>
<td>57 ± 27d</td>
<td>94 ± 16</td>
<td></td>
</tr>
<tr>
<td>Proper time</td>
<td>100b</td>
<td>93 ± 26c</td>
<td>91 ± 20c</td>
<td>58 ± 23d</td>
<td>94 ± 17</td>
<td></td>
</tr>
<tr>
<td>Proper dose</td>
<td>100b</td>
<td>87 ± 33b</td>
<td>95 ± 13c</td>
<td>67 ± 31d</td>
<td>95 ± 16</td>
<td></td>
</tr>
<tr>
<td>What to do if dose missed</td>
<td>100b</td>
<td>20 ± 40b</td>
<td>71 ± 31c</td>
<td>63 ± 37c</td>
<td>85 ± 31</td>
<td></td>
</tr>
<tr>
<td>Total % correct</td>
<td>100</td>
<td>75 ± 00</td>
<td>87 ± 9</td>
<td>62 ± 19</td>
<td>92 ± 14</td>
<td></td>
</tr>
<tr>
<td>Additional Knowledge Components</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Knows drug name</td>
<td>79 ± 41b</td>
<td>79 ± 40b</td>
<td>71 ± 38b</td>
<td>31 ± 32c</td>
<td>68 ± 41</td>
<td></td>
</tr>
<tr>
<td>Knows purpose</td>
<td>90 ± 23b</td>
<td>93 ± 22b</td>
<td>84 ± 25c</td>
<td>64 ± 39d</td>
<td>87 ± 26</td>
<td></td>
</tr>
</tbody>
</table>

*Values in the same row that do not have like superscripts differ significantly (p < 0.05, Student–Newman–Keuls procedure). The value with the b,c superscript does not reliably differ from the value with the b superscript or the value with the c superscript.
of medications × dosage frequency) and the type L group the least complex regimens (F[3, 371] = 11.25, p < 0.001). Not only did type M subjects objectively have the most complex regimens, they were more likely to perceive their regimens as more difficult to follow than the other three groups (χ²[3, 375] = 12.81, p < 0.005). Also, type M subjects rated themselves as less likely than the perfect-understanding group to remember to take their drugs on time (F[3, 371] = 4.35, p = 0.005).

The group with perfect medication understanding reported using strategies that linked taking drugs with other daily activities, such as bedtime or meals (45% of subjects), as did the type L group. This was also the most frequently reported method for the other groups, although the frequency was lower at 30–34%. Type M subjects relied on others for help in remembering to take medications more frequently (15% of subjects) than the other groups (3–4%). There was consistency across groups in the use of pill-organizing systems (12–16% of subjects) and the frequency with which people were attempting to rely only on their own memory (21–28%).

Analysis of variance revealed a significant difference among groups in the mean time all medications had been taken (F[3, 371] = 4.40, p = 0.05), although follow-up tests based on averages did not identify significant differences. The type M group had been taking a majority of its prescriptions for less than one year (53%), while the other three groups had been taking a majority of their medications for over one year (Figure 1).

There were no significant differences among the four groups in self-ratings of physician satisfaction, physician–patient communication, and medication satisfaction. Overall, participants were satisfied with their medications, and had good communication with their physicians. There was a trend, however, suggesting that type M subjects were less satisfied with their medications (F[3, 371] = 2.13, p = 0.09).

The background interview revealed differences in the total number of self-reported medical problems (F[3, 371] = 3.76, p = 0.011). The type L group rated itself as having fewer problems than the perfect-understanding group or the type X group. Type M subjects did not reliably differ from any of the other groups in number of medical problems, but they rated themselves as more frail than the perfect-understanding group (F[3, 371] = 2.64, p = 0.04). There was no difference in self-rated seriousness of medical problems among groups. Participants reported a mean ± S.D. of 4.6 ± 2.0 medical problems (range, 0–11 problems) out of 19 possible problems. The most common self-

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Table 3.
**Variables Related to Types of Medication Misunderstanding**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Perfect Understanders (n = 232)</th>
<th>Type L (n = 28)</th>
<th>Type X (n = 88)</th>
<th>Type M (n = 27)</th>
<th>All Subjects (n = 375)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adherence</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency of nonadherence (1–5 scale, 5 = high)</td>
<td>1.4 ± 0.79&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.9 ± 1.5&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.7 ± 0.86&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.4 ± 1.2&lt;sup&gt;d&lt;/sup&gt;</td>
<td>1.5 ± 0.95</td>
</tr>
<tr>
<td>Complexity of Regimen</td>
<td>3.7 ± 2.0&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2.5 ± 1.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.8 ± 2.1&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.9 ± 2.3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>4.0 ± 2.1</td>
</tr>
<tr>
<td>No. prescriptions</td>
<td>5.9 ± 4.2&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.0 ± 2.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.5 ± 4.3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>9.5 ± 4.3&lt;sup&gt;d&lt;/sup&gt;</td>
<td>6.4 ± 4.3</td>
</tr>
<tr>
<td>Regimen complexity (no. prescriptions × frequency)</td>
<td>4.3</td>
<td>8.0</td>
<td>7.1</td>
<td>22.2&lt;sup&gt;e&lt;/sup&gt;</td>
<td>6.7</td>
</tr>
<tr>
<td>Routine easy? (% no)</td>
<td>4.5 ± 0.72&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.5 ± 0.74&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>4.3 ± 0.94&lt;sup&gt;b,c&lt;/sup&gt;</td>
<td>4.0 ± 0.83&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.4 ± 0.8</td>
</tr>
<tr>
<td>Medication remembering (1–5 scale, 5 = high)</td>
<td>2.1 ± 1.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.4 ± 1.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.4 ± 1.5&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.4 ± 1.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>7.4 ± 1.3</td>
</tr>
<tr>
<td>Attitudes</td>
<td>8.8 ± 1.8&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.5 ± 2.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.4 ± 2.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.0 ± 2.4&lt;sup&gt;b&lt;/sup&gt;</td>
<td>8.6 ± 2.0</td>
</tr>
<tr>
<td>Physician satisfaction score (0–8 scale, 8 = high)</td>
<td>8.4 ± 2.1&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.8 ± 2.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.3 ± 2.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.9 ± 1.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.4 ± 2.1</td>
</tr>
<tr>
<td>Physician–patient communication score (1–5 scale, 5 = high)</td>
<td>1.6 ± 1.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.5 ± 1.2&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.8 ± 1.3&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.2 ± 1.4&lt;sup&gt;c&lt;/sup&gt;</td>
<td>1.7 ± 1.3</td>
</tr>
<tr>
<td>No. medication problems (out of 19)</td>
<td>4.5 ± 2.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>3.6 ± 1.9&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5.0 ± 2.1&lt;sup&gt;c&lt;/sup&gt;</td>
<td>4.6 ± 2.1&lt;sup&gt;a,b&lt;/sup&gt;</td>
<td>4.6 ± 2.0</td>
</tr>
<tr>
<td>Self-rated seriousness of problems (1–5 scale, 5 = high)</td>
<td>2.1 ± 0.86&lt;sup&gt;b&lt;/sup&gt;</td>
<td>1.9 ± 1.0&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.2 ± 0.88&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.0 ± 0.87&lt;sup&gt;b&lt;/sup&gt;</td>
<td>2.1 ± 0.88</td>
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</tbody>
</table>

<sup>a</sup>-Values in the same row that do not have like superscripts differ significantly (p < 0.05, Student–Newman–Keuls procedure). The values with the b,c superscript do not reliably differ from the value with the b superscript or the value with the c superscript.

<sup>b</sup>-p < 0.05, chi-square test.
reported problems were arthritis (71%), hypertension (66%), heart problems (40%), and breathing difficulty (30%).

Discussion

The results of this study suggest considerable variation in how community-dwelling elderly adults understand their medications. A majority of the participants (62%) understood perfectly how to take their medications—a finding consistent with previous studies—and rated themselves more adherent than those with less than perfect understanding. Those with the poorest understanding also admitted to frequent nonadherence and forgetfulness regarding their medication taking. This finding is in line with other research suggesting that those who perceive less success in remembering to take their medications see themselves as having more serious lapses in memory in general.

The perfect-understanding group averaged 3.5 prescription medications per day, well within the range expected from studies of the general population. These individuals had neither the least complex nor the most complex regimens of the groups examined but were the most confident when rating their ability to adhere to and remember to take their medications. They were also likely to report using effective medication-taking strategies. The perfect-understanding group appeared to show the lowest risk of adverse effects related to cognitive aspects of medication taking.

We identified two groups with potentially serious medication misunderstanding. Type L subjects had the least understanding of what to do if a dose was missed, even though they took the fewest medications, had the least complex regimens, and rated themselves as having fewer medical problems. They also had difficulty with knowing the proper dosage. Type L individuals did not appear to have general problems understanding their medications; in fact, their knowledge of the names and purposes of their drugs and how often to take them matched that of the perfect understanders. It may be that type L misunderstanding results from poor education or poor communication between provider and patient about what to do if a dose is missed. While the medications in this study were not grouped by type, it may also be that certain medications with more complicated regimens may be more prone to misunderstanding. Also, individuals who take fewer medications and have fewer perceived health problems may pay less attention to knowing what to do if they miss a dose or may believe that the consequences of missing a dose are less serious.

We originally hypothesized that misunderstanding one medication might indicate communication difficulties between physician and patient or unfamiliarity with a new prescription and that a generally poor understanding might point to more serious cognitive or drug-complexity issues. The indications that group M showed more general cognitive difficulty stem from the fact that they knew less in general about how to take their medications than all other groups and performed extremely poorly in naming and knowing the purpose of their medications. Several factors may contribute to this pattern of depressed understanding. Type M individuals took more drugs more frequently than other subjects and were more likely to believe that their regimens were harder to follow. This group had a high proportion of medications that had been taken for less than one year. In addition to having more medication-related risk factors, the type M group was more frail and older than the other groups. While a precise statement about the cognitive status of this group cannot be
made on the basis of the data, it had the most mentally taxing drug regimens of all the groups, both objectively and subjectively. Thus, the type M group showed multiple indicators from among known predictors of poor adherence suggesting that they were at risk for poor adherence and subsequent adverse health outcomes.

The type X group showed a level of understanding less than that of the perfect understanders but equal to or better than that of types L and M subjects. While this group represented a fairly large proportion of the misunderstanders, it probably also represented a mixture of the problems of groups L and M.

While a majority of our sample had perfect understanding of how to take their medications, close to 40% had difficulty with one or more aspects. An awareness of medication-related cognitive problems and types of medication misunderstanding might aid in tailoring cognitive support. For example, it appears that those who primarily misunderstood only one aspect of their medication regimen (what to do after missing a dose) (the type L group) were cognitively intact with respect to other aspects of medication understanding. An intervention tailored for individuals in this group may need to focus on specific drug-related or communication reasons for the misunderstanding, as opposed to external cognitive support. In contrast, those who show medication misunderstanding across multiple areas (type M individuals) may require the highest level of cognitive support, such as reducing regimen complexity and more frequently checking medication understanding and ability to self-administer medications.

The results of this study may not be generalizable to other populations of elderly people. Also, the subjects were either self-referred or referred by professional staff concerned about their medication management. Thus, it is possible that patients with particularly good medication understanding and especially pronounced misunderstanding may have been overrepresented because of selection factors.

Conclusion
A majority of people over the age of 65 years had good understanding of the drugs they were taking. Substantial percentages showed either limited or global misunderstanding of their medications. By identifying specific types of medication misunderstanding in the elderly, clinicians may be better able to direct interventions.

References


**Reports**  

Medication understanding

Appendix A—Attitudinal questions*

**Physician satisfaction**
1. Are you satisfied with your doctor?
2. Do you feel that your doctor listens carefully to what you have to say?
3. Are you comfortable talking to your doctor about anything that concerns you?
4. Do you feel that your doctor understands your concerns?

**Medication satisfaction**
1. Do you feel that your medications help you feel better?
2. Are you disappointed in what your medicines are doing for you?
3. Do you feel that you are taking too many prescription medicines?
4. Do you believe that taking your medications improves your condition?
5. Do you think your medications are safe to take?

**Physician–patient communication**
1. Have you ever asked your doctor questions about your prescription medicines?
2. Does your doctor clearly explain to you how to take your prescription medicines?
3. Have you discussed your questions about your over-the-counter medicines with your doctor?
4. Have you ever received written information about your prescription medicines?

*All questions were answered with yes (score of 2), sometimes (1), or no (0).