MEDICATION USAGE PATTERNS IN ASSISTED LIVING FACILITIES

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Objective: To describe the types of medications used by residents of U.S. assisted living facilities.
Design: Retrospective review of medication profiles.
Setting: Assisted living facilities in the southwestern United States.
Participants: The combined census for residents residing in 109 assisted living facilities (N = 608).
Main Outcome Measures: Demographic characteristics, prevalence data for overall medication use, and psychotropic drug use.
Results: The data compiled in this study provide a benchmark for medication use and demographic characteristics of residents living in U.S. assisted living facilities. Seventy-six percent of the residents were women, and 73% were 80–95 years of age. The overall mean number of routine medications was 6.2 ± 3.4 standard deviation (SD). The mean number of medications in assisted living facilities was higher than that observed in comparable national or regional studies conducted in skilled nursing facilities.
Conclusions: As the elderly U.S. population continues to expand, assisted living facilities will provide care for more residents. Data from this study demonstrate that these residents are usually women 80–95 years of age. The mean number of routine medications was greater than that previously identified in either national or regional studies in nursing facilities. This observation identifies an important role for consultant pharmacists to screen for significant drug-related problems in the fast-expanding elderly population.
Key Words: Assisted living facilities, Medication use.
Abbreviations: ADL = activity of daily living; SNF = skilled nursing facility; ALF = assisted living facility; CNS = central nervous system.
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It is well known that the mean age of the U.S. population is increasing. In the past, as the elderly could no longer perform activities of daily living (ADLs), they were typically admitted to skilled nursing facilities (SNFs). Nursing facilities provide various levels of care, depending upon the acuity of the individual resident; however, as people age they may not require the more intensive services of an SNF.[1] This has stimulated the development and expansion of assisted living facilities (ALFs).[2,3] These less care-intensive facilities provide ADL "assistance" to residents without the more intensive, expensive services provided in SNFs.

Assisted living, as defined by the Assisted Living Federation of America, is a combination of housing, personalized supportive services, and health care designed for people who require help with ADLs.[4] ALFs are usually designed to maximize the independence of each resident. The growth in the number of ALFs is based on the concept that many seniors may only require assistance with certain ADLs and do not require the level of health care that SNFs provide. As such, assisted living has become an important new component of the health care continuum for the elderly. Assisted living has become a "fourth dimension" of health care delivery, supplementing the services provided by hospitals, SNFs, and home health care providers.

Providers of pharmacy services to ALFs may offer many services, including medication reminders, special packaging to help improve medication compliance, and reorders from pharmacies. Unfortunately, a routine medication review by a consultant pharmacist to improve outcomes and to help prevent adverse drug events is lacking in most ALFs.[5]

As a group, the elderly are at an increased risk for adverse drug events due to physiologic changes associated with aging. Due to the frequent presence of multiple comorbidities in this population, medication use is higher and drug dosage adjustments are often required. Therefore, vigilant medication management is a necessity for these residents. Historically, consultant pharmacists have provided medication monitoring services in SNFs, as mandated by federal

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regulations. However, in many states, regulations requiring routine medication review by a consultant pharmacist for ALF residents either do not exist or have not been implemented. The following language from one state's ALF law is typical: "a nurse, pharmacist, or a primary care provider must review the medication and medication record of each resident receiving medication administration or nursing services every 90 days and after significant change in the resident's condition."[6]

Due to the increasing popularity of the assisted living environment and high rate of medication use among the elderly, this study was designed to describe the types of medications used by ALF residents. Additionally, this study sought to compare ALF medication usage patterns to those observed in SNFs, where consultant pharmacists are routinely and closely involved with medication management. High medication use rates in ALF residents may identify another population of residents that would benefit from consultant pharmacist services.

METHODS

A large pharmacy provider of medications to SNFs and ALFs was identified in a state with a recently initiated requirement of ALF medication review by a physician, nurse, or pharmacist. All ALFs in the state receiving prescription medications from this pharmacy provider were included in the study. All residents in the study lived within a single metropolitan community in the southwestern area of the United States. One-month pharmacy profiles of each resident were reviewed retrospectively to define resident demographics, as well as for information on routine medication orders and psychotropic drug usage. Medication usage patterns were organized into therapeutic class groups. The data were then stratified by ALF size (10 or fewer, 11–49, and 50 or more beds), and these data were compared to those from a 1997 study published in this journal.[7] Chi-square analysis was used to compare nominal data, and analysis of variance with the Tuckey post-hoc test was used to compare continuous data. An alpha level of 0.05 was used to determine statistical significance.

RESULTS

DEMOGRAPHICS

Our analysis included 109 ALFs, which were caring for a total of 608 residents at the time of the study. The number of residents varied by the size of the ALF. There were 306 (50.3%) residents living in ALFs with at least 50 beds, 85 (14.0%) living in facilities with 11–49 beds, and 217 (35.7%) residents in homes with 10 or fewer beds. The average census per ALF was 5.6 (range 1–43). There was an overall predominance of women living in the ALFs (76%), but there was no statistically significant difference in the proportion of women by ALF size ($P = 0.07$). The mean patient age was 83.6 ± 11.4 SD. Although resident age varied widely, 73% of residents were 80–95 years of age.

MEDICATION USE

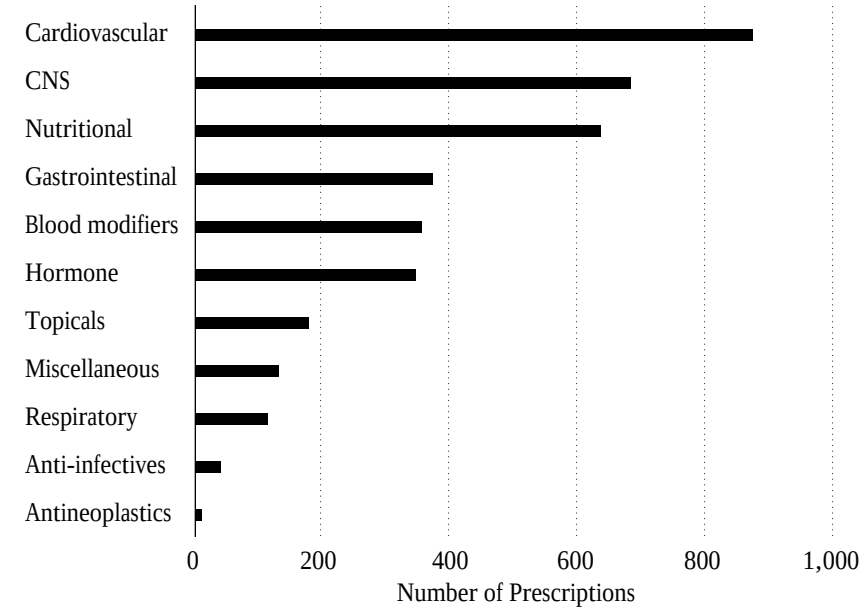
The mean number of routine medication orders (defined as regularly scheduled medications) per resident was 6.2 ± 3.4 SD (range 0–18). The mean number of medications varied from 5.7 ± 3.3 SD in ALFs with 10 or fewer beds to 6.4 ± 3.5 SD in facilities with at least 50 beds. There was a statistically significant difference in mean number of medications by ALF size ($P = 0.028$). The post-hoc test indicated there was a significantly larger number of medications used by residents of ALFs with at least 50 beds, as compared to facilities with 10 or fewer beds. In addition, there were 144 (23.7%) ALF residents receiving nine or more medications.

Figure 1 summarizes the frequency of medication use by drug class. The cardiovascular, central nervous system (CNS), and nutritional medications were prescribed most frequently; these three classes accounted for 58.4% of all prescribed medications. The cardiovascular class included antihypertensives, antiarrhythmics, cardiac glycosides, diuretics, vasodilators, and antilipidemics. The CNS medications included narcotic and non-narcotic analgesics, antiepileptic agents, antidepressants, antipsychotics, anxiolytics, stimulants, dopaminergic agents, hypnotics, and muscle relaxants. The nutritional class included potassium supplements, vitamins, calcium,

iron, and other natural products. Table 1 summarizes the number of medications per resident by ALF size. There were no statistically significant differences in the proportion of medications per resident by drug class between the different ALF groups.

Table 2 summarizes the percentage of residents receiving routine psychotropic medications. There was a statistically significant difference in the proportion of residents receiving antipsychotics by ALF size ($P = 0.04$). The smaller facilities had higher antipsychotic usage rates. There were no significant differences in the proportion of residents receiving other psychotropic agents by ALF size. Table 3 contrasts the psychotropic drug use in the present study to current SNF findings in the literature. The proportion of residents receiving antidepressants in the studied ALFs (39.8%) was statistically significantly higher than previously identified in either the national or western region of nursing facilities ($P < 0.001$). In addition, the proportion of residents receiving hypnotic drugs in the studied ALFs (4.9%) was statistically significantly higher than that previously reported in national studies or studies in nursing facilities in the western United States ($P = 0.003$).

FIGURE 1. ALF MEDICATION ORDERS, BY THERAPEUTIC CLASS



CNS = central nervous system.

DISCUSSION

This study demonstrated that there are unique and important medication-related characteristics of residents of ALFs. Consultant pharmacy services were not routinely provided to the ALFs in this study. It is important to keep in mind that routine consultant pharmacy services are not provided to many ALFs. The results of the present study demonstrate a bimodal distribution of residents living in small facilities (10 or fewer beds) and large facilities (50 or greater beds). Demographic data revealed that 76% of the residents were women, and that the largest numbers of residents were 80–95 years of age.

The mean number of routine medications ordered for all three facility sizes was 6.2 ± 3.4 SD prescriptions. In contrast, a 1997 national survey of nursing home medication use demonstrated that SNF residents were receiving, on average, 5.9 routine medication orders.[7] Among ALF residents in the western region of the United States, these authors documented an average of 5.6 routine medication orders.

It was unexpected that the mean number of routine medication orders among residents of ALFs included in the current study was higher than that identified in nursing homes on either a national or western regional basis. Further, the present study found that 23.7% of ALF residents were receiving nine or more routine medication orders. In comparison, previous nursing home research demonstrated that 18.2% of nursing facility residents nationwide and 17.2% of residents in the western region were receiving nine or more routine medications. Thus, the present study demonstrates that although ALFs are viewed as "lower-acuity" facilities, the residents living in those facilities are receiving more medications than those in "higher-acuity" nursing facilities.

TABLE 1. NUMBER OF MEDICATIONS PER RESIDENT, BY THERAPEUTIC CLASS AND FACILITY SIZE

Therapeutic Class	10 or Fewer Beds	11–49 Beds	50 or More Beds
Anti-infectives	0.1	0.1	0.1
Antineoplastics	0.0	0.0	0.0
Blood modifiers	0.5	0.6	0.6
Central nervous system	1.1	1.3	1.1
Cardiovascular	1.3	1.4	1.6
Gastrointestinal	0.6	0.8	0.5
Hormone	0.5	0.7	0.6
Miscellaneous	0.1	0.2	0.3
Nutritional	1.0	1.0	1.1
Respiratory	0.2	0.2	0.2
Topicals	0.2	0.2	0.4
TOTAL	5.6	6.4	6.5

TABLE 2. FREQUENCY OF USE OF ROUTINE PSYCHOTROPICS, BY FACILITY SIZE

Therapeutic Class	10 or Fewer Beds	11–49 Beds	50 or More Beds	P Value
Antipsychotics	16.6%	15.3%	9.5%	0.04
Anxiolytics	9.7%	12.9%	10.8%	0.71
Hypnotics	5.1%	2.4%	5.6%	0.48
Antidepressants	38.2%	48.2%	38.6%	0.23

In our study of ALFs, the most commonly used drug categories were cardiovascular, CNS, and nutritional therapies; these classes are frequently used to treat diseases prevalent in the elderly population. Within the psychotropic medication category, antidepressant prescriptions were most frequent (Table 3). The proportion of ALF residents receiving antidepressants (39.8%) was greater than the proportion of nursing facility residents using antidepressants in the aforementioned national and regional studies. Also, the proportion of ALF residents receiving hypnotic agents was significantly greater than in national or western region nursing facility studies. It is possible that the higher hypnotic use among ALF residents in our study may indicate inadequate monitoring in small ALFs. The small ALFs were not specialty psychiatric or Alzheimer's care facilities; only one small ALF was an Alzheimer's specialty facility.

There are several important limitations to the present study. Most important is that the ALF data are limited to a single month of compiled data from a large pharmacy provider in a single metropolitan area. Thus, the results may not be generalizable to other communities. Also some of the ALFs in the present study received consultant pharmacy services. It was beyond the scope of the present study to determine clinical outcomes of medication-related problems. Given the paucity of data in the literature examining medication use in ALFs, this study demonstrates that additional research is needed to clarify the medication use patterns in ALF residents and to examine the role of pharmacy consultation services in this setting. With the higher rates of medication use identified in this study, it is likely that drug regimen review services in ALFs may identify important drug-related problems. In addition, further research is needed to clarify the impact of legislation and consultant pharmacy services designed to improve medication use in ALFs.

CONCLUSION

As the mean age of the U.S. population continues to increase, it is anticipated that ALFs will care for larger numbers of seniors. Data from the present study demonstrate that these residents are

TABLE 3. FREQUENCY OF PSYCHOTROPIC DRUG USE IN ALFS AND SNFS

Psychotropic Class	ALF (N = 608)	National* (N = 82,758)	Western Region* (N = 19,030)	P Value
Antipsychotics	12.8%	14.2%	11.7%	< 0.0001
Anxiolytics	10.7%	10.9%	8.0%	< 0.0001
Hypnotics	4.9%	2.7%	2.7%	0.003
Antidepressants	39.8%	26.3%	26.3%	< 0.001

* From reference 7.

usually women, often 80–95 years of age. The mean number of routine medication orders (6.2 ± 3.4 SD) among ALF residents in our study was greater than that previously identified in either national or regional studies in nursing facilities. The relatively high rate of medication use documented in our study clearly points to the important role of consultant pharmacy services in preventing, identifying, and/or resolving significant drug-related problems in the expanding ALF population.

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