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Antidepressant Prescribing in US Nursing Homes Between 1996 and 2006 and Its Relationship to Staffing Patterns and Use of Other Psychotropic Medications

Joseph T. Hanlon, PharmD, MSSteven M. Handler, MD, PhDNicholas G. Castle, PhD

Division of Geriatric Medicine, Department of Medicine, School of Medicine, University of Pittsburgh, Pittsburgh, PA (J.T.H., S.M.H.); Department of Pharmacy and Therapeutics, School of Pharmacy, University of Pittsburgh, Pittsburgh, PA (J.T.H.); Department of Epidemiology, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA (J.T.H.); Geriatric Research Education and Clinical Center (GRECC), Veterans Affairs Pittsburgh Healthcare System (VAPHS), Pittsburgh, PA (J.T.H., S.M.H.); Center for Health Equity Research and Promotion (CHERP), VAPHS, Pittsburgh, PA (J.T.H., S.M.H.); Department of Biomedical Informatics, School of Medicine, University of Pittsburgh, Pittsburgh, PA (S.M.H.); Department of Health Policy and Management, Graduate School of Public Health, University of Pittsburgh, Pittsburgh, PA (N.G.C.)

Abstract

Background—Few studies have examined factors associated with antidepressant prescribing in older nursing home residents.

Objective—The primary objective was to describe the change in antidepressant prescribing for nursing home residents between 1996 and 2006. An additional objective was to examine the association between any change in antidepressant prescribing and staffing patterns or coprescribing of other psychotropic medications in the same cohort.

Design—Longitudinal.

Settings—Settings were 12,556 US nursing homes in 1996 and 2006.

Data Sources—Online Survey Certification and Reporting (OSCAR) data and the Area Resource File (ARF).

Measurements—Increasing prescribing of antidepressants analyzed using multivariable multinomial generalized estimating equations (GEE).

Results—Antidepressant prescribing significantly increased ($P < .05$) from 21.9% in 1996 to 47.5% in 2006. After controlling for resident, organizational, and market factors, increased antidepressant prescribing was associated with more time spent by physician extenders (adjusted odds ratio [AOR] 2.21; 95% confidence interval [CI] 1.96–2.51), registered nurses (AOR 1.06, 95% CI 1.02–1.10), or nurse aides (AOR 1.08; 95% CI 1.04–1.12) in a facility, as well as the coprescribing of sedative/hypnotics (AOR 1.12; 95% CI 1.08–1.16). Factors found to be protective of increasing antidepressant prescribing (ie, decrease antidepressant prescribing) included having medical directors and physicians spend more time in the facility (AOR 0.60; 95%

CI 0.53–0.69 and AOR 0.62; 95% CI 0.54–0.71, respectively), or coprescribing of antianxiety or antipsychotic agents (AOR 0.70; 95% CI 0.68–0.72 and AOR 0.74; 95% CI 0.72–0.77, respectively).

Conclusions—Prescribing of antidepressants has increased dramatically in the past decade in older nursing home residents and seems to be associated with certain staffing characteristics and the coprescribing of psychotropic medications. Further research is needed to determine if antidepressants are appropriately prescribed, and if overuse is determined, develop interventions to improve the quality of prescribing of these medications in older nursing home residents.

Keywords

Aged; nursing home; antidepressant

Major depression is common among nursing home residents with rates ranging from 12% to 20%.^{1–3} Moreover, depression is associated with increased morbidity (including cardiovascular disease, dementia, and stroke) and mortality in nursing home patients.^{2–4} Despite the significant association between depression and morbidity and mortality, previous research conducted between 1992 and 1996 suggested that depression was then underrecognized and undertreated, with only slightly more than half of all depressed nursing home patients receiving an antidepressant.⁵ Therefore, there is considerable concern that there is a mismatch in the prevalence of depression and prescribing of antidepressant medication.

However, more recent data suggest that antidepressant prescribing in nursing home residents may be increasing. A study by Tobias and Sey⁶ of 328 US nursing homes found that the rate of antidepressants rose from 26.3% in 1997 to 34.5% in 2000. This study was limited because it was cross sectional, used a small number of facilities ($n = 328$), and did not provide information about risk factors associated with this increase in antidepressant prescribing. In a study by Lapane and Hughes,⁷ it was determined that a relationship between organizational characteristics and management of depression using antidepressants existed. Specifically, organizational characteristics, such as the presence of more professional nursing staff and having nursing home-employed physicians, were associated with variability in antidepressant prescribing. However, this study from nearly a decade ago was limited in that it was cross sectional and used nursing homes from only 6 states.⁷

Given this background, the primary objective of this longitudinal study was to describe the change in antidepressant prescribing for older nursing home residents between 1996 and 2006. An additional objective was to examine the association between any change in antidepressant prescribing and staffing patterns or coprescribing of other psychotropic medications in the same cohort. This study capitalizes on national nursing home data from merged Medicare and Medicaid databases.

METHODS

Study Design, Sample, and Source of Data

This is a longitudinal panel study of residents admitted to nursing homes between 1996 and 2006. The sample included 12,556 nursing homes from 1996 to 2006. Data sources used in this study included the 1997 through 2007 On-line Survey Certification and Reporting (OSCAR) system⁸ and the Area Resource File (ARF).⁹ OSCAR contains both organizational (eg, staffing levels) and resident characteristic data elements (eg, use of antipsychotics). The ARF represents a compilation of data sources such as the American Hospital Association annual hospital survey and the US Census of Population and Housing

from which information about market characteristics can be determined. This study was approved by the University of Pittsburgh Institutional Review Board.

Outcome Measure

The primary outcome measure was the use of antidepressant drugs representing the percentage of residents in each facility prescribed antidepressant drugs during the 2 weeks before the OSCAR survey. For purposes of analyses, increasing use of antidepressants was defined over the 11-year period (1996–2006) as a 1% increase from one year to the next.

Primary Independent Variables

Based on findings from previous studies suggesting the importance of nursing home staff in psychotropic drug use, 6 separate staffing factors were included.^{10–13} Three different types of nursing staff were included as part of staffing, the number (measured as full-time equivalents [FTEs]) of registered nurses (RNs), the number of licensed practical nurses (LPNs), and the number of nurse aides (NAs) per resident. The hours spent on-site by medical directors (a physician designated as responsible for implementation of resident care policies and coordination of medical care in the facility), other physicians (salaried physicians other than medical directors, who supervise the care of residents when the attending physician is unavailable), and physician extenders (nurse practitioners, clinical nurse specialist, or physician assistant who performs physician-delegated services) were also included. Because changes in one type of psychotropic could be influenced by the use of other psychotropic drugs, we also created variables for the average use of 3 separate types of psychotropic drug classes including (1) antianxiety, (2) sedative/hypnotic, and (3) antipsychotic medications.^{10–13}

Control Variables

Because certain factors might confound any associations found between antidepressant use and staffing or other psychotropic drug use, we controlled for a number of resident, organizational, and market variables.^{7,14–16}

Resident factors included a continuous measure for the activities of daily living (ADL) facility score (ranging from 0 to 1) based on 6 OSCAR questions (difficulty with bathing, dressing, toileting, transferring, feeding, or walking).¹⁶ We also controlled for physical restraint use, which may be used as a substitute for certain psychotropics. We also controlled for proportions of 5 additional resident factors including incontinence of bladder or bowel, any psychiatric diagnosis, mental retardation, or dementia.¹⁶

Organizational factors were represented by 6 factors.⁷ Dichotomous variables were created for ownership type (ownership for-profit versus not-for-profit) and chain membership (chain versus nonchain). Other organizational factors expressed as percentages and mean (SD) included bed size, Alzheimer special care units, average occupancy, and average Medicaid occupancy. Two market factors (competition and Medicaid reimbursement) were also included as control variables.¹⁶

Statistical Analyses

Descriptive statistics were used to summarize the data (ie, percentages, means, and SDs). Differences between 1996 and 2006 variables were evaluated using paired chi-square and *t* tests. We used multivariable Generalized Estimating Equations (GEE) to calculate the odds ratios and 95% confidence intervals between the primary independent variables and increasing antidepressant use adjusted for control variables.^{17,18} SAS version 9.13 (SAS, Cary, NC) was used for all statistical analyses.

RESULTS

Table 1 compares information about resident, organizational, and market factors in 1996 and 2006 in more than 12,000 nursing homes. During that time period physical restraint use decreased despite an increase in the percentage of residents with a psychiatric diagnosis (both comparisons, $P < .05$). The other statistically significant change ($P < .05$) was an increase in the percentage of nursing homes with Alzheimer special care units between 1996 and 2006.

Figure 1 shows the increase in antidepressant use from an average of 21.9% in 1996 to 47.5% in 2006. Table 2 shows the primary independent variables of interest. During the study time period, there was a statistically significant ($P < .05$) increase in the number of hours spent on-site by physicians and physician extenders. All other staffing pattern variables were stable over the 11-year time period. The use of all other psychotropic medication classes increased over the 11-year time period (all comparisons statistically significant, $P < .05$).

Table 3 shows the results of the multivariable analyses for the relationship between the primary independent variables and change in antidepressant use. After controlling for resident, organizational, and market factors, increased antidepressant drug prescribing was associated with physician extenders (adjusted odds ratio [AOR] 2.21; 95% confidence interval [CI] 1.96–2.51), or registered nurses (AOR 1.06; 95% CI 1.02–1.10), or nurse aides (AOR 1.08; 95% CI 1.04–1.12) spending more time in a facility. Increased antidepressant drug prescribing was also associated with the coprescribing of sedative/hypnotics (AOR 1.12; 95% CI 1.08–1.16). In contrast, having medical directors and physicians spend more time in the facility (AOR 0.60; 95% CI 0.53–0.69 and AOR 0.62; 95% CI 0.54–0.71, respectively) or coprescribing antianxiety or antipsychotic agents (AOR 0.70; 95% CI 0.68–0.72 and AOR 0.74; 95% CI 0.72–0.77, respectively) decreased the likelihood of increasing antidepressant use.

DISCUSSION

This study documents that antidepressant prescribing in nursing homes between 1996 and 2006 has increased by 216%. The rise in the rate of antidepressant prescribing seems to have plateaued to 49.1% as per 2009 third quarter Minimum Data Set 2.0 public quality indicator and resident reports listed on the Centers for Medicare and Medicaid Services (CMS) Web site.¹⁹ The rate of antidepressant prescribing in US nursing homes is considerably higher than the rate of 33% reported by Nishtala et al¹⁵ of 500 elderly residents of aged care homes in 2008 from Australia. Similarly, Cherma et al²⁰ studied nursing homes in Sweden and documented that 38% were prescribed an antidepressant. The increased rate of prescribing seen in our longitudinal US study may be because of the introduction of newer antidepressants perceived to be safer and have greater sensitivity by health care professionals to address undertreatment of major depression and perhaps dysthymic disorders.^{3,21}

The high rate of antidepressant prescribing is of potential concern given their potential to cause clinically significant adverse consequences because of which require specific monitoring and careful consideration of relative risks and benefit.²¹ This may be in part why CMS included antidepressants in the most recent list of potentially unnecessary medications included in the revised F-tag 329.²² However, several organizations have expressed concern for antidepressants being included in F-tag 329 because antidepressants can be prescribed for conditions other than depression including generalized anxiety disorders, posttraumatic stress disorder, obsessive compulsive disorder, insomnia,

neuropathic pain (eg, diabetic peripheral neuropathy), migraine headaches, and urinary incontinence.^{21,23,24}

It may be informative to examine the factors associated with increasing antidepressant use found in the current study. It would appear that antidepressants are not being used as substitutes for antipsychotics or anxiety agents given the point estimates for the odds ratio for both being less than one. Indeed the use of both classes of these other psychotropic drugs has also increased over the same 11-year time period despite their being heavily regulated in CMS surveyors interpretive guidelines.¹⁶ Also of note is that the more time spent by physician extenders and nurse aides, the more likely that antidepressants were prescribed. Although it is not clear what the reason is for the relationship with physician extenders and registered nurses, the finding with nurse aides confirms information from other studies about their important role in influencing decisions about psychotropic medications.^{10–13} Currently, nursing homes are under increasing legislative pressure to improve staffing levels.²⁵ Our findings would seem to indicate that if the least expensive increases in staffing are initiated (eg, just more nurse aides), then this may influence antidepressant use.

It was reassuring though that the more time spent on-site by primary physicians and medical directors may counteract the rise in antidepressant use. This is consistent with a recent article by Rowland et al,²⁶ that the presence of certified medical directors is an independent predictor of nursing home quality (including the number and severity of deficiency citations, including F-329). This is also consistent with the countervailing influence clinically trained staff can have on quality of care in nursing homes.

There are several potential limitations worth noting. Information about the type, dose, duration, or specific indication for antidepressant prescribing was not available. Therefore, inferences about the quality of prescribing cannot be made. However, a previous study by Brown et al⁵ found that nearly one third of nursing home residents either received a suboptimal antidepressant choice (ie, tricyclic antidepressants) or dose. Another limitation is that additional information about physician characteristics was not available in these data sources. Having additional information about physician characteristics, such as their type of training (internal versus family medicine), whether or not they completed a geriatric medicine fellowship, or completed additional nursing home–specific training (eg, certified medical director) would help to better understand prescribing patterns. Finally, it is unknown what the generalizability of this study is to other countries because antidepressant prescribing rates seem to be significantly higher in the United States when compared with other countries.

CONCLUSION

Despite these potential limitations, we conclude that the use of antidepressants has increased substantially in the past decade in older nursing home residents and seems to be associated with certain staffing characteristics and the coprescribing of psychotropic medications. Further research is needed to determine if antidepressants are appropriately prescribed, and if overuse is determined, develop interventions to improve the quality of prescribing of these medications in older nursing home residents.

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Fig. 1.
Average rates of antidepressant use in US nursing homes 1996–2006.

Table 1

Characteristics of the Nursing Home Sample in 1996 and 2006 (N = 12,556)

Variables	1996, Mean (or %)	SD	2006, Mean (or %)	SD
<i>Resident Factors</i>				
Activities of daily living	0.28	0.13	0.26	0.12
Restrained	15%	16	10% *	11
Incontinent bladder	50%	18	53%	18
Incontinent bowel	41%	19	43%	18
Psychiatric diagnoses	12%	14	16% *	16
Mental retardation	3%	6	3%	6
Dementia	42%	19	43%	20
<i>Organizational Factors</i>				
For profit	65%	—	66%	—
Chain membership	51%	—	53%	—
Size (beds)	110	76	109	67
Alzheimer special care units	14%	—	18% *	—
Average occupancy	84%	20	83%	17
Average Medicaid occupancy	53%	25	52%	24
<i>Market Factors</i>				
Competition (nursing homes)	0.21	0.24	0.21	0.24
Medicaid reimbursement rate (\$)	91.6	19.9	95.3	19.7

* Paired chi-square or t test significant at $P < .05$ or better (comparing 1996 with 2006 data).

Table 2

Primary Independent Variables (N = 12,556)

Variables	1996, Mean (or %)	SD	2006, Mean (or %)	SD
<i>Staffing Patterns</i>				
FTE RNs/100 beds	5.6	7.2	5.3	7.2
FTE LPNs/100 beds	9.0	6.8	9.6	7.1
FTE nurse aides/100 beds	26.7	11.7	27.4	12.0
FTE medical director	0.11	0.13	0.12	0.15
FTE physicians	0.46	0.11	0.61 [*]	0.13
FTE physician extenders	0.02	0.09	0.07 [*]	0.17
<i>Other Psychotropic Drug Use</i>				
Antianxiety medications	15.5%	9.7	18.5% [*]	9.6
Sedative/hypnotic medications	5%	7.4	6.8% [*]	6.9
Antipsychotic medications	16.2%	13.0	25.5% [*]	14.6

FTE, full-time equivalent; RN, registered nurse; LPN, licensed practical nurse.

^{*} Paired chi-square or t test significant at $P < .05$ or better (comparing 1996 with 2006 data).

Table 3

Multivariable Factors Associated With Increasing Antidepressant Medication Use From 1996 to 2006 (N 5 12,556)*

Variables	Adj. OR	95% CI
<i>Staffing Patterns</i>		
FTE nurse aides		
3rd tercile (high)	1.08	1.04–1.12
2nd tercile (medium)	1.10	1.05–1.15
1st tercile (low)	Reference	—
FTE RNs/100 beds		
3rd Tercile (high)	1.06	1.02–1.10
2nd Tercile (medium)	0.94	0.90–0.98
1st Tercile (low)	Reference	—
FTE LPNs / 100 beds		
3rd Tercile (high)	0.99	0.95–1.02
2nd Tercile (medium)	0.99	0.95–1.04
1st Tercile (low)	Reference	—
FTE Medical directors	0.60	0.53–0.69
FTE Physicians	0.62	0.54–0.71
FTE physician extenders	2.21	1.96–2.51
<i>Psychotropic Use Factors</i>		
Antianxiety medications		
3rd tercile (high)	0.70	0.68–0.72
2nd tercile (medium)	0.41	0.39–0.43
1st tercile (low)	Reference	—
Sedative/hypnotic medications		
3rd tercile (high)	1.12	1.08–1.16
2nd tercile (medium)	1.14	1.10–1.19
1st tercile (low)	Reference	—
Antipsychotic medications		
3rd tercile (high)	0.74	0.72–0.77
2nd tercile (medium)	0.46	0.44–0.48
1st tercile (low)	Reference	—

Adj., adjusted; CI, confidence interval; FTE, full-time equivalent; OR, odds ratio.

* Controlling for other resident, organizational, and market factors.