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Health status and suicide in the second half of life

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Abstract

Objective—To examine the associations of suicide in the second half of life with medical and psychiatric illness, functional limitations, and reported use of inpatient, ambulatory, and home health care services.

Method—A retrospective case-control design was used to compare 86 people over age 50 years who died by suicide with a comparison group of 86 living community participants that were individually matched on age, gender, race, and county of residence.

Results—Suicide decedents had more Axis I diagnoses, including current mood and anxiety disorders, worse physical health status, and greater impairment in functional capacity. They were more likely to have required psychiatric treatment, medical, or surgical hospitalization in the last year, and visiting nurse or home health aide services. In a multivariate model, the presence of any active Axis I disorder and any impairment in instrumental activities of daily living (IADL) made independent contributions to suicide risk.

Conclusions—Mental illness, physical illness, and associated functional impairments represent domains of risk for suicide in this age group. In addition to individuals with psychiatric illness, those with severe or comorbid physical illness and functional disability who require inpatient and home care services should be targeted for screening and preventive interventions.

Keywords

suicide; primary care; functional impairment; service utilization; aged

Introduction

Suicide in older adults is a serious public health problem that is projected to increase as the population ages (Conwell *et al.*, 2002). Development of effective strategies for suicide prevention hinges on identification of causal risk factors that are modifiable by clinical and/or population-based interventions and is aided by the identification of sites where members of the population at risk present for services. Recent studies using the case control psychological autopsy (PA) method (Hawton *et al.*, 1998) have contributed greatly to our understanding of risk factors for suicide in older adults (Conwell *et al.*, 2000; Harwood *et al.*, 2001; Beautrais, 2002; Waern *et al.*, 2002b; Chiu *et al.*, 2004). They indicate that psychiatric illness, particularly affective disorders, social isolation (Beautrais, 2002; Duberstein *et al.*, 2004), negative life

events (Rubenowitz *et al.*, 2001; Beautrais, 2002; Duberstein *et al.*, 2004), an obsessional and anxious (Harwood *et al.*, 2001) or neurotic and constricted personality style (Duberstein *et al.*, 1994), and past suicide attempts (Conwell *et al.*, 2000; Chiu *et al.*, 2004) distinguished late life suicide decedents from controls.

Although physical illness and functional impairments are common in older adulthood, their role as determinants of late life suicide risk has been less systematically examined. In her study of suicides and near fatal suicide attempts among adults aged 55 and over in New Zealand, Beautrais found no differences between cases and matched controls in physical health status, hospital admission in the last year, or primary care outpatient visits in the last month (Beautrais, 2002). In contrast, Chiu *et al.* found that elderly Chinese suicide decedents were significantly more likely than controls to have consulted a physician in the last month and to have been hospitalized in the last year (Chiu *et al.*, 2004). Harwood *et al.*'s PA study of adults aged 60 and over compared suicide deaths with a matched sample that had died of natural causes in hospital, a strategy that precluded examining the role of physical health factors (Harwood *et al.*, 2001). None of these studies included direct measures of physical illness burden or functional status, and none examined other forms of service utilization.

In perhaps the most comprehensive examination of physical health status and suicide using the PA method, Waern *et al.* compared suicide decedents over age 65 with living controls (Rubenowitz *et al.*, 2001; Waern *et al.*, 2002a,b), finding that serious physical illness was independently associated with male suicide, and that visual impairment, neurological disease, and malignancies in particular distinguished the groups (Waern *et al.*, 2002a). Although a higher proportion of suicides had received psychiatric care and home care services (Waern *et al.*, 2003), decedents were no more likely than controls to have visited a non-psychiatric physician in the last month. No measure of functional impairment was included, however.

A more complete characterization of the health and functional status of suicide decedents is needed to help match strategies for suicide prevention to the particular circumstances of older adults at risk for suicide. The analyses reported here use a pair-matched case-control design (completed suicides and living community comparison group). We examined the associations between Axis I diagnoses, physical health status, specific medical conditions, functional impairments, utilization of a wider array of health care services, and risk for suicide in adults aged 50 years and above.

Methods

Subjects

Suicides—Cases were drawn from a consecutive series of 137 subjects age 50 years and above whose deaths were determined by the Chief Medical Examiners (MEs) of Monroe and Onondaga Counties to have been by suicide. Both counties encompass urban, suburban, and rural areas. The study was approved following institutional review. The victim's next-of-kin was contacted by letter and invited to participate. Interviews were conducted an average of 14.2 weeks (SD = 8.1) after the death. We obtained written informed consent from next-of-kin (or from comparison subjects themselves) for interviews and access to records. Interviews, conducted ordinarily in the respondent's home, ranged from 1.5–2.5 h in duration.

Of the 137 age-eligible suicides, 14 (10%) were excluded because we were unable to contact proxy respondents and 37 (27%) were excluded when proxy informants refused participation. Retrospective proxy interviews were conducted for the remaining 86 suicides, of which 63 were men (73%) and 23 were women (27%). There were no significant differences in age or gender between suicides that were excluded (mean age = 64.3, SD = 11.5, 78% male) and included (mean age = 68.0, SD = 13.2, age range = 50–99, 73% male). Thirty-three of the 86

suicides were between 50–64 years of age (38%), 24 (28%) were 65–74, and 29 (34%) were 75 or older.

The analyses utilized data from the primary respondent complemented by record reviews. Proxy respondents were identified by next-of-kin based on their ability to provide detailed information about the suicide decedent. Spouses ($n = 30$, 35%) and children ($n = 32$, 37%) comprised nearly three-quarters of the respondents, consistent with prior research on elderly suicide (Harwood *et al.*, 2001; Beautrais, 2002; Waern *et al.*, 2002b). Thirty-three respondents (39%) lived with the decedent and 35 (41%) saw the decedent within 1 day of death.

Comparison group—Comparison group subjects, recruited by a random digit dialing procedure, were individually matched to suicides on the basis of age (± 5 years), gender, race, and county of residence; one 92-year old control was paired with a 99-year old suicide. To maximize comparability, we used only data gathered from proxy respondents by research personnel masked to other sources of information, and from medical records. Mean age for comparison subjects was 67.2 (SD = 12.6, age range = 50–92); 36 (42%) were between 50–64, 25 (29%) were 65–74, and 25 were more than 75 years old. Seventy-six per cent of comparison proxies were spouses ($n = 44$) or children ($n = 21$). During the week prior to the interview, many proxies had lived with ($n = 54$, 63%) and almost all had spoken directly with ($n = 84$, 98%) the comparison subject.

Measures and procedures

Psychiatric symptoms and diagnoses were documented using the Structured Clinical Interview for DSM-III-R Axis I disorders (SCID) (First *et al.*, 1997), which has been validated for use in proxy-based research of older adult suicidal behavior (Conner *et al.*, 2001). Diagnoses of psychiatric disorders were made *via* a previously supported best-estimate process based on review of all available information for each suicide and comparison subject, and according to DSM-III-R criteria (Maziade *et al.*, 1992; Beautrais *et al.*, 1996; Kelly and Mann, 1996; Conner *et al.*, 2001); reviewers were not blind to case-control status. Prior suicide attempts were assessed *via* interviews with informants and record review.

Physical health status—Judgments regarding the presence or absence of medical diagnoses were based on review of medical records. Specific diagnoses examined were arthritis, cancer (diagnosed or treated within the last 5 years), central nervous system (CNS) diseases, chronic obstructive pulmonary disease (COPD), thyroid disease, diabetes mellitus (DM), hypertension, cardiovascular disease (CVD), and visual and auditory impairment. Ratings of perceived physical health status and pain were made using questions extracted from the SF-36 (Ware and Sherbourne, 1992). Variables were dichotomized as follows: ‘In general, how would you say (subject’s) physical health was’—excellent/very good/good *versus* fair/poor; ‘Compared to 1 year ago, how would you rate (subject’s) health (now/at time of suicide)’—much/somewhat better/same *versus* somewhat/much worse; ‘How much bodily pain did (subject) have during the last 4 weeks’—none/mild *versus* moderate/severe/very severe. The proxy version of the SF-36 has moderate to excellent concordance with patient reports (Solari and Radice, 2001; Hofhuis *et al.*, 2003).

Functional status—Activities of daily living, such as toileting and grooming, were assessed through interviews with proxy informants using the Physical Self-Maintenance Scale (PSMS) (Lawton and Brody, 1969). Higher order functions such as preparing meals and managing money were assessed with the Instrumental Activities of Daily Living (IADL) scale (Lawton and Brody, 1969). Both scales were scored continuously. Deficits in functional ability ascribed specifically to physical illness were assessed using the Karnofsky Performance Status Scale (KPSS) (Karnofsky and Barchenal, 1949) based on synthesis of the proxy report and medical

record review. The KPSS, IADL and PSMS, and their proxy versions, have established reliability and validity for use with older adults (Long *et al.*, 1998; Mccall *et al.*, 2002; Rebollo *et al.*, 2004).

Treatment and utilization—Ratings of health care access and utilization were derived from all sources, including informant interviews and review of medical and psychiatric records. We examined dates of most recent in-person contact documented by any information source; total number of outpatient visits in the last month with primary care providers and mental health professionals endorsed by any information source; total medical or surgical and mental health or substance abuse inpatient treatment days in the last year; date of most recent hospital discharge for medical/surgical or mental health/substance abuse treatment; and utilization of home care services, including informant and medical record documentation of visiting nurse and home health aide services (one or more visits) in the last month and year. Facilities records were reviewed for 78 of the suicides (median number of records = 2) and 74 comparison subjects (median number of records = 1). The total number of information sources (informants interviewed plus records reviewed) for suicides and comparison subjects did not differ (Cochran-Armitage trend test; $z = .52$, $p = 0.599$).

Data analyses

Odds ratios (OR) and 95% confidence intervals (CI) were calculated using paired logistic regression analyses (Hosmer and Lemeshow, 2000), an analysis method that uses the differences between the corresponding values of the suicide and matched controls. Living arrangement (alone vs. other) and education (<12 years vs. ≥12 years) were included as covariates. Relative contributions to suicide risk of psychiatric, physical health, and function variables were tested using sequential multivariate paired logistic regression models. In the first model, case status was regressed on any Axis I diagnosis (0 vs. ≥ 1) and perceived physical health status (excellent/very good/good vs. fair/poor). In the second model, continuous IADL and PSMS scores were added. In both models living situation and education were covaried. All reported analyses are two-tailed with statistical significance at $p < 0.05$.

Results

The sample consisted of 86 individuals who died by suicide and 86 community-residing comparison subjects (63 men and 23 women in each group); nearly all subjects were White (97.6%). Suicides were more likely than the comparison group to be unmarried (OR = 5.00; 95% CI = 2.36–12.28), on disability or unemployed (OR = 8.27; 95% CI = 2.90–31.61), and living alone (OR = 5.33; 95% CI = 2.40–14.16) (Table 1).

Psychiatric illness

Eighty-five per cent of suicides had a diagnosable Axis I disorder, compared with 21% of the comparison group (Table 2). Suicides had a greater probability of any current mood disorder, including major affective illness and other mood disorders (dysthymia, adjustment disorder with depressed mood, and depression NOS). Major depression (single episode and recurrent), anxiety disorders, and previous suicide attempts distinguished the groups. Dementia and delirium, substance use disorders, and primary psychoses (schizophrenia, delusional disorder, psychosis NOS) did not confer greater risk for suicide. However, suicides were significantly more likely than the comparison group to have two or more Axis I disorders (OR = 3.19; 95% CI = 1.10–11.54; $p < .05$).

Physical health and functioning

Proxy reports of fair or poor health and deteriorating health over the past year were significantly associated with suicide, whereas pain was not (Table 3). Disorders conferring significantly

greater risk for suicide were cancer and CNS disorders. Cardiovascular and lung disease did not distinguish the groups, and arthritis was more common among controls.

Suicide decedents had significantly greater mean scores on the IADL and PSMS measures than controls, and their mean KPSS score was significantly lower, indicating greater functional impairment ascribable to physical causes.

Current health, psychiatric diagnosis, and functional impairment

When entered simultaneously into a logistic regression model (Table 4), both fair/poor physical health and the presence of any Axis I psychiatric diagnosis independently conferred risk for suicide. When functional impairment variables were added to the model, IADL deficits significantly predicted death by suicide, whereas perceived physical health no longer did.

Service utilization and treatment

Suicides were significantly more likely than comparison subjects to have had treatment by a mental health provider and one or more previous psychiatric hospitalizations (Table 5). There was no difference between suicide and comparison subjects in the proportion seeing a primary care provider in the last week or month. Suicide decedents, however, were more likely to have had one or more inpatient medical or surgical hospitalizations in the last year, and to have utilized visiting nurse or home health aide services in the last month and last year of life. Suicides were also significantly more likely than controls to have been prescribed benzodiazepines and antidepressant medications; the proportion receiving antipsychotics did not differ between groups.

Discussion

Results indicate that mental illness, physical illness, and associated functional impairments represent domains of risk for suicide among people 50 years of age or older; however, not all older adults who experience severe declines in health or function become suicidal. Our findings suggest that people with relatively more severe illnesses, deteriorating health status, and functional disability who require inpatient and home care services constitute a subset at greater risk that should be targeted for screening and intervention.

The findings support previous research on the role of psychiatric illnesses as modifiable risk factors and a history of psychiatric hospitalization as a marker of suicide risk in older adults (Conwell *et al.*, 2000; Harwood *et al.*, 2001; Beautrais, 2002; Waern *et al.*, 2002b; Chiu *et al.*, 2004). Single episode and recurrent major depressive disorder, anxiety disorders, and history of previous suicide attempts are particularly important and can be easily evaluated by service providers; inquiry about current and past history of mental illness and suicidal behavior should be part of each older patient's baseline health history.

Dementia or delirium and primary psychotic disorders were not significantly associated with suicide in this sample, perhaps due to early mortality from suicide and other causes (Conwell *et al.*, 1996). As well, early stages of cognitive decline are likely to be difficult for informants to detect (Harwood and Jacoby, 2000). Given that anxiety was associated with suicide, clinicians should remain alert for suicide risk among patients with significant anxiety, in particular when it occurs in combination with mood disorders (Fawcett *et al.*, 1990; Johnson *et al.*, 1990). The association of cancer and diseases of the CNS with suicide may be indicative of the strong relationship of these diseases to depression (Musselman *et al.*, 1998; Lyness *et al.*, 2000; Massie, 2004); indeed, the hypothesis that depression serves as a moderator or mediator of the association between disease and suicide should be examined in future research.

Arthritis was significantly more likely in controls than in suicides, perhaps because it was more often reported in those persons who have fewer more severe and life threatening conditions.

Functional limitations in the performance of basic (PSMS) and instrumental (IADL) activities of daily living, in addition to impairments ascribable solely to physical causes (KPSS), were significantly associated with suicide. Results of the multivariate models suggest that functional impairment may be a more robust indicator of suicide risk than physical health status. Functional assessment is central to the practice of geriatric medicine and psychiatry (Fretwell, 1990). Disability may be more readily recognized and assessed than psychiatric disorders in later life, adding additional data for suicide risk assessment in general practice.

Physical illness and functional limitations may result in a pattern of medical service utilization that could serve as a signal for suicide risk. Use of home health aide or nursing service in the last month or year, and any inpatient medical/surgical hospitalization in the last year, were associated with suicide in our sample, but visits to primary care or medical/surgical providers in the last week or month were not. Our findings support past research indicating home health care utilization is a risk factor for suicide, perhaps because it is a marker for other known suicide risk factors such as social isolation, more severe illness burden, and functional impairment (Waern *et al.*, 2003).

Similar rates of outpatient medical/surgical care utilization may actually reflect unequal access to care, since the suicide cases, who have greater illness burden and hence greater need for care, are not receiving it. Nonetheless, the frequency with which older adults were seen in primary care settings before suicide reinforces its importance as a potentially productive venue for mounting preventive interventions. Therapeutic strategies within the primary care setting have been found effective in reducing suicidal ideation in elderly patients (Bruce *et al.*, 2004). Our observation that utilization of home aide services is associated with suicide risk suggests a second potential venue for selective interventions (Rowe *et al.*, 2006). Finally, although cases in this study were more likely to be prescribed antidepressants than the comparison group, an examination of the ratio of antidepressant treatment to mood disorder diagnoses indicates that depressed and suicidal older adults may be under-treated pharmacologically, supporting previous research (Fawcett *et al.*, 1990).

The use of a random digit dialing sampling method precluded our ability to provide data on available subjects who did not participate. The participation rate for case informants was comparable to or better than other PA studies (Chiu *et al.*, 2004), but nonetheless the number of potential case informants who refused to participate may reflect stigma against suicide or inadequate social support for suicide victims. In our sample, suicides were more likely to be unmarried, live alone, and had less recent contact with proxy informants than comparison subjects, perhaps introducing bias. Small sample size limited our ability to examine subgroups by age, gender, race, or socioeconomic status, and may have contributed to instances of Type II error in those domains that we could address. The PA method, although valid for the study of suicide (Kelly and Mann, 1996), is a retrospective approach based on proxy reports. To minimize recollection bias, we conducted interviews as soon as possible after the suicide death. Our choice of a living, rather than deceased, comparison group was necessitated by our focus on physical factors as correlates of case status. Although use of an accidental-death comparison group may help to control bereavement, older adults who die by accident often have greater medical burden and impairment and psychiatric diagnoses (Prior *et al.*, 1996; Kibayashi *et al.*, 2007). Nevertheless, case proxies, having experienced the suicide death of a relative or friend, may have a biased recollection of subject characteristics compared to comparison-group proxies who did not experience such a traumatic event. As well, there is potential for bias with clinician-rated measures and extraction of data from medical and psychiatric records and during the consensus process, as reviewers could not be masked to case status. To mitigate these

possibilities, we used standardized and structured interviews and objective measures, as well as a consensus diagnostic process (Maziade *et al.*, 1992). Our use of proxy report data for both suicides and comparison subjects also served to reduce method variance.

Conclusion

The design of efficient and effective suicide prevention strategies requires the thorough characterization of variables associated with suicide risk in a population, including both fixed markers and modifiable factors. As well, it requires the identification of potential ‘points of capture,’ where people with these markers and risk factors routinely present for care or services and therefore are accessible to targeted interventions. Studies have repeatedly shown that a large proportion of older people who took their own lives did so within days or weeks of visiting a primary care provider (Conwell *et al.*, 2002). Our findings suggest that suicidal individuals have greater illness, impairment and health needs and, although suicide cases in our study did not visit a primary care provider more often than controls in recent weeks or months, they were hospitalized or required home-based care more often in the past year. Such venues may provide an opportunity for detection and aggressive treatment of mood disorders among older patients as one important component of a comprehensive suicide prevention strategy. Further, while serious medical illness and inpatient hospitalization for care indicate increased risk for suicide in people over age 50, associated functional impairments are an important factor to consider as well. Systematic functional assessment is standard in geriatric primary care practice and so may constitute an additional, readily accessible tool for identifying those at increased risk. A more refined understanding of the patterns of association between functional impairment and suicide is needed, particularly given the often dynamic nature of functional status in older adults (Gill *et al.*, 2006).

Home health care services may constitute another point of capture for older people at risk for suicide (Waern *et al.*, 2003; Raue *et al.*, 2007). Chronic illness and functional impairments are pre-requisites for access to in-home care services. Further research is needed to characterize suicidal behaviors in long-term care and to determine whether, as in primary care, routine screening for depression, and previous suicide attempts should accompany physical health and functional assessments at intake as a means to reduce suicide mortality in the second half of life.

Key points

- Suicidal older adults have greater illness, functional impairment, and health needs.
- Primary care is an important point of capture for screening and targeting suicidal behavior.
- Detection and treatment of mood disorders should be a component of a comprehensive suicide prevention strategy.

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Table 1

Sociodemographic characteristics of suicides ($n = 86$) and matched comparison group ($n = 86$)

Variable	Suicides		Comparison group		<i>p</i>
	<i>N</i>	(%)	<i>N</i>	(%)	
Married	33	38.4	61	70.9	<0.0001
Lived alone	40	46.5	14	16.3	<0.0001
Education					
≤12 years	50	60.2	41	47.7	NS
>12 years	33	39.8	45	52.3	
Employment					
Full or Part-time	16	18.6	36	41.9	<0.0001
Retired	43	50.0	44	51.2	
Unemployed/on disability	27	31.4	6	7.0	
Annual income					
<\$35 000	54	69.2	27	33.3	<0.0001
≥\$35 000	24	30.8	54	66.7	

Note: *p*-values were obtained using McNemar's Test.

Table 2

Psychiatric illness and symptoms

Variable	Suicides N(%)	Comparison group N(%)	Pairs in analysis	p	OR	95% CI
Any Axis I dx	73 (84.9)	18 (20.9)	83	.0002	44.6	9.7–792.0
Any current mood d/o	62 (72.1)	8 (9.3)	83	.0002	47.7	10.1–854.2
Major depression	43 (50.0)	4 (4.7)	83	<.0001	12.2	4.2–52.4
single episode	27 (31.4)	3 (3.5)	83	.0007	10.05	3.1–49.3
recurrent	16 (18.6)	1 (1.2)	83	.0076	19.86	3.4–400.2
Other mood d/o	27 (31.4)	4 (4.7)	83	.0023	5.5	2.0–19.2
Any substance use d/o	29 (33.7)	13 (15.1)	83	NS	1.8	0.8–4.5
Current alcohol use d/o	14 (16.3)	5 (5.8)	83	NS	1.7	0.5–6.5
Primary psychoses	4 (4.7)	1 (1.2)	83	NS	1.7	0.2–34.0
Anxiety d/o	13 (15.1)	5 (5.8)	83	.024	5.9	1.4–33.8
Dementia/delirium	4 (4.7)	1 (1.2)	83	NS	3.0	0.4–60.0
Previous suicide attempt	21 (24.4)	2 (2.3)	83	.0119	13.6	2.7–245.9

Note: Age, gender, race, and county of residence controlled by design. Adjusted for education and living situation.

Table 3

Physical health and functioning

Variable	Suicides N (%)	Comparison group N (%)	Pairs in analysis	p	Adjusted OR	95% CI
Physical health status						
Current health—fair/poor	52 (61.2)	13 (15.1)	82	<.0001	13.3	4.5–58.8
Health decline last year—worse/much worse	52 (61.9)	18 (21.2)	80	.0002	5.7	2.5–15.9
Pain—moderate/severe/very severe	38 (46.9)	25 (29.4)	77	NS	1.8	0.8–4.1
Arthritis	36 (44.4)	44 (53.7)	74	.0111	0.3	0.1–0.7
Cancer	16 (19.1)	5 (6.1)	77	.0380	4.4	1.2–22.2
Cardiovascular disease	24 (29.3)	20 (24.1)	76	NS	1.5	0.6–4.0
CNS disease	21 (25.6)	3 (3.7)	75	.0044	17.8	3.3–200
COPD	21 (25.6)	8 (9.8)	75	NS	2.0	0.7–6.5
Functioning [median (range)]						
IADL	3 (0–21)	0 (0–14)	81	<.0001	1.5	1.3–2.0
PSMS	1 (0–12)	0 (0–4)	83	.0018	1.9	1.4–3.2
KPSS	82.5 (30–100)	90 (50–100)	76	.0034	0.9	0.9–1.0

Note: Age, gender, race, and county of residence controlled by design. Adjusted for education and living situation. Sample sizes differ as a result of missing data.

Table 4

Multivariate analysis

	Model 1 *			Model 2 **		
	Adjusted OR	95% CI	p	Adjusted OR	95% CI	p
Any Axis I dx	28.2	5.8–511.4	.0012	23.4	3.5–563.8	.0089
Current physical health–fair/poor	6.3	1.8–33.2	.0102	5.3	0.8–76.4	NS
Education >12 years	0.9	0.3–3.2	NS	1.4	0.3–7.8	NS
Living alone	2.8	0.7–13.9	NS	4.9	0.7–82.3	NS
IADL				1.4	1.1–1.9	.0247
PSMS				0.9	0.4–2.2	NS

Note. Age, gender, race, and county of residence controlled by design.

* 82 pairs in analysis.

** 81 pairs in analysis.

Table 5

Service utilization and treatment history

Variable	Suicides N(%)	Comparison group N(%)	Pairs in analysis	p	OR	95% CI
Medical treatment						
Any med/surg visit						
last week	19 (28.8)	20 (28.6)	52	NS	0.5	0.2–1.6
Any med/surg visit						
last month	41 (54.0)	43 (57.3)	62	NS	0.6	0.3–1.5
Med/surg hospitalization						
last year	24 (28.2)	7 (8.2)	81	.0031	6.6	2.1–27.4
Home health service use						
Aide service						
last month	9 (10.5)	2 (2.3)	83	.058	5.1	1.1–38.1
last year	13 (15.1)	4 (4.7)	83	.0171	5.5	1.5–27.4
Visiting nurse service						
last month	10 (11.8)	2 (2.3)	82	.0174	8.0	1.7–61.1
last year	16 (18.8)	5 (5.8)	82	.0040	6.1	2.0–24.6
Any home nursing or aide service						
last month	21 (24.4)	13 (15.3)	82	.061	2.7	1.0–8.5
last year	28 (32.6)	18 (20.9)	83	.0161	3.0	1.3–7.9
Psychiatric treatment						
History of psychiatric hospitalization	25 (29.4)	3 (3.5)	81	.0079	7.4	2.1–46.8
History of psychiatric treatment	47 (56.0)	23 (27.4)	80	.0405	2.5	1.1–6.6
Medications prescribed at death						
Benzodiazepines	23 (26.7)	6 (7.0)	83	.0319	3.1	1.2–9.9
Narcotics	9 (10.5)	1 (1.2)	83	NS	4.4	0.7–84.2
Antidepressants	28 (32.6)	10 (11.6)	83	.0121	3.7	1.4–11.5
Antipsychotics	9 (10.5)	5 (5.8)	83	NS	1.1	0.3–4.5

Note: Age, gender, race, and county of residence controlled by design. Adjusted for education and living situation.