The Mortality of Elder Mistreatment

Mark S. Lachs, MD, MPH; Christianna S. Williams, MA; Shelley O'Brien, MS; Karl A. Pillemer, PhD; Mary E. Charlson, MD

Context.—Although elder mistreatment is suspected to be life threatening in some instances, little is known about the survival of elderly persons who have been mistreated.

Objective.—To estimate the independent contribution of reported elder abuse and neglect to all-cause mortality in an observational cohort of community-dwelling older adults.

Design.—Prospective cohort study with at least 9 years of follow-up.

Setting and Patients.—The New Haven Established Population for Epidemiologic Studies in the Elderly cohort, which included 2812 community-dwelling adults who were older than 65 years in 1982, a subset of whom were referred to protective services for the elderly.

Main Outcome Measures.—All-cause mortality among (1) elderly persons for whom protective services were used for corroborated elder mistreatment (elder abuse, neglect, and/or exploitation), or (2) elderly persons for whom protective services were used for self-neglect.

Results.—In the first 9 years after cohort inception, 176 cohort members were seen by elderly protective services for verified allegations; 10 (5.7%) of these were for abuse, 30 (17.0%) for neglect, 8 (4.5%) for exploitation, and 128 (72.7%) for self-neglect. At the end of a 13-year follow-up period from cohort inception, cohort members seen for elder mistreatment at any time during the follow-up had poorer survival (9%) than either those seen for self-neglect (17%) or other noninvestigated cohort members (40%) ($P<.001$). In a pooled logistic regression that adjusted for demographic characteristics, chronic diseases, functional status, social networks, cognitive status, and depressive symptomatology, the risk of death remained elevated for cohort members experiencing either elder mistreatment (odds ratio, 3.1; 95% confidence interval, 1.4-6.7) or self-neglect (odds ratio, 1.7; 95% confidence interval, 1.2-2.5), when compared with other members of the cohort.

Conclusions.—Reported and corroborated elder mistreatment and self-neglect are associated with shorter survival after adjusting for other factors associated with increased mortality in older adults.

JAMA. 1998;280:428-432

From the Divisions of Geriatrics and Gerontology (Dr Lachs) and General Internal Medicine (Dr Charlson), Cornell University Medical College, New York, NY; the Departments of Medicine and Epidemiology, Yale University School of Medicine, New Haven, Conn (Ms Williams); the Connecticut Department of Social Services, Hartford (Ms O'Brien); and the Cornell College of Human Ecology, Ithaca, NY (Dr Pillemer).

Reprints: Mark S. Lachs, MD, Division of Geriatrics and Gerontology, New York Hospital-Cornell University Medical College, 525 E 68th St, Box 46, New York, NY 10021.

ELDER MISTREATMENT is suspected to be a morbid and mortal entity, but little is known about the ultimate fate of older victims of family violence. Studies have examined risk factors for mistreatment[1-3] and prevalence surveys have been performed (32 cases per 1000 adults in the most commonly cited study),[4] but no longitudinal studies of survival of mistreated elderly persons have been conducted.

We previously completed a study that identified risk factors for adult protective service use and reported elder mistreatment in a large group of older adults followed up for more than a decade.[2,3,5] In that research, we linked the records of a well-characterized cohort of community-dwelling older adults interviewed annually (The New Haven Established Population for Epidemiologic Studies in the Elderly [EPESE]) with records from protective services for the elderly from Connecticut, which was the official entity charged with the investigation of suspected elder mistreatment. The goal was to identify features of older adults that would predict subsequent elder mistreatment. After completing that research, it occurred to us that elder mistreatment could be viewed not only as an adverse outcome for these subjects, but also as a risk factor itself for other adverse outcomes, such as mortality. Thus, we were able to longitudinally examine the mortality associated with elder mistreatment in a well-characterized cohort of community-dwelling older adults.

METHODS

Description of the Cohort

The New Haven EPESE study is 1 of 4 cohorts funded by the National Institute on Aging.[6] In its inception year, 1982, the study sample consisted of 2812 community-dwelling adults older than 65 years derived from a stratified sample of residence types: public housing for elderly persons (ie, age and income restricted), private housing for elderly persons (ie, age but not income restricted), and community (ie, no restrictions). The sample at baseline consisted

©1998 American Medical Association. All rights reserved.

Downloaded From: http://jamanetwork.com/ on 05/24/2013

of 1643 women and 1169 men; 593 subjects were nonwhite. At cohort inception the average age of subjects was 74 years; 13.1% of subjects had 1 or more impairments in activities of daily living and 61.3% rated their health as excellent or good. A detailed description of the sampling strategy as well as the demographic, clinical, and other characteristics have been reported elsewhere.[7]

At baseline, subjects had a detailed interview covering broad medical, functional, demographic, and psychosocial domains. Standardized instruments were used to assess cognition, depressive symptomatology, social networks, sources of emotional and other support, and chronic conditions. Subjects were interviewed every third year in person and annually by telephone. Interrater reliability substudies were conducted to ensure data quality and mortality follow-up is assumed to be complete. A description of the scales and interview methods has also been published.[6]

Protective Services for the Elderly in Connecticut

Connecticut has the oldest mandatory elder abuse reporting law in the United States, enacted in 1978 (4 years before inception of the New Haven EPESE cohort). The law defines a group of mandatory reporters who are likely to have frequent contact with older adults by virtue of their occupation (such as physicians, nurses, and social service providers), and might therefore be in a position to identify cases of suspected elder abuse. Reports are made to a regional ombudsman in the elderly protective services division who makes an on-site visit to the elderly person to interview the client and any other involved party. Based on the information obtained, the ombudsman verifies or refutes a suspicion of mistreatment and assigns 1 or more of 3 designations to a case: abuse, neglect (including self-neglect), or exploitation. *Elder abuse* is defined as the willful infliction of physical pain, injury, or mental anguish, or the willful deprivation by a caretaker of services necessary to maintain physical and mental health. *Neglect* is defined as an elderly person alone who is not able to provide himself/herself the services necessary to maintain physical and mental health, or who is not receiving those services from a responsible caretaker. Thus, under Connecticut definitions it is possible to be self-neglected. *Exploitation* is defined as taking advantage of an older adult for monetary gain or profit.

The ombudsman then develops a client-specific care plan that is typically multidisciplinary in nature and is intended to ensure safety while maximizing the autonomy of the older adult. Interventions vary and might include home care, physician or other health care clinician referral, pursuit of guardianship, or nursing home placement.

Identification of Cohort Members Seen by the Ombudsman

We performed a manual record matching of EPESE and Connecticut Ombudsman/Elderly Protective Service records to determine if any cohort members had been seen by the ombudsman during an 11-year follow-up period from cohort inception (1982-1992 inclusive). This manual matching was performed in such a way as to protect the confidentiality of all subjects involved (ie, so that elderly protective services had no knowledge of who EPESE cohort members were and EPESE investigators had no knowledge of which cohort members might have been seen by elderly protective services). The protocol was approved by the institutional review board, and the final merged data set (which contained the standardized EPESE data merged with elderly protective services–derived information about the nature of the problems noted by the ombudsman in the home investigation) had no information that would permit the identification of any party.

Strategy of Analysis

After cohort members who were seen by protective services for the elderly were identified, weighted 13-year survival curves from cohort inception were constructed for 3 subgroups of subjects: (1) those found to have sustained verified elder mistreatment (abuse, neglect, and/or exploitation) by another person, (2) those seen by protective services for corroborated self-neglect, or (3) other members of the cohort who had no contact with elderly protective services. Cohort members who were seen by the ombudsman, but who had no verified complaints were excluded. All analyses were weighted and adjusted for the sampling design of the cohort.[8]

Multivariate analysis was conducted with all-cause mortality as the dependent variable. The goal of multivariate analysis was to estimate the independent contribution of reported and corroborated elder mistreatment or self-neglect to all-cause mortality after adjusting for other factors known to predict mortality. The group of cohort members not seen by protective services for any reason served as the referent group. The categories of covariate characteristics were demographic (age, sex, race, education, and income); health related (self-reported chronic conditions including myocardial infarction, stroke, cancer, diabetes, hypertension, and hip fracture, as well as body mass index in tertiles [a measure of weight in kilograms divided by the square of height in meters]; physical functioning (number of activities of daily living impairments [0 to 7] and number of Rosow-Breslau or Nagi impairments [0 to 8])[9,10]; social networks and support (number of social ties, including marital status, frequent contact with friends and relatives, regular attendance at religious services, and participation in social or community groups, and number of sources of emotional support; cognitive performance (Pfeiffer Short Portable Mental Status Questionnaire [SPMSQ][11]); and psychosocial domains (Center for Epidemiological Studies Depression Scale[12]). For body mass index and household income, which had more than 5% missing data, dummy variables were created for the missing data so that the 2 measures could be retained in the model.

Pooled logistic regression[13] was used to allow for updating the independent variables, including referral to elderly protective services as well as characteristics ascertained in the EPESE interviews (such as depression scores and chronic conditions). Proportional hazards regression could not be used because the data did not meet the assumptions. Many of the potential confounders of the association between elder mistreatment and mortality were assessed at only the triennial face-to-face interviews, so we used 9 years of follow-up divided into three 3-year intervals. According to this strategy, each of 3 observation periods (1982-1985, 1985-1988, and 1988-1991) was included as a separate record for each subject in the pooled sample. For each record, the covariates were updated using the subject's status at the beginning of the interval. Likewise, the 3-level protective services variable (no contact with protective services for the elderly, corroborated self-neglect, and corroborated mistreatment by another party) was updated for each interval by using the dates of ombudsman investigation. The outcome for each interval was whether the subject died during that interval. Subjects who died were dropped from subsequent intervals. Subjects who were seen by the ombudsman but had no verified complaints during follow-up (n=38) were excluded from intervals subsequent to their first investigation, although we examined their survival separately.

A series of 7 hierarchical models was constructed to sequentially adjust for domains of potential confounders of the association between elder mistreatment or self-neglect and mortality. The first model included only an indicator for the 3-year interval and dummy variables for self-neglect and elder mistreatment while the

©1998 American Medical Association. All rights reserved.

Downloaded From: http://jamanetwork.com/ on 05/24/2013

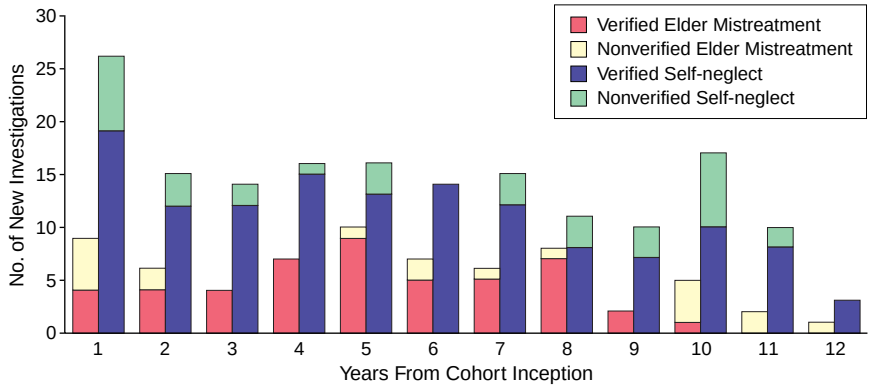

Figure 1.—Number and type of adult protective services events by year of study. Cohort inception refers to the establishment of the New Haven Established Population for Epidemiologic Studies in the Elderly in 1982.

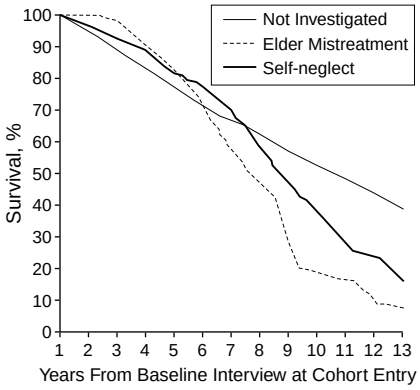

Figure 2.—Survival of cohort members by elder mistreatment status.

seventh model included the covariates from all 6 domains. The pooled method assumes that the odds ratio (OR) is consistent across intervals; therefore, we tested this assumption by running models including interaction terms between protective services status and interval.

We also sought to determine which cohort members might have been placed in nursing homes over the follow-up period. Connecticut has a long-term care registry to which, since 1977, all skilled nursing facilities have been required to report admissions. We submitted identifying data on all members of the study cohort (Social Security number, name, date of birth, sex, and race) to the registry, which identified matches with residents listed. Cohort members (or their proxies) were also asked during each annual interview if the respondent had been admitted to a nursing home at any time in the past year. These reports were confirmed by telephone calls to the nursing homes. Data are currently available for this cohort from cohort inception in 1982 through December 1990.

As ascertainment of mortality is virtually complete for the New Haven EPESE cohort, we also examined the distribution of the cause of death for the 3 groups of cohort members previously described. Cause of death was determined from death certificate data.

Table 1.—Characteristics of Subjects Who Died (Pooled 3-Year Interval)

Characteristic	No. (%) of Subjects Dying When Characteristic: Present*	Absent	Cochran-Mantel-Haenszel χ^2 *P* Value†
Age >75 y‡	999 (23.4)	408 (13.4)	<.001
Female	718 (15.8)	689 (25.4)	<.001
Nonwhite‡	276 (18.9)	1131 (17.9)	.46
<12 y of school‡	957 (19.3)	387 (14.9)	<.001
Annual income <$5000‡	480 (19.6)	715 (16.9)	.02
>1 Chronic condition	574 (26.2)	825 (14.9)	<.001
Body mass index <23.5 kg/m^2‡	592 (23.8)	675 (14.5)	<.001
Activities of daily living (ADL) impairment‡§	534 (38.9)	855 (13.6)	<.001
Higher functional impairment‡‖	1053 (23.9)	334 (10.1)	<.001
No social ties‡	282 (31.6)	1105 (16.4)	<.001
Married‡	420 (15.2)	970 (19.7)	<.001
Sources of emotional support			
No sources	175 (18.9)		
≥1 sources	954 (17.0)		.02
No need for support	209 (20.6)		
Lives alone	767 (18.6)	584 (17.0)	.19
>3 SPMSQ errors‡¶	361 (32.6)	991 (15.3)	<.001
CES-Depression# Score≥16‡	310 (25.5)	995 (15.7)	<.001
Ombudsman investigation status			
No investigations	1303 (17.3)		
Self-neglect only	73 (40.3)		<.001
Elder mistreatment	31 (53.2)		

*Numbers are pooled but not weighted; percentages are weighted for the sampling strategy of the cohort.
†Adjusted for 3-year interval; stratified sampling is also accounted for in generating this test statistic.
‡Characteristic is significantly associated with reported elder abuse or neglect (*P* <.05).
§Impairment in one or more ADLs.
‖Impairment in one or more higher functional activities (Rosow-Breslau[9] or Nagi[10] activities).
¶SPMSQ indicates Pfeiffer Short Portable Mental Status Questionnaire.[11]
#CES-Depression indicates Center for Epidemiological Studies Depression Scale.

RESULTS

The number of verified and nonverified mistreatment and self-neglect events over the follow-up period are shown in Figure 1. By year 8 of follow-up, 90% of the total mistreatment events that had occurred within the cohort over the entire 13-year follow-up had accrued. The 13-year survival curves for the 3 groups are shown in Figure 2. While at the beginning of the follow-up period (years 1-5) survival rates were similar, at the end of follow-up, cohort members seen for abuse and/or neglect had poorer survival (9%) than either those seen for self-neglect (17%) or those cohort members who had no contact with protective services for the elderly (40%) ($P<.001$ for differences, weighted χ^2). Survival of subjects who had nonverified allegations (39%) was not significantly different than the cohort numbers who were not seen by protective services.

Table 1 shows the 3-year pooled bivariate risk of death for several covariates that appear in the final multivariable models; most are associated with increased mortality (older age, male, lower educational attainment, more than 1 chronic medical condition, low body mass index, any activities of daily living or higher impairment, poor social network, cognitive impairment, and depressive symptomatology). In bivariate analysis, elder mistreatment also was significantly associated with many of these covariates.

Table 2 shows all-cause mortality over the three 3-year intervals by risk group. In each interval and for the total pooled results, elder mistreatment (abuse and/or neglect) and self-neglect conferred a significantly increased risk of death. In all but the first interval, elder mistreat-

©1998 American Medical Association. All rights reserved.

Downloaded From: http://jamanetwork.com/ on 05/24/2013

ment was associated with a significantly higher risk of death than self-neglect.

The results of hierarchical pooled logistic regression are shown in Table 3. The risk of death adjusted only for the interval of follow-up was substantial for both subjects who were mistreated (OR, 5.1; 95% confidence interval [CI], 2.8-9.5) as well as those who were self-neglected (OR, 3.1; 95% CI, 2.3-4.2). Subsequent models show the influence of adjusting for demographic characteristics, functional status, social networks, cognitive status, and depressive symptomatology. In general these models decreased the magnitude of the association between elder mistreatment and all-cause mortality, with demographic characteristics and functional status having the greatest influence on the ORs. However, after adjusting for all these covariates, the risk of death remained elevated for both cohort members experiencing elder mistreatment (OR, 3.1; 95% CI, 1.4-6.7) and those seen for self-neglect (OR, 1.7; 95% CI, 1.2-2.5), when compared with other members of the cohort.

The most common causes of death for these 3 groups are shown in Table 4. In general, the major causes of death were similarly distributed among the 3 groups. Notably, no death in either the mistreated group or the self-neglected group was deemed to be due to injury.

Elder mistreatment and self-neglect may be risk factors for entering a nursing home. For the elderly person who has been mistreated, the nursing home may reflect a safe haven from mistreatment. For the self-neglecting elder, a long-term care facility might afford access to food, medicines, or care that would otherwise be inaccessible in the community. Alternatively, nursing home residents generally are at a higher risk of death than their community-dwelling counterparts, and nursing home placement might alter the cause of death for a previously mistreated subject. Accordingly, we assessed the proportion of deaths occurring in long-term care facilities for all 3 groups (Table 5). While those subjects experiencing self-neglect were more likely to die in a nursing home compared with uninvestigated subjects, those experiencing mistreatment were not.

Table 2.—All-Cause Mortality Associated With Verified Self-neglect and Verified Elder Mistreatment, by 3-Year Interval and Overall

Investigation Status	Total No. at Risk	No. (%) Who Died in Interval*	χ^2	*P* Value
Interval 1 (1982-1985)				
Self-neglect	43	16 (34.3)	6.12	.05
Elder mistreatment	12	2 (30.2)		
No investigations	2745	467 (15.3)		
Interval 2 (1985-1988)				
Self-neglect	66	21 (31.6)	7.71	.03
Elder mistreatment	33	12 (49.7)		
No investigations	2211	468 (18.7)		
Interval 3 (1988-1991)				
Self-neglect	71	36 (51.0)	35.54	<.001
Elder mistreatment	33	17 (66.4)		
No investigations	1693	368 (18.5)		
Total (pooled)				
Self-neglect	180	73 (40.3)	57.27†	<.001
Elder mistreatment	78	31 (53.2)		
No investigations	6649	1303 (17.3)		

*Percentages are weighted and adjusted for sampling design as are all statistical tests.
†Cochran-Mantel-Haenszel χ^2, adjusted for interval.

Table 3.—Hierarchical Pooled Logistic Regression for 3-Year All-Cause Mortality Risk Associated With Verified Self-neglect and Verified Elder Mistreatment*

Model	Covariates	Odds Ratio (95% CI) Self-neglect	Odds Ratio (95% CI) Elder Mistreatment
I	Interval	3.1 (2.3-4.2)	5.1 (2.8-9.5)
II	Interval, demographics (age, sex, race, education, income)	2.6 (1.8-3.9)	3.8 (1.6-8.9)
III	Interval, demographics, health related (number of chronic conditions, body mass index entered as 2 variables)	2.3 (1.5-3.4)	4.5 (2.0-10.4)
IV	Interval, demographics, health related, function (number of ADL impairments, number of Rosow-Breslau[9] and Nagi[10] impairments)	2.1 (1.4-3.2)	3.0 (1.4-6.3)
V	Interval, demographics, health related, function, social (number of social ties, martial status, number of sources of emotional support)	1.8 (1.2-2.5)	3.2 (1.5-7.0)
VI	Interval, demographics, health related, function, social, cognitive (Pfeiffer SPMSQ[11] score)	1.8 (1.2-2.5)	3.1 (1.4-6.5)
VII	Interval, demographics, health related, function, social, cognitive, psychosocial (CES-Depression[12] score)	1.7 (1.2-2.5)	3.1 (1.4-6.7)

*All of the following were included as continuous variables in the models: age, years of education, activities of daily living (ADL) impairments, higher functional impairments, number of chronic conditions, number of social ties, the Pfeiffer Short Portable Mental Status Questionnaire (SPMSQ) score, and CES-Depression score. Other variables were categorized as shown in Table 1; CI indicates confidence interval.

COMMENT

This longitudinal study is the first to examine mortality in a well-characterized cohort of community-dwelling older adults, a subset of whom both have been referred to protective services and have experienced elder mistreatment. The results demonstrated a mortality gradient in which older adults who have been mistreated were more likely to be dead at the end of a 13-year follow-up period than either their self-neglected counterparts or those cohort members who had no interaction with adult protective services. Survival was similar at the beginning of the study, but midway through follow-up, the survival curves diverged. Notably, the majority of mistreatment events had occurred in the cohort by this time, which may reflect a saturation effect in the pool of persons susceptible. Additionally, a multivariable analysis that controlled for other factors known to be predictive of mortality in older adults revealed that both the need for protective service use generally and elder mistreatment specifically were independent predictors of early death.

Notably, no deaths in the mistreated group were immediately ascribed to injury. How then might elder mistreatment confer additional risk for mortality? One possibility is that we did not adequately adjust for the confounders (eg, comorbidity) or did not identify all confounders that might be associated with mortality, such as noncompliance with medical treatment or poor access to medical care. For example, malnutrition might be associated with many of the covariates in these models, but was only indirectly assessed through body mass index. Comorbidity adjustment in this study was through self-report of 7 medical conditions, which is less accurate than medical record–based abstraction. Another possibility is that protective service use and elder mistreatment represent comprehensive markers of frailty not captured by traditional constructs of the older adult at risk. It may do this by amalgamating, individually, high-risk features known to be associated with adverse outcomes such as poor functional status, cognitive impairment, and pov-

©1998 American Medical Association. All rights reserved.

Downloaded From: http://jamanetwork.com/ on 05/24/2013

Table 4.—Immediate Cause of Death by Investigation Status

Immediate Cause of Death	No. (%) of Case Status at Death (n = 1383)*		
	No Investigations (n=1280)	Self-Neglected (n=72)	Elder Mistreatment (n=31)
Circulatory disease	752 (58)	44 (65)	22 (66)
Symptoms, signs, or ill-defined conditions	176 (14)	10 (14)	4 (22)
Neoplasms	162 (13)	5 (6)	1 (4)
Respiratory disease	89 (7)	5 (6)	4 (7)
Injury or poisoning	23 (2)	1 (1)	0 (0)
Other	78 (6)	7 (9)	0 (0)

*Excludes 24 deaths (23 in no investigations group and 1 in self-neglect group) with unknown cause. Percentages are weighted.

Table 5.—Proportion of Deaths Occurring in Nursing Homes Through 1990*

Group	Total No.	No. (%) of Nursing Home Deaths	χ^2	*P* Value
No investigations	2598	254 (21.2)	NA	NA
Verified self-neglect†	126	29 (44.5)	19.481	<.001
Verified elder mistreatment†	48	7 (25.0)	0.238	.63
Nonverified complaints‡	38	5 (41.7)	. . .	.15

*NA indicates not applicable.
†χ^2 and *P* value are based on a comparison with no investigation group.
‡Ellipses indicate cell sizes are too small for χ^2 analysis. *P* value from 2-tailed Fisher exact test.

erty into an identifiable composite characteristic that is easily measured.

An intriguing, but somewhat speculative, hypothesis derives from the growing body of literature on the relationship between various forms of interpersonal stress (sometimes termed *negative social support*) and individual well-being. Research has consistently shown that negative interpersonal interactions with network members strongly predict a variety of negative psychological outcomes and are strongly related to distress.[14-18] The caregiver burden associated with caring for a frail or demented loved one may lead to mistreatment in some situations.[19] Although research using mortality as an outcome is lacking, it seems plausible that experiencing elder abuse is an extreme form of negative social support. In the same manner that social integration reduces mortality, it may conversely be the case that the extreme interpersonal stress resulting from elder abuse situations may confer additional death risk. Future research that examines this hypothesis is greatly needed.

Nursing home placement is an intervention that is frequently implemented for egregious adult protective services cases involving both mistreatment and/or self-neglect. This study had limited follow-up of deaths occurring in long-term care facilities, but in general, self-neglecting older adults were more likely to die in long-term care facilities than either mistreated subjects or those who had no contact with adult protective services. Unfortunately, the numbers in this study were small, and we believe that defining the outcomes of long-term care placement for adult protective service clients of all types is a crucial area of study, since nursing home placement is a radical, restrictive, and expensive intervention. It is also one of the most difficult decisions that adult protective services workers and elder abuse field workers face in their jobs. More objective data on when it is appropriate and efficacious are greatly needed.

Another limitation of this study is that it examines the survival of individuals sustaining reported elder mistreatment and there are likely mistreatment cases among the nonprotective services group. Similarly, physicians probably underreport elder abuse as a contributing cause of death on death certificates, either unaware that it existed or unaware that it might contribute to death. This study argues that it may. Additionally, we have no way of adjusting for length of abuse because protective service referral does not indicate when mistreatment began, only when it became known to an official agency.

In summary, reported elder mistreatment confers additional death risk. Whether multidisciplinary interventions directed at stopping elder mistreatment would avert the associated increased mortality is an area worthy of further investigation.

This study was supported by the National Institute on Aging, contract number N01-AG-0-2105, and the EPESE. Dr Lachs is a Paul Beeson Physician Faculty Scholar and recipient of Academic Award grant K0800580 from the National Institute on Aging.

The authors are indebted to the Connecticut Department of Social Services for their tireless advocacy and compassion on behalf of disenfranchised older adults.

References

1. Johnson T, ed. *Elder Mistreatment: Deciding Who Is at Risk*. Westport, Conn: Greenwood Press; 1991.
2. Lachs MS, Williams C, O'Brien S, Hurst L, Horwitz R. Older adults: an 11-year longitudinal study of adult protective service use. *Arch Intern Med.* 1996;156:449-453.
3. Lachs MS, Williams C, O'Brien S, Hurst L, Horowitz R. Risk factors for reported elder abuse and neglect: a nine year observational cohort study. *Gerontologist.* 1997;37:469-474.
4. Pillemer KA, Finkelhor D. The prevalence of elder abuse: a random sample survey. *Gerontologist.* 1988;28:51-57.
5. Lachs MS, Berkman L, Fulmer T, Horowitz RI. A prospective community-based pilot study of risk factors for the investigation of elder mistreatment. *J Am Geriatr Soc.* 1994;42:169-173.
6. National Institute on Aging. *Established Populations for Epidemiologic Studies of the Elderly: Resource Data Book*. Washington, DC: US Dept of Health and Human Services; 1986. NIA publication 86-2443.
7. Cornoni-Huntley J, Ostfeld AM, Taylor JO, et al. Established populations for epidemiologic studies of the elderly: study design and methodology. *Aging.* 1993;5:27-37.
8. Shah BV, Barnwell BG, Bieler GS. *SUDAAN User's Manual, Release 7.0.* Research Triangle Park, NC: Research Triangle Institute; 1996.
9. Rosow I, Breslau N. A Guttman health scale for the aged. *J Gerontol A Biol Sci Med Sci.* 1966;21:556-559.
10. Nagi SZ. An epidemiology of disability among adults in the United States. *Milbank Q.* 1976;54:439-468.
11. Pfeiffer E. A short portable mental status questionnaire for the assessment of organic brain deficit in elderly patients. *J Am Geriatr Soc.* 1975;23:433-441.
12. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977;1:385-401.
13. Cupples LA, D'Agostio RB, Anderson K, Kannel WB. Comparison of baseline and repeated measure covariate techniques in the Framingham Heart Study. *Stat Med.* 1988;7:205-218.
14. Fiore J, Becker J, Coppel DB. Social network interactions: a buffer or a stress? *Am J Community Psychol.* 1983;11:423-439.
15. Okun MA, Melichar JF, Hill MD. Negative daily events, positive and negative social ties, and psychological distress among older adults. *Gerontologist.* 1990;30:193-199.
16. Pillemer K, Suitor JJ. Family stress and social support among caregivers to persons with Alzheimer's disease. In: Pierce GR, Sarason BR, Sarason IG, eds. *Handbook of Social Support and Family.* New York, NY: Plenum; 1996:467-494.
17. Rook K. The negative side of social interactions: impact on psychological well-being. *J Pers Soc Psychol.* 1984;46:1097-1108.
18. Vinocur AD, van Ryn M. Social support and undermining in close relationships: their independent effects on the mental health of unemployed persons. *J Pers Soc Psychol.* 1993;65:350-359.
19. Pillemer KA, Suitor JJ. Violence and violent feelings: what causes them among family caregivers? *J Gerontology: Soc Sci.* 1992;47:S165-S172.

©1998 American Medical Association. All rights reserved.

Downloaded From: http://jamanetwork.com/ on 05/24/2013