Bereavement After Informal Caregiving: Assessing Mental Health Burden Using Linked Population Data

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Objectives. We compared the mental health risk to unpaid caregivers bereaved of a care recipient with the risk to persons otherwise bereaved and to nonbereaved caregivers.

Methods. We linked prescription records for antidepressant and anxiolytic drugs to characteristics and life-event data of members of the Northern Ireland Longitudinal Study (n = 317 264). Using a case-control design, we fitted logistic regression models, stratified by age, to model relative likelihood of mental health problems, using the proxy measures of mental health–related prescription.

Results. Both caregivers and bereaved individuals were estimated to be at between 20% and 50% greater risk for mental health problems than noncaregivers in similar circumstances (for bereaved working-age caregivers, odds ratio = 1.41; 95% confidence interval = 1.27, 1.56). For older people, there was no evidence of additional risk to bereaved caregivers, though there was for working-age people. Older people appeared to recover more quickly from caregiver bereavement.

Conclusions. Caregivers were at risk for mental ill health while providing care and after the death of the care recipient. Targeted caregiver support needs to extend beyond the life of the care recipient. (*Am J Public Health.* 2015;105: 1630–1637. doi:10.2105/AJPH.2015.302597)

Although experiencing bereavement is difficult for any person, some people are affected more acutely.[1,2] It is important to try to understand who will suffer the most after the death of someone close to them because it can help ensure that available resources reach those bereaved persons in most need of structured support.

The issue of mental health is highly pertinent for those individuals providing unpaid care to members of their family and household with illness or disability.[3–6] Caring workload has been shown to relate to psychological distress among unpaid caregivers, particularly among those with a high caring burden[6] and particularly among women.[4] Conversely, however, although health problems have been shown among caregivers, the caring role has also been shown to predict greater longevity of life,[5] suggesting the existence of benefits underrepresented in the literature, such as increased resilience and personal fortitude.

There are several reasons to believe that being bereaved of someone to whom a person has provided care may affect a person differently from bereavement in other circumstances. On one hand, the caring relationship may represent one of greater intensity that is grieved for more profoundly than other bereavement. Prolonged distress may also reflect internalized guilt or continued rumination on the part of former caregivers,[6] who may feel their care was insufficient to avert the death or to improve the person's end-of-life experience. On the other hand, it has been argued elsewhere that those who struggle acutely to cope are the minority and that caregivers usually have great resilience from which to draw when the time comes to grieve for the person for whom they cared.[7] Furthermore, a study of persons bereaved through cancer revealed that greater duration spent caring for the deceased mitigated against the onset of complicated grief.[8]

The degree to which either the stresses or the benefits associated with caring are accentuated or eliminated by the death of the care recipient has been explored but not firmly established. Although it seems likely that a bereaved caregiver will grieve differently than other bereaved parties, precisely how caring history might modify the mental health burden of bereavement is unclear. Beery et al.[9] found that those with greater caregiving burdens before bereavement were more likely to experience poor mental health. Bodnar and Kiecolt-Glaser[6] found no difference between current caregivers' levels of depression and anxiety and those of caregivers bereaved more than 3 years ago, with both groups at elevated risk compared with controls. However, taking a longer observation period, Hirst[4] found that caregivers returned to normal levels of psychological well-being within 5 years of the cessation of their role. It is noteworthy that the latter study did not differentiate role cessation through bereavement from other circumstances of cessation, effectively assuming bereavement to be equivalent to a reprieve from caring duty.

Among bereaved caregivers, sociodemographic factors and pre-event mental ill health have been shown to dispose a person to complicated grief.[7] The growing number of children and young people involved in caring has become an issue of concern to public health communities. Young people are perceived as particularly vulnerable to caregiving burdens, as well as to interruption of the normative pathway to adulthood via education.[1,2] Furthermore, some authors have suggested a differential impact on women because caregiving roles are placed within a wider portfolio of caregiving duties, such as childcare, that are borne disproportionately by women.[3] These concerns highlight the imperative to consider which caregivers will be most affected after bereavement. A further area of interest is the relationship between duration or intensity of the caregiving period and mental health sequelae. Fujisawa et al.[10] found no additional risk conferred by having been primary caregiver to the deceased. However, intensity of relationship before bereavement (i.e., seeing the person every day in his or her last week of life) did increase the likelihood of complicated grief. Understanding the relationship between the amount of care given and mental health

outcomes after bereavement would greatly help to disentangle the significance of ending the caregiving relationship in this way and suggest mechanisms by which this particular type of bereavement will affect mental health.

Conclusions regarding these questions have usually been drawn from data provided by bereaved individuals accessed through purposive recruiting. This creates 2 limitations, namely that there is no nonbereaved control group and that willing participants may be an unrepresentative sample of the target population. However, using linked administrative data from a representative population sample is an unobtrusive alternative in the pursuit of generalizable findings. We used such a sample from Northern Ireland to pursue such an alternative.

Given the evidence on either side, we adopted two 2-tailed hypotheses, namely that the risk of poor mental health outcomes would be different for caregivers who are bereaved compared with (1) noncaregivers who are bereaved (hypothesis 1) and (2) caregivers who are not bereaved (hypothesis 2). If bereaved caregivers are particularly at risk for, or protected from, poor mental health, we would expect that those caregivers who provided more care would be further at risk or further protected (hypothesis 3).

METHODS

This study capitalized on a unique linked data set that allows for population-wide assessment of mental health outcomes. The spine of the data set is the Northern Ireland Longitudinal Study (NILS), while proxy indicators of poor mental health were imported from records of dispensed mental health-related prescriptions at community pharmacies.

Data Sources and Linkage

The NILS database contains data from about 28% of the population of Northern Ireland randomly selected by birth date. NILS consists of administrative health care data linked to the 2001 UK Census returns for 445 819 individuals (excluding students not normally resident at the census household; subsequent to design and approval of this study, Census 2011 data have been linked to NILS cohort members). For this project, 3 additional linkages took place: (1) death of a coresident and the cause of death from the General Registrar's Office death register via the Northern Ireland Mortality Study (2001–2009), (2) characteristics of coresidents (e.g., limiting long-term illness) from 2001 Census returns, and (3) records of prescriptions for antidepressant and anxiolytic medication from the Enhance Prescribing Database for Northern Ireland. Accurate electronic prescription records are available for collected scripts from January 2009 forward. Furthermore, an anonymized indicator of prescribing general practitioner was included so that practice-level variation in prescribing habits and preferences would not affect overall estimates of the risk of mental health problems. In this analysis, we used as an outcome antidepressant or anxiolytic prescription between January and February 2010, allowing for all available deaths of participants' Census coresidents to be included. Data sets were linked using anonymous 1-way encryption methods by the data custodians, and the anonymous data extract was made available to us.

For the purpose of this study, the sample excluded persons aged 6 years or younger on Census day 2001 (n = 41 913) and persons living alone (n = 47 232). Therefore, all study participants were either aged 16 years or turning 16 in 2010 and therefore could experience the outcome as measured. All study participants had at least 1 coresident on Census 2001, allowing for observation of bereavement exposure and caregiving status. We excluded from all analyses cohort members who died (n = 2478) or emigrated (n = 6976) before the period of outcome observation between Census 2001 and the end of 2009 because they could not experience the outcome of interest in January 2010. We also excluded persons living in a communal establishment (n = 3643) because it was not possible to establish relationships for nonresident family members. In 26 322 cases, it was not possible to match NILS members to the Enhanced Prescribing Database. The remaining study sample consisted of 317 264 individuals.

Caregiver status was determined from the Census responses to the following items (by the NILS member and coresidents, respectively): "Do you look after, or give any help or support to family members, friends, neighbours or others because of: long-term physical or mental ill-health or disability? Problems related to old age? Do not count anything you do as part of your paid employment" (response options were *none, 1–19 hours a week, 20–49 hours a week,* and *50+ hours a week*) and "Do you have any long-term illness, health problem or disability which limits your daily activities or the work you can do? Include problems which are due to old age" (response options were *yes* or *no*).

If the NILS member reported being a caregiver in 2001, and 1 of the member's coresidents reported having a long-term limiting illness in the same year, the NILS member was assumed to be providing care within the home to that coresident. If the same coresident with a long-term limiting illness in 2001 died within the time frame of the study, the person was identified as a bereaved caregiver. To examine the interaction between caregiver workload and bereavement, we generated a further set of exposure subcategories for caregivers and bereaved caregivers, namely persons who provided care for 0 to 19, 20 to 49, or 50 or more hours per week.

We identified 4 discrete exposure categories: those bereaved of a cared-for coresident (n = 5414), caregivers not bereaved (n = 18 690), other persons (noncaregivers) bereaved of a coresident (n = 18 407), and the reference group with no exposure to either bereavement or caregiving burden (n = 274 753).

Analysis

Analysis of mental health outcomes between January and February 2010 was conducted on the basis of a case-control design, controlling for confounders related to the likelihood of both bereavement and mental health problems. These confounders included being female, being older, lower educational attainment, and area-level deprivation. Table 1 outlines the distribution of the selected confounders by caregiving status.

Preliminary analyses tested for moderating influences of gender and age on the relationship between caregiving status, bereavement, and mental health. We found evidence of a significant interaction between age and exposure, with caregiving roles creating greater risk to mental health for people in emerging adulthood than for older people. We found no evidence of variation between males and females. Given these preliminary interactions, we stratified predictive models by age

TABLE 1—Distribution of Characteristics Among Caregivers and Noncaregivers: Northern Ireland Longitudinal Study, Census Day, April 29, 2001

Characteristic	Combined Ages, No. (%)		Young (16–24 Years), No. (%)		Working Age (25–64 Years), No. (%)		Retirement Age (≥ 65 Years), No. (%)	
	Noncaregiver	Caregiver	Noncaregiver	Caregiver	Noncaregiver	Caregiver	Noncaregiver	Caregiver
Unpaid care given, h/wk								
1–19	. . .	25 339 (59.07)	. . .	1 001 (81.58)	. . .	19 692 (61.98)	. . .	4 646 (46.93)
20–49	. . .	6 615 (15.37)	. . .	128 (10.43)	. . .	5 031 (15.84)	. . .	1 456 (14.71)
≥ 50	. . .	10 942 (25.51)	. . .	98 (7.99)	. . .	7 046 (22.18)	. . .	3 798 (38.36)
Gender								
Female	137 730 (50.20)	25 847 (60.26)	27 560 (48.22)	649 (52.89)	87 252 (50.56)	19 453 (61.23)	22 918 (51.13)	5 745 (58.03)
Male	136 638 (49.80)	17 049 (39.74)	29 589 (51.78)	578 (47.11)	85 316 (49.44)	12 518 (38.77)	21 733 (48.67)	4 155 (41.97)
Religion								
Protestant	144 983 (52.84)	24 191 (56.39)	2 000 (45.50)	550 (44.82)	90 189 (52.26)	17 110 (53.86)	28 794 (64.49)	6 531 (65.97)
Roman Catholic	123 332 (44.95)	18 043 (42.06)	29 027 (50.79)	630 (51.34)	78 848 (45.69)	14 140 (44.51)	15 457 (34.62)	3 273 (33.06)
Other or no religion	763 (0.28)	110 (0.26)	129 (0.23)	(< 4.00%)[a]	534 (0.31)	86 (0.26)	100 (0.22)	(< 1.00%)[a]
No response	5 290 (1.93)	552 (1.29)	1 993 (3.49)	(< 4.00%)[a]	2 997 (1.74)	435 (1.37)	300 (0.67)	(< 1.00%)[a]
General health								
Good	204 569 (74.56)	27 089 (63.15)	54 684 (92.19)	1 052 (85.74)	131 450 (76.17)	21 373 (67.28)	20 435 (45.77)	4 664 (47.11)
Fair	46 687 (17.02)	11 934 (27.82)	3 740 (6.54)	155 (12.63)	27 878 (16.15)	7 988 (25.14)	15 069 (33.75)	3 791 (38.29)
Not good	23 112 (8.42)	3 873 (9.03)	725 (1.27)	20 (1.54)	13 240 (7.67)	2 408 (7.67)	9 147 (20.90)	1 445 (14.60)
Long-term limiting illness								
Yes	44 381 (16.18)	8 155 (19.01)	3 503 (6.09)	89 (7.31)	22 662 (13.03)	4 518 (14.23)	18 216 (41.59)	3 548 (36.42)
Accommodation type								
Detached house or bungalow	123 445 (44.99)	19 808 (46.18)	25 408 (44.46)	569 (46.37)	76 545 (44.36)	14 400 (45.33)	21 492 (47.84)	4 839 (48.13)
Semidetached house or bungalow	77 909 (28.40)	11 855 (27.64)	15 869 (27.77)	314 (25.59)	50 333 (29.17)	8 932 (28.12)	11 707 (26.22)	2 609 (26.35)
Terraced	67 250 (24.51)	10 363 (24.16)	15 079 (26.39)	326 (26.57)	41 837 (24.24)	7 819 (24.61)	10 334 (23.14)	2 218 (22.40)
Other noncommunal	5 764 (2.10)	870 (2.03)	793 (1.39)	18 (1.47)	3 853 (2.23)	618 (1.95)	1 118 (2.50)	234 (2.36)
Car in household								
No car	35 869 (13.07)	4 883 (11.38)	9 638 (16.86)	187 (15.24)	20 663 (11.97)	3 614 (11.21)	5 568 (12.47)	1155 (11.67)
1 car	114 328 (41.67)	18 387 (42.86)	25 003 (43.75)	546 (44.50)	66 761 (38.69)	13 030 (40.40)	22 564 (50.63)	4 989 (50.39)
≥ 2 cars	124 171 (45.26)	19 626 (45.75)	22 508 (39.38)	494 (40.26)	85 144 (49.34)	15 609 (48.40)	16 519 (37.00)	3 756 (37.94)
Household tenure/value								
Renting	55 977 (20.40)	8 254 (19.24)	15 305 (26.78)	320 (26.08)	33 599 (19.47)	6 413 (20.19)	7 073 (15.84)	1 521 (15.36)
Owner/< £75 000	27 386 (9.98)	3 977 (9.27)	4 703 (8.23)	110 (8.96)	17 059 (9.89)	2 804 (8.83)	5 624 (12.60)	1 063 (10.74)
Owner/£75 000–£159 999	110 936 (40.43)	17 572 (40.96)	20 702 (36.22)	450 (36.67)	70 947 (41.11)	12 861 (40.48)	19 287 (43.20)	4 261 (43.04)
Owner/≥ £160 000	52 131 (19.00)	9 197 (21.44)	11 141 (19.49)	236 (19.23)	32 948 (19.09)	6 819 (21.46)	8 042 (18.01)	2 142 (21.64)
Missing	27 938 (10.18)	3 896 (9.08)	5 298 (9.27)	111 (9.05)	18 015 (10.44)	2 872 (9.04)	4 625 (10.36)	913 (9.22)

Continued

TABLE 1—*Continued*

Education[b]								
No qualifications	84 600 (30.83)	16 765 (39.08)	–	–	54 949 (31.84)	10 751 (33.84)	29 651 (66.41)	6 014 (60.75)
Foundation	39 607 (14.44)	7 297 (17.01)	–	–	37 765 (21.88)	6 722 (21.16)	1 842 (4.13)	575 (5.81)
≥ 5 GCSE	36 507 (13.31)	7 057 (16.45)	–	–	32 889 (19.06)	5 940 (18.70)	3 618 (8.10)	1 117 (11.28)
A levels	19 036 (6.94)	3 100 (7.23)	–	–	18 289 (10.60)	2 881 (9.07)	747 (1.64)	219 (2.21)
1st degree	32 394 (11.81)	6 581 (15.34)	–	–	28 676 (16.62)	5 475 (17.23)	3 718 (8.33)	1 106 (11.17)
Not asked (≥ 74)	62 224 (22.68)	2 096 (4.89)	–	–	–	–	5 075 (11.37)	869 (8.78)
Income deprivation quintile								
1	51 766 (18.87)	8 810 (20.54)	9 770 (17.10)	199 (16.22)	32 896 (19.06)	6 297 (19.82)	9 100 (20.38)	2 363 (23.37)
2	54 513 (19.87)	8 386 (19.55)	10 737 (18.79)	217 (17.69)	34 905 (20.23)	6 255 (19.69)	8 871 (19.87)	1 914 (19.33)
3	52 748 (19.23)	8 001 (18.65)	10 648 (18.63)	244 (19.89)	33 534 (19.43)	5 851 (18.42)	8 566 (19.18)	1 906 (19.25)
4	51 946 (18.93)	7 788 (18.16)	10 894 (19.06)	240 (19.56)	32 537 (18.85)	5 785 (18.21)	8 515 (19.07)	1 763 (17.81)
5	49 028 (17.87)	7 814 (18.22)	12 340 (21.59)	272 (22.17)	2 9 761 (17.25)	6 046 (19.03)	6 927 (15.51)	1 496 (15.11)
Missing	14 367 (5.24)	2 097 (4.89)	2760 (4.83)	55 (4.48)	8 935 (5.18)	1 535 (4.83)	2 672 (5.98)	507 (5.12)
Family structure								
U16: 2 biological parents	39 872 (14.53)	845 (1.97)	39 872 (69.77)	845 (68.87)	. . .	. . .	. . .	. . .
U16: single biological parent	14 136 (5.15)	323 (0.75)	14 136 (24.74)	323 (26.32)	. . .	. . .	. . .	. . .
U16: step- or reconstituted family	1 268 (0.46)	25 (0.06)	1 268 (2.22)	25 (2.04)	. . .	. . .	. . .	. . .
U16: alternative household	1 873 (0.68)	34 (0.08)	1 873 (3.28)	34 (2.77)	. . .	. . .	. . .	. . .
Parent(s) only–single	49 080 (17.89)	5 079 (11.84)	. . .	. . .	48 897 (28.33)	4 866 (15.32)	183 (0.41)	213 (2.15)
Parent(s) only–widowed, separated, divorced	1 013 (0.37)	313 (0.73)	. . .	. . .	977 (0.57)	253 (0.80)	36 (0.08)	60 (0.61)
Partner only	45 749 (16.67)	9 010 (21.00)	. . .	. . .	21 789 (12.63)	3 814 (12.01)	23 960 (53.66)	5 196 (52.48)
Kids only–single	4 651 (1.70)	836 (1.95)	. . .	. . .	4 489 (2.60)	817 (2.57)	162 (0.36)	19 (0.19)
Kids only–widowed, separated, divorced	12 700 (4.63)	2 406 (5.61)	. . .	. . .	8 382 (4.86)	1 870 (5.89)	4 318 (9.67)	536 (5.41)
Partner and kids only	93 194 (33.97)	21 879 (51.00)	. . .	. . .	79 739 (46.21)	18 513 (58.27)	13 455 (30.13)	3 366 (34.00)
Alternative household–single	8 019 (2.92)	974 (2.27)	. . .	. . .	6 271 (3.63)	719 (2.26)	1 748 (3.91)	255 (2.58)
Alternative household–married or cohabiting	1 409 (0.51)	886 (2.07)	. . .	. . .	1 223 (0.71)	717 (2.26)	186 (0.42)	169 (1.71)
Alternative household–widowed, separated, divorced	1 404 (0.51)	286 (0.67)	. . .	. . .	801 (0.46)	200 (0.62)	603 (1.35)	86 (0.87)

Note. GCSE = General Certificate of Secondary Education; U16 = under 16. Dashes indicate not applicable.
[a]Numbers obscured to conform to Northern Ireland Statistics and Research Agency disclosure policy.
[b]Education variable only available for cohort members aged older than 16 y at Census 2001.

group: young age or emerging adulthood (16–24 years), working age (25–64 years), and retirement age (≥ 65 years).

The main logistic regression models used as an outcome a binary variable, prescribed antidepressant in either January or February 2010. Models were robust to the use of 2 alternative proxy outcomes, anxiolytic prescription and length of prescription (available on request).

Given the debate in the literature as to how long subsequent to bereavement a caregiver might be expected to suffer mental ill health, we produced 2 iterations of the main models. The first model restricted bereavement to instances 3 years or more before the observation (December 2006 or earlier), and the second restricted bereavement to 5 years or more before the observation (December 2004 or earlier).

RESULTS

People in the oldest of the 3 age groups were most likely to be caregivers, bereaved or nonbereaved, or to be otherwise bereaved, and persons in the youngest age group were least likely to experience these exposure conditions (χ^2 probability < 0.001 in each case; Table 1). Among the oldest group, 4.39% (n = 2491) of people had been bereaved of someone to whom they provided unpaid care, compared with 1.49% (n = 2960) in the working-age group and 0.17% (n = 101) in the youngest group.

Taking the entire population together, Table 2 shows that risk of poor mental health was greater in each of the 3 exposure groups compared with the general population. (The discrete proxy outcome referred to is "received or did not receive any antidepressant prescription from January through February 2010." Ordinal logistic models demonstrated that findings were robust to the use of an alternative 6-category outcome.) In descriptive terms, prevalence of antidepressant prescription was highest among bereaved caregivers, whereas both nonbereaved caregivers and bereaved noncaregivers were more often prescribed to than the reference group ($\chi^2_3 > 1000$; $P < .001$).

Unadjusted logistic regression showed overlapping confidence intervals around odds ratios for the 2 caregiver categories. Although this suggests little evidence for any difference between bereaved and nonbereaved caregivers, there is evidence that both of these groups are at greater risk of poor mental health than people bereaved in other circumstances in which they have an ill coresident.

Risk to nonbereaved caregivers compared with the reference category was evidenced across all age bands but was particularly acute among young people (Table 2). By contrast, caregivers of retirement age had only marginally elevated risk of antidepressant prescription. We also found age variation in the effect of bereavement on noncaregivers. Working-age people in this group appeared to be less affected by bereavement than persons at either extreme of the age spectrum, though this difference was less pronounced in covariate-adjusted models (Table 3).

Comparing Bereaved Caregivers With Other Bereaved Persons

Among working-age people, bereaved caregivers were around 50% more likely to be prescribed antidepressants than the reference group (Table 2). Bereaved noncaregivers were also at an elevated risk, but less so than bereaved caregivers (about 15%). The gap between the 2 narrows in the covariate-adjusted models (Table 3). For those bereaved in the past 3 years, the risk estimated for bereaved caregivers is larger in descriptive terms, although confidence intervals around the 2 estimates overlap. Furthermore, subcomparisons by recency of bereavement suggest that the grief trajectory of the 2 groups differed substantially. The estimated risk to caregivers bereaved more than 5 years earlier differed little from the risk to persons bereaved in the past 3 years. Working-age noncaregivers who were bereaved before 2005 had a lower risk of receiving antidepressants, suggesting that bereavement effects may be longer lasting for those who provided unpaid care.

In the retirement age band, antidepressant prescription was initially estimated to be marginally less likely in the bereaved caregiver group than in the otherwise bereaved group (Table 2). After adjustment for covariates, the risk estimate for both groups was approximately equivalent (38% and 42%, respectively; Table 3). As with the working-age group, the time profiles of the bereavement effect are distinct. For bereaved caregivers, risk estimates

TABLE 2—Descriptive Distribution of Mental Health-Related Prescriptions by Caregiver Status: Northern Ireland Longitudinal Study, January–February 2010

Status	Total No.	Poor Mental Health (Prescribed Antidepressant), No. (%)	Unadjusted OR (95% CI)			
			Combined Ages	Young (16–24 Years)	Working Age (25–64 Years)	Retirement Age (≥ 65 Years)
Caregiver						
Bereaved	5 414	850 (15.70)	1.82* (1.68, 1.97)	0.91 (0.23, 3.67)	1.56* (1.41, 1.72)	1.44* (1.28, 1.63)
Nonbereaved	18 690	2 789 (14.92)	1.72* (1.64, 1.79)	2.65* (2.03, 3.46)	1.56* (1.48, 1.64)	1.17* (1.07, 1.28)
Noncaregiver						
Bereaved	18 407	2 423 (13.16)	1.48* (1.41, 1.56)	1.59* (1.26, 2.00)	1.16* (1.09, 1.25)	1.60* (1.48, 1.73)
Nonbereaved	274 753	25 475 (9.27)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)	1.00 (Ref)

Note. CI = confidence interval; OR = odds ratio.
*$P < .05$.

TABLE 3—Covariate-Adjusted Odds Ratios for Poor Mental Health by Bereavement and Caregiver Status: Northern Ireland Longitudinal Study, January–February 2010

Status	Young Age (16–24), OR (95% CI)	Working Age (25–64), OR (95% CI)	Retirement Age (≥ 65), OR (95% CI)
Caregiver			
Nonbereaved	2.42* (1.82, 3.21)	1.17* (1.11, 1.24)	1.11* (1.01, 1.29)
Bereaved, 2001–2009	1.00 (0.25, 3.20)	1.41* (1.27, 1.57)	1.38* (1.21, 1.56)
Bereaved, 2007–2009	3.42 (0.80, 14.56)	1.52* (1.25, 1.84)	1.60* (1.29, 1.97)
Bereaved, 2005–2006	. . .	1.26* (1.02, 1.57)	1.49* (1.19, 1.98)
Bereaved 2001–2004	. . .	1.39* (1.19, 1.62)	1.20 (1.00, 1.43)
Noncaregiver			
Nonbereaved (Ref)	1.00	1.00	1.00
Bereaved 2001–2009	1.45* (1.14, 1.86)	1.24* (1.15, 1.33)	1.42* (1.30, 1.54)
Bereaved 2007–2009	1.52 (1.04, 2.22)	1.23* (1.11, 1.38)	1.48 (1.32, 1.66)
Bereaved 2005–2006	1.19 (0.73, 1.93)	1.40* (1.24, 1.59)	1.49* (1.29, 1.71)
Bereaved 2001–2004	1.55 (1.11, 2.17)	1.14 (1.01, 1.28)	1.31* (1.15, 1.48)

Note. CI = confidence interval; OR = odds ratio. Logistic regressions adjust for sex, age, religion, economic activity, deprivation, physical health, household structure, and housing. Ellipses indicate numbers not sufficient to estimate.
*$P < .05$.

declined steadily with greater length of time elapsed since bereavement, to the extent of being at the margins of significance for those bereaved of a care recipient 5 or more years earlier. Although estimates also fell for bereaved noncaregivers, the decline was less pronounced.

For the younger age group, overlapping confidence intervals suggest that there is little overall difference between bereavement effects for noncaregivers and caregivers in this bereaved population. The small sample size means that these comparisons may be underpowered and prohibits analysis of time since bereavement.

Comparing Bereaved and Nonbereaved Caregivers

In the retirement age band, both bereaved caregivers and nonbereaved caregivers were more likely to receive antidepressant prescriptions than the reference group. This is shown in both unadjusted (Table 2) and covariate-adjusted models (Table 3). Risk estimates were higher for older caregivers bereaved in the past 3 years, though confidence intervals around estimates for pre-2007 bereavements suggest a return to the prebereavement levels of relative risk.

For working-age people, unadjusted models indicated that bereaved caregivers were no more likely than nonbereaved caregivers to be prescribed antidepressants (Table 2), which suggests that working-age caregivers are similarly likely to be prescribed for poor mental health regardless of whether the care recipient is deceased. Note that adjustment for covariates caused a diminution in the risk estimate for nonbereaved working-age caregivers (Table 3). Comparisons here suggest that recently bereaved caregivers were at elevated risk for poor mental health.

For young people, although there is clearer evidence of a risk to current caregivers than bereaved caregivers, estimates for the bereaved are based on small numbers. In and of itself, the substantially elevated risk for nonbereaved young caregivers, who had almost twice the risk of poor mental health as nonbereaved noncaregivers, is noteworthy because it suggests that young caregivers are particularly vulnerable to mental health burden.

Levels of Caregiver Involvement

Evidence suggests that among working-age people, people who become bereaved after providing more than 50 hours of care per week to the decedent are particularly at risk for being prescribed antidepressant medication. Among the bereaved caregiver group, although confidence intervals around risk estimates overlapped, risk was clearly elevated for the group providing 50 or more hours of care compared with either bereaved noncaregivers or nonbereaved caregivers at the equivalent level of weekly involvement (Table 4). No corresponding pattern could be determined for persons in the retirement age band. Bereaved caregivers and bereaved noncaregivers were at an equivalent level of risk.

DISCUSSION

Hypothesis 1, that bereaved caregivers will experience different postbereavement outcomes than the rest of the bereaved population, was not supported by models that included recent bereavements, although a descriptive comparison of risk among the working-age band is suggestive of elevated risk to bereaved caregivers. However, analysis of caregiving intensity suggest that, among working-age people, those bereaved after bearing the greatest caring burden were more at risk than nonbereaved caregivers. Therefore, we found no evidence of increased resilience accrued by bereaved caregivers, as suggested by Schulz et al.[7] and by Chiu et al.[8] The idea of deeper mourning, residual guilt,[6] or grief compounded by grief for one's own role was substantiated but only among working-age caregivers in the most intensive caring relationships. We found evidence that bereaved caregivers recover from mental ill health at a different pace than other bereaved persons, although the direction of the effect varied with age. Data on retirement-age persons supported an easing of mental health burden with time for bereaved caregivers, whereas among working-age persons, bereaved caregivers endure more sustained mental ill health than those otherwise bereaved.

Hypothesis 2, that bereaved caregivers will be differently at risk for poor mental health than the rest of the caring population, was strongly supported in the case of working-age caregivers, among whom a greater risk of mental health problems was estimated among bereaved caregivers than nonbereaved caregivers. This challenges the idea of bereavement offering a reprieve from the burden of caring. There is some support for this hypothesis in the case of older caregivers, but no evidence of a similar relationship among young caregivers.

Hypothesis 3 was substantiated insofar as the excess risk to bereaved caregivers versus

TABLE 4—Covariate-Adjusted Odds Ratios for Mental Ill Health by Bereavement Status and Caring Burden: Northern Ireland Longitudinal Study, January–February 2010

Status	No.	Total Antidepressant	Young Age (16–24 Years), OR (95% CI)	Working Age (25–64 Years), OR (95% CI)	Retirement Age (≥ 65 Years), OR (95% CI)
Bereaved caregiver					
< 20 h/wk	1 564	188	1.19 (0.29, 4.79)	1.32* (1.09, 1.62)	1.33* (1.03, 1.75)
20–49 h/wk	1 002	145	. . .	1.23 (0.98, 1.56)	1.43* (1.05, 1.96)
> 50 h/wk	2 848	517	. . .	1.54* (1.33, 1.78)	1.37* (1.19, 1.58)
Nonbereaved caregiver					
< 20 h/wk	7 969	918	2.68* (1.94, 3.70)	1.14* (1.05–1.23)	1.10 (0.93, 1.31)
20–49 h/wk	3 477	554	2.50* (1.24, 5.02)	1.23* (1.10, 1.38)	1.14 (0.94, 1.39)
> 50 h/wk	7 244	1 317	0.84 (0.20, 3.58)	1.19* (1.10, 1.28)	1.10 (0.96, 1.26)
Bereaved noncaregiver	18 407	2 423	1.47* (1.15, 1.88)	1.24* (1.15, 1.33)	1.42* (1.30, 1.54)

Note. CI = confidence interval; OR = odds ratio. Reference group is nonbereaved noncaregivers. Ellipses indicate numbers not sufficient to estimate.
*$P < .05$.

comparators was far greater for those who provided the most hours of care, supporting the proposition of Beery et al.[9] that those with the greatest prior burden experience loss most acutely.

Results suggest that risks to caregivers, bereaved and otherwise, depend both on the length of time elapsed since bereavement and on the age of the caregivers. Older people appear to be more resilient to the stressful effects of unpaid caregiving and to experience less prolonged suffering after bereavement. Furthermore, although for most adults bereavement and caregiving burden appeared to confer similar risks to mental health, the exception to this was people who provide care at a young age. Data for this group demonstrated that poor mental health outcomes are highly prevalent among caregivers of this age, more so than for persons bereaved at a similar age. Only in the case of the retirement age band was there evidence of additional mental health risk to bereaved over nonbereaved caregivers.

The variation in how bereavement and caregiving experience interact to differently affect people at different life stages is intriguing. These differences allow for consideration of factors underlying the risks to certain caregivers. The prolonged risk to people of working age could reflect disruption to normal working life, employability, and attendant social support networks, contributing to longer-term mental health problems. It may also be that, for older people, being capable of caring for a dying relative is a marker of self-efficacy and self-worth that protects against some of the impact of witnessing that relative's health deteriorate and recalling that deterioration after death. Common to both of these putative mechanisms is the idea of role expectation. For working-age people, a term of caregiving followed by bereavement may mark a departure from normative roles such as work and leisure, an incongruity between self-image and reality, and a resultant detachment from one's role within a social network. The lack of similar peers on whom to model one's own role may compound this. Meanwhile, caregiving is a more expected role among older people, and the inability to fulfill that role is the greater stressor.

Limitations

For the interpretation of the observed trends, we assumed that the distribution of antidepressant prescription accurately represents the distribution of mental health problems in the population. Note that the availability of these data owes in part to the integrated nature of the health care system in Great Britain and the data that this creates. Furthermore, the fact that health care services and medication can be accessed in Northern Ireland without charges at the point of access may allow for more comprehensive coverage of mental health by this proxy measure than would be possible in other jurisdictions. Furthermore, the trends observed may partly capture the judgment and attitude of physicians rather than latent mental ill health. Some physicians may classify either caregiving burden or bereavement itself as a depressive symptom, signaling need for treatment and prescription.

Even if antidepressant prescription is representative of underlying population-level mental health, physician prescribing captures only a subset of mental health problems. Therefore, the estimates provided of the effect of bereavement on likelihood of mental health problems are likely to be underestimates of the actual effect. However, existing evidence has indicated that there is considerable correspondence between diagnostic assessment and antidepressant prescription, suggesting it is an acceptable proxy indicator.[11,12] Furthermore, the comparative effect on different groups is the central focus of this article, and there is no a priori case that caregivers would be differently likely to see a physician after bereavement.

The proxy measure of caregiving status also requires assumptions, namely that a caregiving arrangement is represented by a caregiver sharing a residence with someone with a long-term illness. A more stringent measure would require further data, such as details of state financial aid to caregivers based on stated needs of coresidents. Such data would be a useful complement to self-report measures of caregiving status. In addition, although we do not assume that the caregiving arrangement was ongoing up to the point of bereavement, because living arrangements may change between census captures, additional data such as those just described would enable more thorough

capture of the ordering of transitions in the caregiving relationship.

Given the specificity of these findings to caregiving and mental health in Northern Ireland, further research is required to ascertain whether they can be generalized to other regions.

Conclusions

Services designed to alleviate mental health risks, both to bereaved persons and to the general population, should consider any history of a caregiving relationship between the bereaved and the decedent and also the stage of life at which the caregiving relationship was entered into. ■

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Contributors

All authors contributed substantially to this article in all sections. The analytical strategy, results, and implications were discussed collectively. J. Moriarty reviewed the literature, conducted statistical analysis, and drafted the article. M. McCann and D. O'Reilly proposed the study and edited drafts of the article. A. Maguire contributed to the writing of the Methods section and to the generation of the linked data set, and coded control variables.

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Human Participant Protection

The study was approved by the Office for Research Ethics Committees Northern Ireland (Ref. 061 08/05/2013).

References

1. Hawton K. Complicated grief after bereavement. *BMJ.* 2007;334(7601):962–963.
2. Lobb EA, Kristjanson LJ, Aoun SM, Monterosso L, Halkett GK, Davies A. Predictors of complicated grief: a systematic review of empirical studies. *Death Stud.* 2010;34(8):673–698.
3. Buyck JF, Bonnaud S, Boumendil A, et al. Informal caregiving and self-reported mental and physical health: results from the GAZEL Cohort Study. *Am J Public Health.* 2011;101(10):1971–1979.
4. Hirst M. Carer distress: a prospective, population-based study. *Soc Sci Med.* 2005;61(3):697–708.
5. O'Reilly D, Connolly S, Rosato M, Patterson C. Is caring associated with an increased risk of mortality? A longitudinal study. *Soc Sci Med.* 2008;67(8):1282–1290.
6. Bodnar JC, Kiecolt-Glaser JK. Caregiver depression after bereavement: chronic stress isn't over when it's over. *Psychol Aging.* 1994;9(3):372–380.
7. Schulz R, Boerner K, Shear K, Zhang S, Gitlin LN. Predictors of complicated grief among dementia caregivers: a prospective study of bereavement. *Am J Geriatr Psychiatry.* 2006;14(8):650–658.
8. Chiu YW, Huang CT, Yin SM, Huang YC, Chien CH, Chuang HY. Determinants of complicated grief in caregivers who cared for terminal cancer patients. *Support Care Cancer.* 2010;18(10):1321–1327.
9. Beery LC, Prigerson HG, Bierhals AJ, et al. Traumatic grief, depression and caregiving in elderly spouses of the terminally ill. *Omega.* 1997;35(3):261–279.
10. Fujisawa D, Miyashita M, Nakajima S, Ito M, Kato M, Kim Y. Prevalence and determinants of complicated grief in general population. *J Affect Disord.* 2010;127(1–3):352–358.
11. Henriksson S, Boëthius G, Håkansson J, Isacsson G. Indications for and outcome of antidepressant medication in a general population: a prescription database and medical record study, in Jämtland County, Sweden, 1995. *Acta Psychiatr Scand.* 2003;108(6):427–431.
12. Gardarsdottir H, Heerdink E, Van Dijk L, Egberts A. Indications for antidepressant drug prescribing in general practice in the Netherlands. *J Affect Disord.* 2007;98(1–2):109–115.