Article

The Burden of Loss: Unexpected Death of a Loved One and Psychiatric Disorders Across the Life Course in a National Study

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Objective: Unexpected death of a loved one is common and associated with subsequent elevations in symptoms of multiple forms of psychopathology. Determining whether this experience predicts novel onset of psychiatric disorders and whether these associations vary across the life course has important clinical implications. The authors examined associations of a loved one's unexpected death with first onset of common anxiety, mood, and substance use disorders in a population-based sample.

Method: The relation between unexpected death of a loved one and first onset of lifetime DSM-IV disorders was estimated by using a structured interview of adults in the U.S. general population (analytic sample size=27,534). Models controlled for prior occurrence of any disorder, other traumatic experiences, and demographic variables.

Results: Unexpected death of a loved one was the most common traumatic experience and most likely to be rated as the respondent's worst, regardless of other traumatic experiences. Increased incidence after unexpected death was observed at nearly every point across the life course for major depressive episode, panic disorder, and posttraumatic stress disorder. Increased incidence was clustered in later adult age groups for manic episode, phobias, alcohol use disorders, and generalized anxiety disorder.

Conclusions: The bereavement period is associated with elevated risk for the onset of multiple psychiatric disorders, consistently across the life course and coincident with the experience of the loved one's death. Novel associations between unexpected death and onset of several disorders, including mania, confirm multiple case reports and results of small studies and suggest an important emerging area for clinical research and practice.

(Am J Psychiatry 2014; 171:864–871)

Population-based studies in the United States show that unexpected death of a loved one is the most frequently reported potentially traumatic experience (1, 2), making mental health consequences of unexpected death an important public health concern. Loss of a close relationship through death, especially one that is unexpected (3), is a stressful life event for both children and adults that is associated with the development of psychiatric disorders (4–7). Given the central role of close relationships through the life course (8), loss of close relationships is unique among stressful experiences. Close relationships influence a wide range of physical, cognitive, and emotional processes in everyday life (9). They can make important contributions to a sense of identity and are often intertwined in a person's self-concept, and for this reason, the death of a close loved one has unique psychological sequelae.

Although any death of a loved one can be emotionally devastating, unexpected deaths provoke especially strong responses, as there is less time to prepare for and adapt to the death (10–12). Throughout the lifespan, unexpected death of a loved one is associated with the development of depression and anxiety symptoms, substance use, and other psychiatric disorders (3, 13, 14) and with heightened risk for prolonged grief reactions (15). Despite this evidence that death of a loved one is associated with common psychiatric disorders and substance use, however, the impact of unexpected death in the general population remains understudied. Central unresolved issues regarding the association between unexpected death and psychiatric morbidity include whether certain disorders are more likely than others to occur in the wake of a loved one's death, whether death has different associations with mental disorders at different points across the life course, and whether a greater number of unexpected death experiences is associated with more episodes of psychiatric disorders. Studies to date have predominately examined death occurring in discrete developmental periods, such as early childhood (e.g., reference 16), late childhood (e.g., reference 6), or older adulthood (e.g., references 3 and 7), yet

This article is featured in this month's AJP Audio, is the subject of a CME course (p. 893), and is discussed in an Editorial by Drs. Kaplow and Layne (p. 807)

traumatic experiences can have differential effects across developmental periods (17). Existing studies have considered a limited set of psychiatric outcomes, and mania has been rarely considered in population-based studies despite numerous case reports of onset during acute bereavement (18–26). Finally, it remains unclear whether a greater number of unexpected death experiences is associated with a greater number of psychiatric disorder episodes, or whether individuals become inoculated to the adverse effects of a loved one's death after many experiences of loss. Given the high prevalence of unexpected deaths in the population, greater knowledge of the nature, magnitude, and breadth of psychiatric outcomes is necessary.

The present study used data based on the U.S. population to examine the association of unexpected death of a loved one with onset of mood, anxiety, and alcohol use disorders. Unexpected death was ascertained in this study by self-report regarding whether someone very close to the respondent died unexpectedly, such as in an accident or terrorist attack, by murder or suicide, or through an acute medical condition such as a heart attack. We examined how the association between unexpected death and onset of common psychiatric disorders varies across different stages of the life course. Finally, we examined how the experience of multiple loved ones dying unexpectedly is associated with the number of psychiatric disorder episodes experienced across the life course.

Method

Sample

Data were drawn from the National Epidemiologic Survey on Alcohol and Related Conditions, a face-to-face survey of noninstitutionalized adults living in households and group quarters. There were two points of data collection: 2001 (N=43,093) and 2004–2005 (N=34,653) (cumulative response rate, 70.2%); we included individuals who participated in the second wave, as lifetime experience of unexpected death, other potentially traumatic experiences, and posttraumatic stress disorder (PTSD) were assessed only at the second wave. We removed individuals from analysis for whom the worst traumatic event was related to the terrorist attack on Sept. 11, 2001 (as described in the following) except if a loved one died; thus, the total sample for the present analysis was 27,534. Demographic characteristics of the sample and distributions of study variables are provided in Tables S1 and S2 in the data supplement accompanying the online version of this article.

Measures

Potentially traumatic experiences. We determined exposure to unexpected death on the basis of answers to two questions: "Did someone very close to you ever die in a terrorist attack" and "Not counting a terrorist attack, did someone very close to you ever die unexpectedly, for example, they were killed in an accident, murdered, committed suicide, or had a fatal heart attack?" Follow-up questions assessed the age at first exposure, the total number of exposures, and age at most recent exposure. The age at the first unexpected death experience was on average 19.3 years before the time of the survey (SD=2.3, interquartile range=6–30). Other potentially traumatic experiences included interpersonal violence (e.g., rape, physical assault), accidents and injuries (e.g., auto accidents), social network events (e.g., traumatic event for a loved one), and witnessing traumatic events (e.g., observing death or serious injury). The respondents were also asked to identify the experience that they considered to be the worst potentially traumatic experience. For the purpose of this study, respondents who endorsed any potentially traumatic experience other than unexpected death of a loved one are described as reporting "other potentially traumatic experiences."

Other than death of a loved one during the terrorist attack on 9/11, we did not include other experiences related to 9/11 in our count of potentially traumatic experiences, as one-time large-scale traumatic experiences such as this attack can distort examinations of more general, ongoing traumatic experiences (27). For example, 76.5% of the sample reported indirect exposure to 9/11 (e.g., watching television reports of the events), and 22.2% of the sample reported indirect exposure to 9/11 as their worst experience. Individuals for whom exposure to 9/11 was the worst traumatic event experienced were removed from the analysis.

Psychiatric disorders. The onset of nine lifetime DSM-IV mood, anxiety, and alcohol use disorders was assessed by lay interviewers using the Alcohol Use Disorder and Associated Disabilities Interview, Schedule IV (28–30). Respondents who endorsed lifetime criteria for a disorder were asked to estimate their age at onset of the first episode, the number of episodes, and their age at the most recent episode. Because age at each episode was not assessed, we focused on estimating the risk of the first episode onset by age.

The mood disorders assessed were major depressive episode, dysthymia, and manic episode. As indicated by DSM-IV, a major depressive episode was diagnosed only if the respondent reported that the symptoms did not occur within 2 months of the loved one's death. Anxiety disorders included panic disorder (with or without agoraphobia), social phobia, specific phobia, generalized anxiety disorder, and PTSD. Alcohol use disorders included DSM-IV alcohol abuse and dependence. Test-retest reliability for these diagnoses ranged from fair (kappa=0.42, panic disorder) to excellent (kappa=0.84, alcohol dependence) (28–30). These estimates are similar to those in other large-scale psychiatric epidemiological surveys using lay-administered instruments (31, 32).

For each disorder, among those with a diagnosis, respondents reported the age at onset of symptoms and the number of distinct periods in which they experienced symptoms of the disorder. The average number of years between the age at the time of the survey and the age at reported onset of disorder symptoms ranged from 10.9 years (manic episode) to 27.5 years (specific phobia). Clear instructions were given to respondents to count disorder episodes that were separated by periods of improvement. We created a total count of the number of episodes of each disorder, as well as the total number of episodes of all psychiatric disorders for respondents with multiple disorders.

Sociodemographic Factors

The sociodemographic factors included as covariates were sex, race and ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic Asian or Pacific Islander, non-Hispanic Native American or Alaska Native, and Hispanic), marital status (never married, widowed/separated/divorced, married), personal income at the time of the interview (<$19,999, $20,000–$34,999, $35,000–$69,999, ≥$70,000), and highest level of completed education (less than high school, high school, or more than high school).

Statistical Analysis

First, we examined the proportion of respondents who reported an unexpected death of a loved one as their worst

TABLE 1. Proportion of a U.S. Population Sample Reporting the Unexpected Death of a Loved One as the Worst Lifetime Potentially Traumatic Experience

Number of Lifetime Potentially Traumatic Experiences	N	Respondents Who Identified Unexpected Death of Loved One as Worst Potentially Traumatic Experience in Lifetime	
		%	SE
One or more	21,937	30.7	0.4
Two or more	17,327	31.5	0.4
Three or more	12,330	31.7	0.5
Four or more	8,350	30.1	0.5
Five or more	5,427	28.2	0.6
Six or more	3,450	26.3	0.7
Seven or more	2,196	24.2	0.9
Eight or more	1,342	23.3	1.0
Nine or more	825	22.6	1.4
10 or more	467	22.1	1.7
11 or more	276	21.6	2.3

stressful experience, as a function of exposure to other potentially traumatic experiences. Second, we examined the association between timing of the earliest unexpected death and first onset of each disorder. We grouped age into 5-year intervals ranging from age 5 to 69 years; the age of older respondents was categorized as ≥70. We used a series of conditional logistic regressions to estimate the incidence of disorder in each age category, conditional on never having experienced the disorder at a prior age interval, as a function of exposure to the first unexpected death at the same age interval relative to respondents who did not experience unexpected death during that interval. Respondents for whom the age at onset of the focal psychiatric disorder was prior to their age at the first unexpected death were excluded from the analysis for that disorder. The models controlled for sociodemographic variables, onset of any disorder that was not the focal outcome of that model before the first experience of unexpected death, and number of lifetime potentially traumatic experiences (none, one or two, three or four, five or more). Sensitivity analyses explored the potential for retrospective reporting biases by limiting the sample to respondents who experienced their first unexpected death within 10 years of the interview (removing 8,218 individuals from the analysis). Finally, we examined how experiencing multiple deaths of loved ones contributed to the number of psychiatric disorder episodes across the life course. On the basis of preliminary analyses, we divided the number of unexpected death experiences into four categories: no deaths (N=13,478), one death (N=7,872), two or three deaths (N=3,936), and four or more deaths (N=1,949). We used Poisson regression with the number of episodes as the outcome after creating a sum of all episodes across mood, anxiety, and alcohol use disorders (median=4.0 episodes). All analyses were conducted by using SAS-callable SUDAAN software (RTI International, Research Triangle Park, N.C.).

Results

Rates of Potentially Traumatic Events and Psychiatric Disorders

Demographic characteristics of the respondents are included in Table S1 in the online data supplement. A total of 50.3% of the respondents reported ever experiencing the unexpected death of a loved one (see online Table S2), and it was the most common type of potentially traumatic experience reported by the respondents. The most common lifetime psychiatric disorders were alcohol use disorder (35.9%) and major depressive episode (23.7%), with mean ages at onset of 28.6 and 32.8 years, respectively (supplemental Table S2). These lifetime prevalence estimates of psychiatric disorders are higher than those in previous reports (e.g., reference 33), owing to removal of individuals for whom the worst potentially traumatic experience was related to 9/11.

Worst Experience

The proportion of individuals who reported an unexpected death as their worst experience, across numbers of total lifetime experiences, is shown in Table 1. Among those with a minimum of one, two, three, or four potentially traumatic experiences, more than 30% reported that the unexpected death of a loved one was the worst event that they had experienced. Among those in each of the groups with more potentially traumatic experiences, more than 20% reported the unexpected death of a loved one as the worst. Unexpected death was identified as the worst experience by a higher proportion of respondents than for any other traumatic experience assessed in the survey, at every level of exposure (data not shown, available on request).

Mood, Anxiety, and Alcohol Use Disorders in Relation to Unexpected Death

Table 2 shows the conditional adjusted odds of disorder onset at each age, comparing respondents experiencing their first loss due to unexpected death to those who did not experience unexpected death at that age. The incidence proportions that form the basis of comparison for each age group and each disorder are given in Table S3 in the online data supplement.

As shown in Table 2, unexpected death was associated with increased odds of each mood and alcohol use disorder examined in at least one age group, with significant associations tending to cluster in older age groups. Increased odds of major depressive episodes were observed in 12 of the 14 age groups, dysthymia in six age groups, manic episodes in five age groups, and alcohol use disorders in the six age groups occurring after age 45.

Table 3 shows associations between age at first unexpected death experience and onset of anxiety disorders. The odds of disorder onset were heightened in all 14 age groups for PTSD, 12 age groups for panic disorder, seven age groups for generalized anxiety disorder (all after age 40), five age groups for specific phobia (all after age 40), and two age groups for social phobia.

To assess the role of reporting bias in these associations, we conducted a sensitivity analysis by removing the 8,218 individuals whose first unexpected death experience was

TABLE 2. Association Between Age at First Unexpected Death of a Loved One and Onset of Mood or Alcohol Use Disorder in a U.S. Population Sample (N=27,534)[a]

Age at First Unexpected Death of Loved One (years)	N	Odds of Mood or Alcohol Disorder in Relation to No Lifetime Experience of Unexpected Death[b]: Major Depression (N=7,881) Odds Ratio[c]	Major Depression (N=7,881) 95% CI	Dysthymia (N=2,051) Odds Ratio[c]	Dysthymia (N=2,051) 95% CI	Manic Episode (N=1,855) Odds Ratio[c]	Manic Episode (N=1,855) 95% CI	Alcohol Use Disorder (N=11,197) Odds Ratio[c]	Alcohol Use Disorder (N=11,197) 95% CI
5–9	750	3.56	1.54–8.23	2.84	0.59–13.58	1.22	0.48–3.11	1.81	0.73–4.53
10–14	1,397	1.62	1.05–2.52	0.91	0.35–2.34	0.93	0.60–1.45	0.93	0.77–1.13
15–19	2,164	1.24	0.94–1.63	0.77	0.41–1.46	0.94	0.56–1.56	1.11	0.86–1.44
20–24	1,685	1.47	1.12–1.93	1.37	0.72–2.59	0.69	0.36–1.32	1.30	0.90–1.88
25–29	1,426	1.50	1.10–2.03	2.41	1.17–4.94	1.08	0.50–2.35	0.93	0.60–1.44
30–34	1,297	1.53	1.13–2.06	1.91	1.04–3.51	2.14	1.19–3.83	1.27	0.86–1.87
35–39	1,145	2.25	1.61–3.16	1.31	0.59–2.91	2.08	1.05–4.13	1.36	0.90–2.05
40–44	1,033	1.43	0.97–2.11	1.24	0.61–2.54	2.65	1.32–5.31	1.12	0.66–1.90
45–49	787	4.33	3.03–6.17	3.78	1.74–8.22	2.01	0.85–4.79	3.01	1.80–5.03
50–54	620	2.94	1.86–4.65	4.67	2.33–9.34	5.71	1.85–17.56	2.68	1.03–6.99
55–59	440	5.77	3.31–10.06	4.07	1.63–10.17	1.99	0.24–16.21	4.94	2.07–11.81
60–64	313	7.45	3.93–14.12	6.77	2.24–20.53	—[d]		7.89	2.62–23.80
65–69	201	10.66	4.42–25.70	—[d]		4.71	0.89–24.94	3.14	1.25–7.92
≥70	324	2.47	1.26–4.82	2.14	0.37–12.34	5.66	1.12–28.54	3.23	2.02–5.16

[a] There were 294 missing responses for age at first unexpected death.
[b] Each regression model included a different denominator, as each model assessed the association between age at unexpected death and onset of the focal psychiatric disorder among respondents with no onset at a prior age.
[c] Models were controlled for sex, age, race/ethnicity, income, education, marital status, number of lifetime potentially traumatic experiences, and onset of a psychiatric disorder prior to the focal disorder.
[d] Group size was not sufficient to estimate a robust association.

more than 10 years before the time of the survey. The results are shown in Table S4 in the online data supplement. We could not estimate incidence for age 5–9, though for the other age groups the results were robust and the associations were often stronger than those observed for the total sample.

Timing of Psychiatric Disorder Onset and First Unexpected Death Experience

In each online supplementary figure, we show the proportion of respondents with onset of a given psychiatric disorder at each age interval, for respondents with no unexpected death experiences and for those with an experience at each age interval. Online Figures S1–S9 display these relationships for PTSD, dysthymia, depressive episode, manic episode, panic disorder, generalized anxiety disorder, alcohol use disorders, social phobia, and specific phobia, respectively. For most disorders, a marked increase was observed in onset frequency in the time period during which the unexpected death occurred, with the exception of social and specific phobia, for which little association with unexpected death was observed.

Numbers of Unexpected Death Experiences and Psychiatric Disorder Episodes

Table 4 shows the associations between the number of unexpected deaths and the number of episodes of each psychiatric disorder as well as the total number of psychiatric disorder episodes across all disorders. Increasing exposure to unexpected death was associated with a monotonic increase in the number of total psychiatric disorder episodes. Compared with those with no unexpected deaths, individuals with one, two or three, and four or more deaths had 1.18 (95% CI, 1.09–1.27), 1.25 (95% CI, 1.12–1.41), and 1.72 (95% CI, 1.44–2.04) times the number of total episodes of psychiatric disorders, based on a Poisson distribution. When examined separately for each disorder, increases in episode frequency were particularly notable for major depression and PTSD episodes (see Table 4).

Discussion

Unexpected death of a loved one is most frequently cited as the most severe potentially traumatic experience in one's life, even among individuals with a high burden of lifetime stressful experiences. Unexpected death is associated with heightened vulnerability for onset of virtually all commonly occurring psychiatric disorders that we assessed. This heightened incidence risk is observable from childhood through late adulthood for major depression, PTSD, and panic disorder, and it is particularly concentrated in older age groups for manic episode, phobias, and alcohol use disorders. However, it is also notable that the majority of individuals in the present study did not have the onset of any disorder in the wake of an unexpected death of a loved one.

There are several pathways through which experiencing a loved one's death may influence psychiatric disorders. Bereavement is a major life stressor, and stressful life

TABLE 3. Association Between Age at First Unexpected Death of a Loved One and Onset of Anxiety Disorders in a U.S. Population Sample (N=27,534)[a]

Age at First Unexpected Death of Loved One (years)	Odds of Anxiety Disorder in Relation to No Lifetime Experience of Unexpected Death[b]									
	Generalized Anxiety Disorder (N=2,646)		Posttraumatic Stress Disorder (N=3,423)		Social Phobia (N=2,332)		Specific Phobia (N=5,197)		Panic Disorder	
	Odds Ratio[c]	95% CI	Odds Ratio[c]	95% CI	Odds Ratio[c]	95% CI	Odds Ratio[c]	95% CI	Odds Ratio[c]	95% CI
5–9	2.57	0.89–7.42	4.50	3.38–6.00	0.96	0.60–1.54	0.76	0.58–1.01	3.64	1.56–8.50
10–14	0.65	0.20–2.04	4.04	3.18–5.12	0.95	0.71–1.27	0.83	0.63–1.09	2.08	1.08–4.02
15–19	0.71	0.38–1.33	4.36	3.48–5.49	0.80	0.59–1.09	1.15	0.89–1.49	1.57	1.10–2.24
20–24	1.24	0.73–2.13	8.60	6.74–10.98	0.92	0.49–1.72	0.88	0.56–1.37	1.62	1.15–2.28
25–29	1.41	0.78–2.53	7.38	5.69–9.59	1.51	0.67–3.39	1.46	0.88–2.16	1.65	1.11–2.44
30–34	1.27	0.75–2.17	8.07	5.81–11.21	0.90	0.35–2.33	1.40	0.87–2.23	1.88	1.27–2.78
35–39	1.53	0.94–2.48	11.08	8.09–15.19	1.02	0.39–2.72	1.12	0.69–1.82	2.42	1.58–3.72
40–44	2.02	1.15–3.56	9.36	6.40–13.70	1.80	0.79–4.09	1.87	1.12–3.12	1.22	0.72–2.06
45–49	2.01	1.18–3.41	12.47	8.37–18.58	2.72	1.29–5.78	2.49	1.57–3.96	3.03	1.82–5.03
50–54	2.25	1.26–4.02	20.08	12.38–32.58	3.50	1.53–7.89	2.50	1.31–4.76	2.00	1.05–3.79
55–59	2.82	1.45–5.46	31.36	17.42–56.45	—[d]		2.29	0.98–5.35	6.17	2.49–15.26
60–64	6.18	2.47–15.49	37.24	16.22–85.54	—[d]		8.41	3.18–22.28	3.68	1.12–12.10
65–69	9.65	3.81–24.46	11.35	5.52–23.35	—[d]		4.78	2.48–9.20	—[d]	
≥70	3.58	1.77–7.28	13.61	6.45–28.70	—[d]		—[d]		5.42	2.14–13.74

[a] There were 294 missing responses for age at first unexpected death.
[b] Each regression model included a different denominator, as each model assessed the association between age at unexpected death and onset of the focal psychiatric disorder among respondents with no onset at a prior age.
[c] Models were controlled for sex, age, race/ethnicity, income, education, marital status, number of lifetime potentially traumatic experiences, and onset of a psychiatric disorder prior to the focal disorder.
[d] Group size was not sufficient to estimate a robust association.

experiences in general are associated with later onset of many physical and mental disorders (34–36). A variety of cognitive, affective, and neurobiological mechanisms linking stress exposure to the onset of mental disorders have been identified (37), and work in this area in relation to death of a loved one is ongoing (11). There may also be mechanisms associated specifically with the consequences of bereavement, given that attachment relationships play a critical role in human experience (9). Available evidence indicates that lack of social support is an important predictor of depression (38); sudden loss of social support may thus engender increased psychiatric sequelae. Further, evidence indicates that bereavement following hospitalization of a loved one in an intensive care unit has significant effects on a wide range of psychological and biological measures (39). Loss of a romantic partner regularly engenders separation distress, with yearning and longing for the loved one and disruption of self-concept (e.g., reference 40), and these could trigger the onset of a mood or anxiety disorder. Among children, in particular, the death of an attachment figure can have important maladaptive consequences (41). Sudden death of a loved one might therefore have consequences specific to attachment loss as well as those explainable by stress mechanisms. Death is the most obviously permanent and extreme form of loss, and sudden death is one of the more difficult forms of bereavement. It remains to be seen whether and how other types of loss, e.g., abandonment, incarceration, separation, deportation, might be similar to or different from the response to sudden death. Moreover, several important time-varying constructs, such as attachment loss, disruption of sense of self, loss of social support, and stress reactivity, likely interact to affect mental health and well-being; future research could be enhanced by explanatory models to guide us in understanding and testing intersecting associations among these important relationship-centered experiences.

We observed heightened risk for onset of a range of mood, anxiety, and alcohol use disorders after the unexpected death of a loved one all along the life course. Previous research in children (6), widows (7), survivors of disasters (42), and older adults (43) suggests that the risks of depression and PTSD are elevated following the death of a loved one. However, to our knowledge, the association between unexpected death and a range of psychiatric disorders across the life course has not previously been examined by using population-based data. We found robust and pervasive relationships of unexpected death to other mood and anxiety disorders and to alcohol use disorders, with many of these associations clustered among respondents in older age groups. The first incidence of a psychiatric disorder in old age is relatively rare; these data indicate that psychiatric disorder onset in older age is commonly concomitant with the death of a loved one. The underlying developmental mechanisms that underlie this clustering of risk at older ages are an important area for future

TABLE 4. Association Between Number of Unexpected Deaths of Loved Ones and Number of Episodes of Psychiatric Disorders in a U.S. Population Sample (N=27,534)[a]

	Incidence of Psychiatric Disorder Episode, Relative to Group With No Unexpected Deaths (reference)[b]					
	One Unexpected Death (N=7,879)		Two or Three Unexpected Deaths (N=3,632)		Four or More Unexpected Deaths (N=1,950)	
Diagnosis	Incidence Density Ratio[c]	95% CI	Incidence Density Ratio[c]	95% CI	Incidence Density Ratio[c]	95% CI
All assessed psychiatric disorders	1.18	1.09–1.27	1.25	1.12–1.41	1.72	1.44–2.04
Major depressive episode	1.01	0.88–1.16	1.22	0.97–1.52	1.52	1.16–1.99
Dysthymia	0.93	0.81–1.07	1.04	0.86–1.27	1.08	0.89–1.32
Manic episode	1.05	0.79–1.40	1.05	0.70–1.57	1.34	0.91–1.98
Generalized anxiety disorder	1.04	0.80–1.34	0.89	0.67–1.18	1.42	0.72–2.78
Social phobia	1.06	0.80–1.39	1.22	0.89–1.67	1.03	0.69–1.54
Specific phobia	0.92	0.70–1.21	0.83	0.63–1.10	0.89	0.63–1.25
Posttraumatic stress disorder	1.02	0.85–1.22	1.10	0.88–1.37	1.39	1.09–1.78
Alcohol use disorders	0.99	0.88–1.11	0.95	0.84–1.07	1.11	0.93–1.33

[a] There were 119 missing responses for number of unexpected deaths.
[b] There were 13,680 individuals who experienced no unexpected deaths and formed the reference group.
[c] From Poisson regression. Models controlled for age, sex, race/ethnicity, marital status, income, education, number of lifetime potentially traumatic experiences, and each psychiatric disorder that was not the focal psychiatric disorder of the model.

research. However, we note that unexpected death of a loved one was associated consistently with elevated odds of new onsets of PTSD, panic disorder, and depressive episodes at all stages of the life course. It is particularly notable that these pervasive associations between unexpected death and onset of specific disorders were maintained even after adjustment for psychiatric comorbidity.

The present study also provides novel data supporting an association between unexpected death and the onset of manic episodes in a general population sample across the life course. An increase in risk of manic episodes after death of a loved one has been suggested by a number of case reports (18–26), and a study based on the Danish psychiatric register indicated that suicide of a mother or sibling was strongly associated with increased risk for mania/mixed episodes (44). Our results suggest that unexpected death of a loved one may be a substantial risk factor for the onset of a manic episode, especially among older adults, and even among those with no prior history of mood, anxiety, or alcohol disorders. The observation of mania in response to traumatic events has been discussed in the literature for over a century (45), yet the specific mechanisms for this association remain unclear. Our findings should alert clinicians to the possible onset of mania after an unexpected death in otherwise healthy individuals.

We further document that the number of lifetime episodes of mood, anxiety, and alcohol use disorders increases as the number of unexpected deaths increases. This suggests that prior experiences of unexpected death do not offer protection from mental health problems following a later unexpected death; rather, each unexpected death experience is associated with similar elevations in risk for novel onsets of mood, anxiety, and alcohol disorder episodes (46).

We note several limitations to the present study that should be addressed in future research. Grief symptoms (47) were not assessed in the National Epidemiologic Survey on Alcohol and Related Conditions. A loved one's death typically evokes a recognizable grief reaction, characterized by yearning and longing, intense sorrow and emotional pain, preoccupation with thoughts and memories of the deceased, a sense of disconnection from ongoing life, and disturbance of self-concept and sense of self (8, 47). Grief can resemble major depression and PTSD (48), and it is now clear that some bereaved individuals develop aberrant grief reactions (43). Further, we did not have information on the nature of the relationship between the respondent and the deceased loved one or the circumstances of the death. Grief intensity, frequency, and duration as well as ensuing psychiatric morbidity might vary depending on the relationship to the deceased (49). For example, among children, death of a parent is especially difficult (50), and among adults, death of a child or a spouse is especially difficult (3). Therefore, it is possible that these specific types of close relationships account for the increased risk observed in these data. Further, the assessment did not distinguish between violent and nonviolent unexpected death. According to DSM-5, only unexpected violent death of a loved one can be coded as an inciting potential trauma. It is possible that violent death accounts for the relations we found between unexpected death and PTSD or other disorders. However, the literature indicates that PTSD symptoms do occur following nonviolent death (4). Future studies with information regarding differences between violent and nonviolent death will be helpful in understanding these relations further; for example, future research might contrast psychiatric sequelae after unexpected versus anticipated death to determine the extent to which the suddenness of a loved one's death influences psychiatric disorders. The description of a death as "unexpected" is a subjective judgment, and we do not have information about the reliability or validity of

this judgment. However, a subjective judgment is commonly used in studies of unexpected death. The ages at both the unexpected death and the onset of psychiatric disorder were retrospectively reported, which introduced reporting biases. However, analyses restricted to respondents who reported a first unexpected death within 10 years of the interview showed similar or slightly stronger results than analyses of the whole sample, mitigating reporting bias as an explanation for our findings. Finally, the diagnoses were not confirmed by clinicians and were assessed with lay interviewers using structured questionnaires.

The diagnosis of PTSD also deserves comment. Two issues are noteworthy. First, the National Epidemiologic Survey on Alcohol and Related Conditions followed DSM-IV and permitted unexpected death to qualify as a potential traumatic event. DSM-5 requires that the death be directly witnessed or both violent and unexpected; thus, some cases identified here may not meet the DSM-5 criteria. However, this has been a controversial issue in the field, and we believe it is useful to know the prevalence of PTSD diagnoses after unexpected death more generally. The second issue is that not all respondents had a lifetime occurrence of an event that qualified as a potential trauma. A large majority of the sample (80%) did experience a potential trauma, though this was not consistent across different age groups. Therefore, our estimates of the association between unexpected death of a loved one and the development of PTSD include individuals who were not at risk for PTSD. However, the estimates we report in this article are overall population-average estimates of PTSD risk following unexpected death, and thus they are of clinical interest.

In summary, we found a significant relationship between the onset of a mood, anxiety, or alcohol use disorder and the unexpected death of a loved one. These results suggest bereavement may be a useful lens in examining the etiology of psychiatric illness. Clinically, our results highlight the importance of considering a possible role for loss of close personal relationships through death in assessment of psychiatric disorders, especially among older adults without a prior history of mental disorder. Clinicians should query the loss of key relationships through death over the patient's life course, especially around the period of onset of symptoms. It may be important to address the patient's response to death of a loved one in order to optimize treatment outcome and reduce the likelihood of illness recurrence.

Received Aug. 25, 2013; revisions received Dec. 10, 2013, and Feb. 13, 2014; accepted Feb. 27, 2014 (doi: 10.1176/appi.ajp.2014.13081132). From the Department of Epidemiology and the School of Social Work, Columbia University, New York; and the Division of General Pediatrics, Department of Psychiatry, Boston Children's Hospital, Harvard Medical School, Boston. Address correspondence to Dr. Keyes (kmk2104@columbia.edu).

Dr. Shear received a contract from Guilford Press to write a complicated grief treatment manual. The other authors report no financial relationships with commercial interests.

This study was supported by NIMH grants MH-092526 to Dr. McLaughlin, MH-093612 and MH-078928 to Dr. Koenen, and MH-60783 and MH-70741 to Dr. Shear and by grant AA-021511 to Dr. Keyes from the National Institute on Alcohol Abuse and Alcoholism.

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