Predictors of Symptoms of Posttraumatic Stress and Depression in Family Members After Patient Death in the ICU

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Background: Patients' deaths in the ICU have been associated with a high burden of psychologic symptoms in families. This study identifies characteristics associated with psychologic symptoms in family members.

Methods: Families of patients dying in the ICU or within 30 h of ICU discharge in 11 hospitals previously participated in a randomized trial. In the current study, we assessed these families for symptoms of posttraumatic stress disorder (PTSD) and depression with follow-up surveys. Outcomes included validated measures of PTSD (PTSD Checklist) and depressive (Patient Health Questionnaire) symptoms. Predictors included family member mental-health history, involvement in decision making, and demographics.

Results: Surveys were completed by 226 families. Response rate was 46% in the original randomized trial and 82% in this study. Prevalence (95% CI) of PTSD and depressive symptoms were 14.0% (9.7%-19.3%) and 18.4% (13.5%-24.1%), respectively. Family characteristics associated with increased symptoms included: female gender (PTSD, $P = .020$; depression, $P = .005$), knowing the patient for a shorter duration (PTSD, $P = .003$; depression, $P = .040$), and discordance between family members' preferences for decision making and their actual decision-making roles (PTSD, $P = .005$; depression, $P = .049$). Depressive symptoms were also associated with lower educational level ($P = .002$). Families with psychologic symptoms were more likely to report that access to a counselor (PTSD, $P < .001$; depression, $P = .003$) and information about spiritual services might have been helpful while the patient was in the ICU (PTSD, $P = .024$; depression, $P = .029$).

Conclusions: Families demonstrated a high prevalence of psychologic symptoms after a death in the ICU. Characteristics associated with symptoms may help target interventions to reduce these symptoms.

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Abbreviations: IPACC = Integrating Palliative and Critical Care Study; IQR = interquartile range; PCL = Post Traumatic Stress Disorder Checklist Civilian Version; PHQ = Patient Health Questionnaire; PTSD = posttraumatic stress disorder

Critical illness and death in an ICU can result in a significant burden of stress and anxiety among family members and may result in both short- and long-term psychologic symptoms associated with disorders, such as complicated grief, posttraumatic stress disorder (PTSD), and depression.¹⁻⁴ A study from France found that a third of family members of critically ill patients had a moderate to major risk of developing PTSD 90 days after the death of their loved one.¹ In another study from France, Pochard and colleagues⁵ reported that 35% of family members experienced significant depressive symptoms 3 to 5

days after their loved one's admission to the ICU. In addition, in two recent US studies that evaluated psychologic health in family members at least 6 months after a patient's death in the ICU, 27% of next-of-kin met diagnostic criteria for major depressive disorder,³ and 46% of family members experienced complicated grief.⁴ These studies suggest a much higher prevalence of significant psychologic symptoms than the 3% to 10% that has been reported in the general population.⁶⁻⁹

Because patients in the ICU are frequently too ill and sedated to make decisions, a surrogate decision

maker is often involved in medical decisions.^{10,11} However, family members assuming the role of surrogate decision maker may be at increased risk for stress, especially if they do not want to act as the decision maker. In French studies, more than half of family members of ICU patients did not want to participate in end-of-life decision making,¹² and family members involved in decisions about end-of-life care were more likely to have PTSD symptoms than those who were not.¹ As a result of these findings, a randomized trial was conducted in France to determine if the burden of psychologic symptoms in family members of patients who died in the ICU could be reduced. The results of this study suggest that providing standardized end-of-life family conferences to encourage family participation and a bereavement packet significantly decreases symptoms of PTSD, depression, and anxiety in family members of patients who die in the ICU.¹³

There have been few US studies that document the prevalence and risk factors of psychologic symptoms among family members of critically ill patients. Because families' preferences and clinicians' delivery of care are affected by religious, cultural, and regional influences, the US experience may be different from that reported by French investigators. A single-institution US study suggested significantly higher rates of psychologic symptoms in families of patients dying in the ICU than the general population, but lower than those reported for family of patients dying in French ICUs.^{3,6-9} In North America, physicians seek family input in 70% to 80% of decisions about limiting life-sustaining therapies as compared with 40% among French physicians.^{14,15} This increased participation in end-of-life decision making, along with other different cultural factors, may result in differing burdens and predictors of psychologic disease in families in North America as compared with other

regions. Therefore, studies to evaluate the prevalence and predictors of psychologic symptoms in different regions are needed.

Our study evaluates the prevalence and family member predictors of PTSD and depressive symptoms in family members of patients who died in 11 Washington State hospitals. The identification of these factors may help guide the development of future interventions to improve the care that we deliver to patients and their families.

MATERIALS AND METHODS

Design

We are currently completing a cluster randomized trial of an interdisciplinary, quality improvement intervention called Integrating Palliative and Critical Care (IPACC) in 15 Washington State hospitals (NCT00685893).^{16,17} The original IPACC study measured family satisfaction with care but not psychologic symptoms. Of the 15 hospitals enrolled in the IPACC study, 11 allowed us to recontact participating family members to assess the prevalence of psychologic symptoms among family members. These 11 hospitals included three teaching hospitals (ranging from 28-65 ICU beds), one community-based teaching hospital (31 ICU beds), and seven community-based nonteaching hospitals (15-32 ICU beds). As part of the survey materials in the randomized trial, we asked respondents to indicate if they could be approached for future studies. In this article, we present data from a follow-up survey of respondents who indicated that they could be recontacted.

Study Participants

In the randomized trial, potential family participants were identified by sending recruitment letters to the homes of all patients who were in the ICU for at least 6 h and who died in the ICU or died within 30 h of transfer from the ICU. Patients were identified using hospital admission, discharge, and transfer records.¹⁶ At one hospital, mailings were sent to the legal next-of-kin listed in the medical record. At all other hospitals, mailings were sent to the patient's home and addressed to "the family of" the patient. Family members had to be older than 18 years of age and were given the option to identify someone else who was more involved in the patient's care (ie, another family member or a friend) and better able to participate in the study. For the follow-up survey, only family members who returned questionnaire materials for the randomized trial and agreed to further contact were approached. Family members were enrolled at a minimum of 6 months after the patient's death in order to reduce the risk of detecting normal bereavement symptoms. Institutional review board approval was obtained at all sites for all activities.

Outcome Survey Measures

PTSD Checklist Civilian Version: The Posttraumatic Stress Disorder Checklist Civilian Version (PCL) uses 17 self-report items to assess the intrusive, avoidant, and arousal *Diagnostic and Statistic Manual of Mental Disorders-IV* PTSD symptom clusters. Responses are recorded on a 5-point Likert scale that ranges from 1 "not at all," through 3 "moderately," to 5 "extremely." The measure can be scored continuously by summing the values of each response or dichotomously using an algorithm that considers a response of "moderately"

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or greater as a symptom and follows the *Diagnostic and Statistical Manual of Mental Disorders-IV* diagnostic rules requiring at least one intrusive symptom, three avoidant symptoms, and two arousal symptoms.¹⁸ In this study, the prevalence of symptoms consistent with a diagnosis of PTSD was ascertained using the recommended algorithm,¹⁹ whereas the relationship between family characteristics and the burden of psychologic symptoms was ascertained using the PCL score as a continuous variable.

Patient Health Questionnaire: The Patient Health Questionnaire (PHQ)-8 uses eight items of the PHQ-9 and excludes the item that asks respondents about their “thoughts of death or suicide.” Responses are recorded on a four-point Likert scale that ranges from 0 “not at all” through 3 “nearly every day.” The PHQ-8 can be scored continuously by summing the values of each response resulting in scores that range from 0 to 24 or dichotomously by using a cutoff value of 10. In this study, we used the cutoff score of 10 to identify the prevalence of depression, whereas we used the continuous PHQ score to assess the association of family member characteristics with the burden of depressive symptoms.

Predictors Survey Measures

Mental Health Visits/Medications Questionnaire: The Mental Health Questionnaire has 7 items that evaluate preexisting mental health and medical problems. The items are derived from questionnaires assessing mental health service use in general medical settings.^{20,21} Items include: (1) the number of times the respondent stayed overnight in a hospital for mental or emotional problems, (2) the number of times the respondent stayed overnight in a hospital for physical problems, and (3) the number of times the respondent visited the emergency room. Responses range from “0” to “5 or more times.” These items were dichotomized as having or not having a hospital or emergency room stay in the past year. Additionally, there are four questions regarding the history of the respondent’s pain medication use and emotional or mood medication use. Responses were reported as percentages of family members who used these medications. All seven items were framed to refer to the year prior to the patients’ critical illness.

Decision Making: In order to identify participants’ preference and actual role in end-of-life decision making, we used two questions previously developed and validated by Heyland and colleagues.²² The questions asked about the role the family member preferred to play in medical decision making and the role that the family member actually played in decision making. Responses included: (1) left it all to the doctor, (2) left it to the doctor after s/he considered the family member’s opinion, (3) shared the decision-making process with the doctor, (4) made the decision after considering the doctor’s opinion, or (5) made the decision by themselves. The decision-making questions were scored by dichotomizing each response as: (a) primarily the doctor’s decision (response 1 and 2), or (b) family member involvement in the decision (response 3, 4, and 5). This dichotomous scoring was determined *a priori* based on methods used by the developer of this item.²² These data were reported as percentages and 95% CIs.

Family Member Services in the ICU: Finally, we asked families to indicate if any additional services would have been helpful to them while their loved one was in the ICU, including: (1) support group of other family members of patients in the ICU, (2) time with a counselor, (3) access to a place to be alone in the hospital, (4) help with financial problems, (5) 24-h access to the patient, (6) daycare for children, and (7) information about spiritual care. These data were reported as the percentage of family members who reported that these services would have been helpful.

Data Analysis

A priori, we designed an algorithm to handle missing data. When a subject skipped a single item from the PHQ or the PCL, the missing value was imputed by substituting the mean value for the items completed by that individual on that measure. Patients who missed more than one question on the PHQ or the PCL were excluded from the analysis.

Descriptive statistics were used to determine the prevalence and 95% CI for estimates of PTSD and depression using the validated scoring algorithms.^{19,23} In addition, we also calculated the median and interquartile range (IQR) of the PCL and PHQ-8.

Our primary goal of this exploratory analysis was to determine if family member characteristics were associated with the level of PTSD and depressive symptoms. To evaluate these associations, we performed unadjusted linear regression using the PCL and PHQ score as continuous outcome variables. We chose to use these variables as continuous outcomes because we were most interested in associations with the burden of symptoms rather than a screening tool cutoff. Because the PCL and PHQ scores were nonnormally distributed, we used a restricted maximum likelihood estimator with adjusted standard errors. Family characteristics were assessed as either dichotomous (gender, minority racial/ethnic status), continuous (age, time knew patient, time from death to survey), categorical (relationship), or ordinal (education). Prior medical care, involvement in/preference of decision-making, and desire for additional services were assessed as dichotomous variables. Significance was reported at $P \leq .05$ because this is a secondary analysis of data collected for a randomized trial and the goal of these analyses was to generate hypotheses for future studies.

RESULTS

Survey data were collected between November 15, 2006 and November 10, 2008. Development of the survey sample is described in Figure 1. Baseline demographics for the 226 family members who returned questionnaires are reported in Table 1. The median

FIGURE 1. Development of study sample.

Table 1—Baseline Characteristics of Family Member Participants

Characteristic	Total (N = 226)
Age, mean (SD), y ^a	59.7 (13.1)
Women	74.8 (169)
Minority or mixed racial/ethnic group ^b	11.6 (26)
Relationship to decedent	
Spouse/partner of decedent	48.7 (110)
Child of decedent	36.7 (83)
Education	
No formal education through eighth grade	0.4 (1)
Some high school	1.8 (4)
High school diploma or GED	10.6 (24)
Some college or trade school	50.0 (113)
4-y college degree	19.5 (44)
Post-college training	17.7 (40)
Median years association with decedent (IQR)	46 (34, 55)

Values expressed as % (n) unless otherwise noted. GED = graduate equivalency degree; IQR = interquartile range.

^aComputed as survey completion year minus family member's year of birth.

^bOne case was missing data on race/ethnicity.

(IQR) length of the patient's ICU stay was 3.55 (1.27, 7.25). The intervention in the randomized trial was not associated with any difference in family members' psychologic symptom; therefore, analyses included all family members.

Overall, the proportion of family members who met symptomatic criteria for PTSD was 14.0% (95% CI, 9.7%-19.3%); PCL scores ranged from 17 to 76 with a median (IQR) of 29 (22, 37). The proportion of family members who met symptomatic criteria for depression was 18.4% (95% CI, 13.5%-24.1%). PHQ-8 scores ranged from 0 to 21 with a median

(IQR) of 4 (1, 8). The proportion of family members who simultaneously met criteria for both PTSD and depression was 10.6% (95% CI, 6.8%-15.5%).

Family characteristics associated with a higher burden of PTSD symptoms included: female gender, having a relationship with the patient other than spouse or adult child, and knowing the patient for a shorter duration (Table 2). Family characteristics associated with depressive symptoms included: female gender, lower educational level, and knowing the patient for a shorter duration (Table 2). There were no significant associations between the burden of either PTSD or depressive symptoms and the time from the patient's death to survey completion.

Medical care in the year prior to the patient's critical illness was associated with increased PTSD symptoms, including: (1) taking prescription medications for emotions or moods, and (2) seeing an outpatient psychiatrist or counselor (Table 3). Family members' medical care in the year prior to the patient's critical illness was associated with increased depressive symptoms, including: (1) having had a hospitalization for emotional or mental problems, (2) taking prescription medications for emotions or moods, (3) seeing an outpatient psychiatrist or counselor, and (4) seeing a neurologist or pain specialist (Table 3).

A total of 85.6% (95% CI, 80.2%-90.0%) of family members preferred to be involved in the end-of-life decision-making process and a total of 84.1% (95% CI, 78.7%-88.7%) of family members reported that they actually participated. A total of 86.3% (95% CI, 81.0%-90.7%) of family members reported that their preferred and actual roles were the same. Families' preferences for the role they would like to play in making end-of-life

Table 2—PTSD and Depressive Symptom Burden by Family Member Characteristics

Characteristic	PTSD Symptoms				Depressive Symptoms			
	No. (218)	β (SE)	P	95% CI	No. (222)	β (SE)	P	95% CI
Age, y	218	−0.106 (0.065)	.102	−0.234-0.021	222	−0.025 (0.029)	.399	−0.082-0.033
Women	218	3.851 (1.647)	.020	0.604-7.097	222	1.973 (0.697)	.005	0.600-3.346
Minority racial/ethnic status	217	0.679 (2.886)	.814	−5.010-6.368	221	−0.071 (1.270)	.956	−2.575-2.433
Relationship to decedent ^a	218		.036		222		.057	
Spouse		−1.608 (3.067)		−7.653-4.436		0.286 (1.231)		−2.140-2.712
Adult child		−5.595 (3.129)		−11.763-0.574		−1.398 (1.211)		−3.785-0.989
Education ^b	218	−1.334 (0.804)	.099	−2.920-0.251	222	−1.072 (0.337)	.002	−1.736 to −0.407
Years association with patient	218	−0.175 (0.058)	.003	−0.290 to −0.061	222	−0.051 (0.025)	.040	−0.099 to −0.002
Years between death and survey	218	−1.463 (1.295)	.260	−4.016-1.090	222	−0.321 (0.554)	.564	−1.413-0.772

Associations were based on 14 unadjusted regression models (single-predictor except for the relationship predictor, which used two dummy indicators for the relationships of interest), using a restricted maximum likelihood estimator with standard errors corrected for departure of the outcome from the normal distribution. The *P* value for relationship to decedent is based on the *F*-test for the *R*²; other *P* values are based on *t* tests of the slope. PTSD = posttraumatic stress disorder; SE = standard error.

^aRelationships in the "other" category included: sibling (n = 11), parent (n = 7), relative (n = 11), friend (n = 4).

^bEducation was reported in six ordinal categories: through eighth grade, some high school, high school diploma or GED, some college or trade school, 4-year college degree, post-college training.

Table 3—PTSD and Depressive Symptom Burden by Family Medical Care

	PTSD Symptoms					Depressive Symptoms				
	No. (218)	% Yes	β (SE)	<i>P</i>	95% CI	No. (222)	% Yes	β (SE)	<i>P</i>	95% CI
Hospitalization, physical problems	216	12.0	2.772 (2.994)	.356	−3.129-8.673	222	11.7	1.785 (1.304)	.173	−0.786-4.355
Hospitalization, emotional/mental problems	216	1.4	−2.235 (2.647)	.400	−7.453-2.984	222	1.4	−3.404 (1.679)	.044	−6.713-0.096
Hospital emergency room visit(s)	215	16.3	3.570 (2.531)	.160	−1.420-8.560	221	15.8	0.879 (1.143)	.443	−1.374-3.133
Accident/injury	215	20.0	0.506 (2.123)	.812	−3.680-4.691	219	20.1	−0.606 (0.882)	.493	−2.343-1.132
Pain medication	214	28.0	1.721 (2.034)	.398	−2.289-5.731	218	27.5	0.419 (0.807)	.604	−1.171-2.009
Medications for emotions/mood	214	18.7	6.319 (2.491)	.012	1.410-11.229	218	18.3	3.590 (1.019)	.001	1.582-5.599
Outpatient psychologic/counseling visits	185	5.9	7.589 (2.998)	.012	1.673-13.504	187	6.4	3.482 (1.622)	.033	0.281-6.683
Outpatient neurologist/pain specialist visit(s)	188	8.0	7.561 (4.162)	.071	−0.649-15.771	190	7.9	3.178 (1.605)	.049	0.011-6.344
Primary care visit(s)	211	86.7	0.619 (2.636)	.814	−4.577-5.815	214	86.9	−1.212 (1.216)	.320	−3.610-1.185

Associations were based on 18 single-predictor regression models, using a restricted maximum likelihood estimator with standard errors corrected for departure of the outcome from the normal distribution. The *P* values are based on *t* tests of the slope. See Table 2 for expansion of abbreviations.

decisions for the patient as well as the role they actually played were not significantly associated with psychologic symptoms. However, families who experienced discordance between their preferences and actual decision-making roles reported higher level of symptoms of both PTSD and depression (Table 4).

A significant proportion of family members reported specific services that would have been helpful while the patient was in the ICU, including: individual time with a counselor (32.4% [95% CI, 26.2-39.1]), access to a place to be alone in the hospital (33.8% [95% CI, 27.6-40.5]), and 24-h patient access (41.6% [95% CI, 34.9-48.4]). In addition, two services were reported as more likely to be helpful among family members with psychologic symptoms: (1) individual time with a counselor, and (2) information about spiritual care (Table 5).

DISCUSSION

This follow-up survey after a randomized trial was not primarily designed to assess prevalence of psy-

chologic symptoms, but rather was designed to identify predictors associated with these symptoms in order to guide the development of interventions to reduce this burden of symptoms. Our overall response rate is too low to confidently assess the prevalence of psychologic symptoms among family members; however, our estimates of prevalence are comparable to that of some of the other studies that were designed to identify the prevalence of these symptoms.¹⁻³ These findings and prior studies suggest that the prevalence of PTSD and depressive symptoms in family members of patients who die after a stay in the ICU is at least two to three times higher than the general population.^{7,8,24-26}

Several French studies have suggested a higher prevalence of PTSD and depression in comparison with our study and other US studies.³ This difference might be explained by the fact that only 3 months elapsed between patients' deaths and survey administration in the French studies, whereas a considerably longer follow-up time exists in the US studies. In our cross-sectional study, we did not see evidence of

Table 4—PTSD and Depressive Symptom Burden by Family Members' Preferred/Actual Decision Making Roles

	PTSD Symptoms					Depressive Symptoms				
	No. (218)	% Yes	β (SE)	<i>P</i>	95% CI	No. (222)	% Yes	β (SE)	<i>P</i>	95% CI
Preferred to be involved in decision making	206	85.0	−5.670, (2.989)	.059	−11.564-0.224	210	85.2	−2.016 (1.215)	.098	−4.411-0.379
Was involved in decision making	213	84.0	−4.313 (2.595)	.098	−9.428-0.803	216	84.3	−1.919 (1.079)	.077	−4.045-0.207
Concordance between preferred/actual role	205	86.3	−8.329 (2.949)	.005	−14.143 to −2.515	208	86.5	−1.936 (0.978)	.049	−3.864 to −0.008

Associations were based on six single-predictor regression models, using a restricted maximum likelihood estimator with SEs corrected for departure of the outcome from the normal distribution. The *P* values are based on *t* tests of the slope. See Table 2 for expansion of abbreviations.

Table 5—PTSD and Depressive Symptom Burden by Services Families Would Have Found Helpful

Potentially Helpful Services	PTSD Symptoms					Depressive Symptoms				
	No. (218)	% Yes	β (SE)	<i>P</i>	95% CI	No. (222)	% Yes	β (SE)	<i>P</i>	95% CI
Counselor or psychologist	211	32.2	7.661 (1.906)	<.001	3.904-11.418	214	31.8	2.469 (0.827)	.003	0.838-4.099
Place to be alone	211	33.2	2.725 (1.860)	.144	−0.941-6.392	214	34.1	0.459 (0.741)	.536	−1.001-1.920
Help with financial problems	211	9.5	6.494 (3.306)	.051	−0.023-13.011	214	8.9	2.259 (1.443)	.119	−0.585-5.104
Support group	211	16.1	2.968 (2.427)	.223	−1.816-7.752	214	15.0	1.871 (1.099)	.090	−0.296-4.038
24-h access to patient	211	42.7	1.162 (1.696)	.494	−2.182-4.506	214	42.1	0.471 (0.730)	.519	−0.967-1.910
Information about spiritual care services	211	15.2	5.719 (2.510)	.024	0.770-10.668	214	14.5	2.394 (1.092)	.029	−0.241-4.546

Associations were based on 12 single-predictor regression models, using a restricted maximum likelihood estimator with SEs corrected for departure of the outcome from the normal distribution. The *P* values are based on *t* tests of the slope. See Table 2 for expansion of abbreviations.

a higher burden of psychologic symptoms among those who had a shorter duration between the patient's death and survey administration. However, the earliest time point that we surveyed family members was 6 months after the patient's death and it is possible that surveying family members as early as 3 months could be associated with a higher burden of these symptoms.

Our predictors of psychologic symptoms were different from those reported by Azoulay and colleagues¹ but similar to those reported by US researchers. For demographic predictors, the only finding consistent with those reported by Azoulay was an association of female gender with higher levels of PTSD and depression symptoms. We did not show an association between being a spouse and the presence of increased psychologic symptoms. However, we did show that respondents with shorter relationships with patients reported more psychologic symptoms. In our data, spouses as well as respondents in other relationships (eg, other relative, friend) reported significantly shorter mean (IQR) duration of relationships with the patient (40 [30, 51] years) than did adult children (52 [45, 59] years), suggesting that length and type of relationship may be confounded. However, even after controlling for the length of relationship, we failed to find a relationship between being a spouse and having increased psychologic symptoms. Larger and more diverse samples may be needed to clarify the role of relationship in the development of psychologic symptoms.

Although we found that more families participated in end-of-life decision-making than reported in France (84% vs 44%), we did not find that either preferences for being involved in decision making or actual involvement in decision making were significantly associated with increased psychologic symptoms. Instead, we found that discordance between decision-making preferences and activities were significantly associated with increased psychologic symptoms. The concept of cognitive dissonance may help explain this

finding.²⁷ Family members may experience cognitive dissonance when they perceive an inconsistency between their preference and what is actually required of them. These observations are consistent with prior findings linking dissonance to physiologic arousal²⁸ and incongruence in responses to PTSD interventions.²⁹ The importance of preferred vs perceived decision-making roles for both patient and family outcomes has been supported by other researchers. Gattellari and colleagues³⁰ reported higher anxiety in cancer patients when their preferred and perceived roles in decision making were discordant, and Heyland and colleagues³¹ found increased satisfaction among families of patients in the ICU when decision-making preferences and activities were concordant. These data suggest that psychologic symptoms may be reduced by identifying family members' preferred role in decision making and attempting to provide care consistent with that preference.³²

We also showed that the burden of PTSD and depressive symptoms were associated with a previous history of taking psychologic medications and seeing an outpatient psychiatrist or counselor. Although the number of family members with these risk factors was small (18% and 6% respectively) it suggests that prior psychiatric treatment may be an important risk factor and may help identify family members who are more likely to benefit from interventions. Our findings also suggest opportunities for other interventions that might be useful in reducing the burden of psychologic symptoms in families of ICU patients, including offering families counseling services and spiritual support while the patient is in the ICU.

Our study has several important limitations. First, subjects included family members who participated in a randomized trial and agreed to be recontacted for a follow-up survey. Although 82% of family members eligible for the follow-up survey participated, only 13% of all eligible patients dying in or shortly after a stay in the ICU were represented in our final sample. This low overall response rate raises the

possibility of nonresponse bias that may affect the external validity of the results. Although we do not know the demographics of family members who did not participate, a prior publication from this study showed that patients of family members who responded were more likely to be older, to be white, and to have received more indicators of palliative care, including medical record documentation of family present at death, involvement of spiritual care, and dying after a decision to limit life-sustaining therapies.³³ Studies have suggested that demographics such as minority race or older age may be associated with higher risk of psychologic disease; therefore we may be underestimating the prevalence of these symptoms.³⁴⁻³⁶ It is also possible that family members who have psychologic symptoms would be less likely to respond because of these symptoms; therefore, our study may underestimate the true prevalence of PTSD and depressive symptoms. Second, because the psychologic symptoms and mental health history of the family member was obtained by self-report, this could be another reason for an underestimation of the prevalence of symptoms or mental health problems.^{37,38} It is also possible that use of different survey instruments could result in different estimates of burden of symptoms, although research comparing validated instruments for these psychologic symptoms has suggested comparable results.^{9,39,40} In addition, it is important to note that formal diagnostic clinical interviews are the gold standard to identifying psychologic disease and our study focuses on the burden of psychologic symptoms rather than the diagnosis of psychologic disease. Third, because we did not obtain information about the family members' psychiatric history after the patient's death, we do not know if the family member was exposed to additional traumatic stressors or risk factors, such as drug and alcohol abuse, or received any counseling or psychiatric medications after the patient's death. Fourth, this study took place in 11 hospitals in the Seattle, Washington area in a predominantly white and well-educated population and our findings may not generalize to other areas. Finally, although we designed this study as an exploratory analysis, multiple comparisons could have led to spurious associations. Therefore, our results should be considered hypothesis generating and be confirmed in future studies.

In conclusion, we identified a number of predictors of symptoms of PTSD and depression among family members that may be useful for identifying family members at risk for increased psychologic symptoms and for developing interventions to reduce the risk of PTSD and depression after the death of a loved one in the ICU. Demographic factors associated with increased risk, such as female gender and a

history of psychologic symptoms or illness, may help target individuals at highest risk. Additionally, interventions that enable clinicians to both identify and implement families' preferred roles in decision making may enhance families' experiences in the ICU, potentially lessening psychologic symptoms. Finally, additional support services may be helpful to families as they deal with the stressful and difficult circumstances faced in the ICU setting. Interventions designed to reduce morbidity associated with psychologic symptoms among family members of critically ill patients is an important area for future study.

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Dr Engelberg: contributed to providing statistical advice and a significant amount of support in writing of the manuscript; she was the coprincipal investigator of the original randomized trial.

Dr Kross: contributed to management of the database and providing advice in the writing of the manuscript.

Dr Zatzick: contributed to providing advice on the selection, analysis, and interpretation of the psychiatric measurements; he is a licensed psychiatrist.

Ms Nielsen: contributed to administering the surveys and managing the database.

Ms Downey: contributed to providing statistical advice and completing a number of analyses; she was an analyst for the original randomized trial.

Dr Curtis: contributed to sharing the existing database of the original randomized trial and providing names of family members who were contacted in the current study. Dr Curtis also contributed to the development of the research question, the analysis of the data, and the interpretation of the results in the manuscript; he was the principal investigator of the original randomized trial.

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