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THE WISH-TO-DIE AND FIVE-YEAR MORTALITY IN ELDERLY PRIMARY CARE PATIENTS

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Abstract

Objectives—We examined the impact of the wish-to-die on mortality over a 5-year period, stratified by baseline depressive status (i.e., major, minor, no depression diagnosis). We also examined whether a depression care management intervention would minimize these relationships.

Design—Longitudinal analyses of the practice-randomized Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT).

Setting—20 primary care practices from New York City, Philadelphia, and Pittsburgh.

Participants—1202 participants were identified via two-stage, age-stratified (60–74; 75+) depression screening of randomly sampled participants.

Intervention—Practices randomized to Care Management Intervention or Usual Care conditions.

Measurements—Vital status at 5 years using the National Death Index.

Results—Rates of the wish-to-die were 29% (major depression), 11% (minor depression), and 7% (no depression). In Usual Care, the wish-to-die was associated with an increased risk of 5-year mortality across depressive status (adjusted hazard ratios ranging from 1.62 to 1.71). In Intervention practices, this association was greater among the no depression (adjusted hazard ratio 1.64) compared to major depression group (adjusted hazard ratio 0.68).

Conclusions—The wish-to-die was associated with mortality in the usual care of elderly primary care patients, suggesting that the wish-to-die has clinical significance and may be worth assessing even in patients without other evidence of depression. This association was not observed among depressed patients located in primary care practices that implemented the PROSPECT intervention, suggesting potential long-term benefits of treatment and management of depression.

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Keywords

suicidal ideation; wish-to-die; mortality; primary care; geriatrics

Prospective studies have documented a relationship between depression and mortality in community samples, (1–4) with fewer investigations in primary care. (5) Our group found that elderly primary care patients with major or minor depression were almost twice as likely to die over a 2-year follow-up period, (6) in comparison to non-depressed patients, after controlling for medical illnesses. In a longer-term follow-up of the same sample, patients with major depression whose physicians participated in a depression care management intervention were less likely to die over a 5-year course, in comparison to those who received usual care. (7)

Less is known about the impact of suicidal ideation on natural-cause mortality in primary care, and whether its impact contributes over and above depression. While individuals with major depression are among the most likely to express suicidal ideation, ideation at more passive levels frequently presents among older adults in the absence of depression. (8) There is some evidence that suicidal ideation predicts mortality in elderly community (9–10) and acutely medically ill inpatients, (11) but other studies have not found such a relationship. (12–13)

Documentation of specific types of suicidal ideation as risk factors for mortality in the absence of depression, and independent of medical burden, would inform clinical practice and aid the development of intervention and prevention efforts. We were particularly interested in an individual's wish-to-die, which we define as desire to die or lack of desire to live. (14–15) This construct has also been described as death ideation or passive suicidal ideation (16). One model of the suicidal process proposes a continuum whereby feelings of hopelessness may lead to death ideation or the wish-to-die, which in turn may progress to active ideation, a plan, and ultimately suicide (17). We chose to examine wish-to-die as it is prevalent in primary care, (18–19) can negatively affect self-care and health behaviors related to mortality, (20) and is potentially modifiable with appropriate treatment. (18) Using PROSPECT (Prevention of Suicide in Primary Care Elderly: Collaborative Trial) data, we hypothesized that the wish-to-die would be associated with all-cause mortality over the 5-year study period regardless of baseline depressive status (i.e., major, minor, no current depression diagnosis). As PROSPECT tested a care management intervention to provide algorithm-based depression treatment against physician usual care, we also hypothesized that exposure to the Intervention condition would moderate the relationship between wish-to-die and mortality.

METHODS

Study Sample

The study used data collected as part of the PROSPECT trial, augmented with five-year mortality data to test hypotheses about risk of mortality. PROSPECT was conducted in 20 primary care practices from greater New York City, Philadelphia, and Pittsburgh. We recruited participants from 5/99–8/01, and conducted follow-up interviews for two years. After pairing by urban location, academic versus community affiliation, size, and population type, practices were randomized to Intervention or Usual Care. Participants were recruited from an age-stratified (60–74, 75+ years) random sample of persons with upcoming appointments. Research associates confirmed study eligibility (age≥60, Mini-Mental State Examination (21) ≥18, English-speaking) with consenting patients, and screened for depression using the Centers for Epidemiologic Studies Depression scale (CES-D). (22) See Bruce et al. (18) for a full description of the sample.

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Eligibility Criteria

All patients scoring CES-D>20 or reporting prior depressive episodes or treatment were invited to enroll, as were a random 5% sample of patients with lower scores to produce a non-depressed comparison group. Research associates administered baseline interviews to 1,226 patients. The sampling strategy yielded a cohort that approximated a representative sample of PROSPECT practice attendees, with oversampling of patients with depressive symptoms. For purposes of this analysis, 24 non-depressed patients with psychotic symptoms, bipolar disorder, or alcohol/substance abuse were excluded, yielding a total sample of 1,202 participants. We excluded these disorders given their potentially unique contributions to mortality.

Assessment of Suicidal Ideation and Depression

We used the Scale for Suicidal Ideation (SSI) (14) to measurepresence of specific types of current suicidal or death ideation. As we were interested in the presence of a wish-to-die, given its greater frequency in primary care compared to active suicidal ideation, main analyses using SSI as a predictor dichotomized the scale and excluded participants with more severe suicidal ideation. Scores of 0 indicated no wish-to-die or other suicidal ideation, while scores ≥1 on items 1–3 indicated the wish-to-die. These items reflect lack of desire to live, desire to die, and the belief that reasons for dying outweigh reasons for living. We also descriptively examined "suicidal desire" as a more severe form of suicidal ideation, defined as a score ≥1 on items 4 or 5. These items reflect desire to make an active suicide attempt, and precautions to save one's life.

We used the Structured Clinical Interview for Axis I DSM-IV Disorders (SCID) to assess for major depression and other depressive disorders. (23) We defined clinically significant minor depression by DSM-IV criteria modified to require 3–4 depressive symptoms, Hamilton Depression Rating Scale (HDRS) ≥10, (24) and duration ≥4 weeks. (18) A subgroup of patients categorized as "no current depression diagnosis" experienced subthreshold depressive states, anxiety disorders, or past major depression. We assessed depression severity with the 24-item HDRS, removing the suicidal ideation item.

The Assessment Coordinator (PJR) conducted regular teleconferences with all research associates to review diagnostic practices. Ongoing monitoring indicated excellent interrater reliability across sites for SSI ratings (Intraclass Correlation Coefficient under a random effects model;ICC=0.96), HDRS scores (ICC=0.97), and SCID diagnoses (ICC=0.92).

Assessment of Other Patient Characteristics

We obtained baseline information on age, gender, marital status, self-reported ethnicity, education, and smoking status based on tobacco use within 6 months. We estimated overall medical comorbidity using the Charlson Comorbidity Index (25) based on self-reported medical conditions and medication use. Functional disability in Instrumental Activities of Daily Living (IADL) (26) was measured by count of activities that participants were unable to undertake without assistance.

Description of Usual Care and the Intervention Condition

Practices randomized to Usual Care received notification of the depressive status of their patients, but no specific recommendations. Practices randomized to the Intervention Condition had available depression care managers (DCMs) who worked within the practice. DCMs implemented the intervention among patients with major or minor depression by working with primary care physicians to recommend treatment according to standard guidelines. DCMs followed patients over two-years to monitor treatment response, adherence, and side effects. First-line treatment was citalopram. Interpersonal Psychotherapy could be used alone or as an

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augmentation. In both study arms, physicians were informed by letter if patients reported any suicidal ideation, and immediately when patients were identified at high suicide risk. Other sources detail the role of DCMs (27), pharmacotherapy strategy (28), and management of suicidal ideation. (29)

Ascertainment of Vital Status

Vital status was determined using the National Death Index (NDI Plus), the computerized national death certificate registry of the National Center for Health Statistics (NCHS). (30) We did not transmit any study data along with identifying data, nor transmit identifying data via e-mail. The three PROSPECT sites verified vital status information obtained from NDI, and sent the final version indexed by unique study identifier and stripped of personal identifiers to the University of Pennsylvania Data Core to produce the analytic dataset. Written consent, including permission to obtain death certificate information, had been obtained from each participant. This study received approval from the Institutional Review Boards at each university and independent review at NCHS.

Statistical Analysis

Our primary analyses focused on mortality differences between participants with and without the wish-to-die stratified by their baseline depression status (major depression, minor depression, no depression). Secondary analyses focused on whether the intervention moderated these differences. To identify potential confounders, we compared baseline characteristics of patients with and without the wish-to-die within each of the three depression strata. Bivariate comparisons for both continuous and binary characteristics were based on the F-test from linear and logistic regression models with random effects for clustering by practice. Associations between baseline characteristics and mortality were assessed using Wald-type Chi-square tests from Cox proportional hazard models. Characteristics that were significantly different across "wish-to-die" groups and associated with mortality at the α=0.10 significance level were considered potential confounders and included in the adjusted model, (31) as was Intervention condition.

We performed survival analyses using a Cox proportional hazard model for clustered data to explore the effect of explanatory variables on survival. (32) Variance estimates, confidence intervals, and p-values were adjusted for within-practice clustering. (32) Point estimates and associated Wald-type Chi-square 95% confidence intervals were provided for the hazard ratio of time to death.

For our first hypothesis (that wish-to-die independently contributes to all-cause mortality), we evaluated the possibility of effect modification of presence or absence of the wish-to-die on risk of death by baseline depression status. The formal test for effect modification was based on the two-way interaction between baseline wish-to-die and baseline depression status under the Cox model, with main effects for presence or absence of baseline wish-to-die and baseline depression status. Consistent with the literature, (33) we set α at 0.10 to denote statistical significance for the interaction term in the Cox proportional hazards model. The primary result involved evaluation of the main effect of wish-to-die in the Cox model, or the stratified effect of wish-to-die if we found evidence of effect modification.

Our second research question examined whether intervention assignment moderated the above relationship. The analysis introduced a three-way interaction between baseline wish-to-die, baseline depression status, and intervention assignment into the Cox model, in addition to main effects for presence or absence of baseline wish-to-die, baseline depression status, and intervention assignment, and the corresponding two-way interactions. Based on the above Cox three-way interaction model, hazard ratios between baseline wish-to-die and mortality, and

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corresponding confidence intervals, were stratified by six groups defined by baseline depression status and intervention group.

Results of all Cox models are reported in terms of hazard ratios and 95% confidence intervals. There was no evidence of violation of the proportional hazards assumption, as the weighted Schoenfeld residuals were not associated with time. (34) SAS version 9.1 was used for analyses (SAS Institute Inc., Cary, NC).

RESULTS

Sample Characteristics

Flow diagrams depicting participant sampling, screening, and study enrollment for both PROSPECT (18)and the mortality follow-up (7)have been published elsewhere. Among depressed participants, previously reported analyses found a significantly larger proportion of Intervention than Usual Care participants reported any suicidal ideation (29.4% vs. 20.1%). (18)

The baseline rate of wish-to-die (SSI score ≥1 on items 1–3) was 178/1202 (15%) for the total sample, a rate which varied by depression: 114/390 (29%) of participants with major depression, 22/201 (11%) of those with minor depression, and 42/611 (7%) of those with no depression reported the wish-to-die. Most subjects (32/42; 76%) with the wish-to-die but no depression diagnosis reported neither gateway depression symptom (i.e., depressed mood or anhedonia). The rate of suicidal desire at baseline (SSI score ≥1 on either item 4 or 5) was 13/1202 (1%) for the total sample, 11/390 (3%) for those with major depression, 1/201 (0.5%) for those with minor depression, and 1/611 (0.2%) for those with no diagnosis. The 13 participants with suicidal desire were excluded from main analyses, as they may be qualitatively different than those with the wish-to-die, yielding a total N of 1189. While all subjects were assessed for depression status and suicidal ideation, other variables contained missing data at a rate of <10%.

Tables 1–3 compare baseline demographic and clinical characteristics between participants with and without the wish-to-die, stratified by depression status, and present associations of these characteristics with time to death. Functional disability in IADLs, depression severity, and smoking status met criteria for potential confounding variables as they differed significantly across “wish-to-die” groups and were associated with mortality.

Mortality Risk by Wish-to-die within Depression Status

After a median follow-up of 52.8 months, 218 of 1189 (18.3%) participants had died. The percentage of deaths was 23.6% (42/178) in the wish-to-die group and 17.4% (176/1011) in others. Over the study period, one participant in the Intervention group died by suicide and 4 others attempted suicide. No other suicide was identified in NDI Plus during the 5-year follow-up phase. Seven deaths were due to accidents.

Hazard ratio estimates were adjusted for Intervention group and confounding variables (i.e., IADL disability, depression severity, and smoking status). In adjusted Cox models on the entire sample, the wish-to-die was associated with 5-year mortality among participants with no depression (adjusted hazard ratio 1.69, 95% CI [1.09, 2.61], $\chi^2(1)=5.52$), but not among those with minor (adjusted hazard ratio 1.27, 95% CI [0.92, 1.76], $\chi^2(1)=2.05$) or major depression (adjusted hazard ratio 0.96, 95% CI [0.60, 1.51], $\chi^2(1)=0.04$). The adjusted interaction between depression and wish-to-die was statistically significant ($\chi^2(1)=3.23$, p=0.070) according to our prespecified α level. (33)

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In unadjusted Cox models, participants with "suicidal desire" were no more likely to die over 5 years (3/13, 23%) than were those with wish-to-die (42/178, 24%; hazard ratio=0.95 [0.34, 2.68], $\chi^2(1)=0.008$).

Mortality Risk as a Function of Intervention vs. Usual Care

Table 4 provides adjusted hazard ratio estimates representing relationships of baseline wish-to-die and 5-year mortality, stratified by both patient baseline depression status and practice intervention group. In Usual Care, the wish-to-die was associated with an increased risk (ranging in magnitude from 1.62 to 1.71) of 5-year mortality in adjusted models. This risk was statistically significant in Usual Care participants with minor and no depression, but not among those with major depression. In Intervention practices, the wish-to-die was not significantly associated with mortality in any group, although the magnitude of the effect (1.64) was similar in participants with no depression as that observed in Usual Care. The observed effect in participants with minor and major depression approached or was lower than 1.0.

The three-way interaction was not statistically significant ($\chi^2(1)=1.46$, p=0.23). However, we did find differences in the significance of the two-way interactions within treatment arm. Specifically, the two-way interaction between wish-to-die and depressive status within the Usual Care group was not significant ($\chi^2(1)=0.01$, p=0.91), indicating increased risk of mortality associated with the wish-to-die regardless of baseline depression status among this group (i.e., even among those individuals with no depression). In contrast, the interaction between wish-to-die and mortality in the Intervention group was statistically significant ($\chi^2(1)=3.53$, p=0.06) according to our prespecified α level, indicating that in the Intervention group, the effect of the wish-to-die on mortality was significantly greater in patients without depression than among those with major depression.

CONCLUSIONS

Our results highlight that in usual primary care practice, the wish-to-die was associated with increased risk of 5-year mortality among elderly patients regardless of depression status. Most striking, even among those individuals without depression, patients who wished to die had lower survival rates. In primary care practices in which a depression intervention was implemented, we did not observe this increased risk of mortality among depressed patients. The wish-to-die, however, did have a greater impact on mortality among those without depression (who were not targeted by the Intervention). We examined the moderating impact of Intervention status given previous findings demonstrating that this Intervention reduced the risk of mortality associated with depression. We cannot say definitively that the Intervention further reduced the risk of mortality among participants with the wish-to-die, given the non-significant three-way interaction between wish-to-die, depressive status, and Intervention group. On the other hand, the risk of mortality associated with the wish-to-die remained elevated in patients without depression regardless of whether or not they received care from practices assigned to the PROSPECT intervention. Because patients without depression were not the Intervention's target, these findings further suggest the beneficial effect of the Intervention.

Our data do not address mechanisms responsible for the observed association between the wish-to-die and mortality. We may conjecture that feelings that life is not worth living or that one would be better off dead influence psychological factors and behaviors that contribute to the risk of fatal medical illnesses. These could include lowered self-efficacy, sense of control over self-care activities, and environmental safety, (20) and health behaviors such as limited help-seeking, self-neglect, and poor treatment adherence. The wish-to-die in the absence of depression may also lead to new onset depression. As our data are cross-sectional, we do not

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know how wish-to-die and depression status change over time, nor the impact of these changes on mortality risk.

Regarding possible confounding variables, the wish-to-die was related to mortality over and above effects of hopelessness, history of previous depression, medical burden, and functional disability. Thus, the observed relationship does not merely reflect more severely ill patients. Consistent with previous research, (35) IADL disability independently predicted mortality in the multivariate model. Disability was associated with wish-to-die only among patients without depression, and could partially contribute to the development of the wish-to-die in these patients. However, the wish-to-die remained a significant predictor of mortality even controlling for disability. The association of both depression severity and hopelessness with wish-to-die among the non-depressed group (Table 3) is consistent with a continuum model of the suicidal process in which despair and hopelessness may progress to a wish-to-die, and then to more severe ideation and behavior. (17) Other unmeasured predictor variables such as personality factors may also contribute to the wish-to-die. For example, there is some evidence that impulse control and pessimism predict suicidal behavior. (36) While it is unclear whether the wish-to-die represents a milder degree of suicidal ideation or a distinct phenomenon, we believe that this wish is consistent with the construct of passive suicidal ideation and not a normal anticipation of one's death.

Our findings contribute to the debate on screening for suicidal ideation in primary care. The US Preventive Services Task Force recommends that such screening be targeted to individuals experiencing major depression or substance abuse. (37) We found a relatively high, 7% rate of any level of suicidal ideation among patients without a depression diagnosis, a rate similar to that of major depression in primary care. While presence of the wish-to-die has poor specificity for predicting suicide, its association with mortality may indicate some benefit in asking non-depressed elderly patients about their desire to die. From a public health perspective, even though the wish-to-die and other types of suicidal ideation are more common among depressed patients, the majority of patients exhibiting such ideation in the primary care population will nonetheless not be depressed. If we assume an estimated 6.5% prevalence of major and 5.2% of minor depression, (38) then approximately two-thirds of patients with the wish-to-die will have neither major nor minor depression. Moreover, we found that 76% of nondepressed patients who reported the wish-to-die did not even endorse a gateway depression symptom (i.e., depressed mood or anhedonia).

Beyond such screening, should intervention and prevention efforts target older individuals experiencing the wish-to-die in the absence of a depressive disorder? On the one hand, there may be value in investigating psychosocial approaches that address underlying problems related to an individual's wish-to-die. Further, evidence is accumulating that trained primary care physicians can successfully manage suicidal patients with care manager assistance and specialist consultation. (19,39) On the other hand, it may be premature to change clinical practice without further study of factors that mediate the association between wish-to-die and mortality. There are also feasibility concerns regarding actual implementation of such interventions among non-depressed patients.

Study limitations include a larger proportion of overall baseline suicidal ideation among Intervention versus Usual Care participants. We have no evidence, though, that there were differences in the manner in which assessment instruments were administered in each study condition; moreover, we obtained excellent SSI interrater reliability. While participants in the "no depression" group included a subgroup of patients with subthreshold depression, analyses controlled for depression severity. We used a liberal alpha level of 0.10 to test hypotheses regarding interaction terms, (33) and so findings require replication. We believe that our data relate to all-cause mortality and not suicide per se, as only one participant completed suicide

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during the study period. Death by suicide may be misclassified in part because this is not always known with confidence. Overall sensitivity of the NDI for ascertainment of vital status, however, has generally been well over 90% in most studies. (40)

In conclusion, our findings suggest the potential positive value of screening for the wish-to-die and other types of suicidal ideation in older primary care patients in the absence of a depressive disorder. Further investigation is needed on factors that mediate the association between wish-to-die and mortality, and whether interventions such as care management for geriatric depression might benefit patients who are not depressed but wish-to-die.

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Table 1

Characteristics of the major depression study sample, and associations with time to death

	Major depressed (n =379)	No Wish-to-Die (n =265)	Wish-to-Die (n =114)	Test of equality across groups (p-value and degress of freedom)[1]	Association with time to death (hazard ratio and 95% CI)[2]
Sociodemographic characteristics					
Age, mean in years (s.d.)	70 (7.8)	70 (7.7)	70 (8.2)	0.852 (df=358)	1.07 (1.05, 1.11)
Education, mean in years (s.d.)	12 (3.3)	12 (3.4)	12 (3.0)	0.987 (df=357)	0.94 (0.91, 0.98)
Women, n (%)	275 (73)	196 (74)	79 (69)	0.351 (df=359)	0.64 (0.40, 1.00)
Ethnic minority, n (%)	119 (31)	89 (34)	30 (26)	0.198 (df=359)	0.83 (0.53, 1.31)
Married, n (%)	130 (34)	93 (35)	37 (32)	0.573 (df=357)	0.57 (0.32, 1.03)
Smoking					
Current smoker at baseline, n (%)	73 (20)	44 (17)	29 (26)	0.052 (df=350)	1.89 (1.10, 3.24)
Medical and functional status					
Medical conditions, mean (s.d.)	3.1 (2.4)	3.1 (2.4)	3.2 (2.3)	0.475 (df=358)	1.24 (1.15, 1.33)
Disabilities, mean (s.d.)	2.3 (2.0)	2.3 (2.0)	2.3 (2.1)	0.980 (df=302)	1.24 (1.15, 1.34)
Baseline psychiatric and cognitive status					
HDRS, mean (s.d.)	20 (5.4)	19 (5.1)	21 (5.8)	0.013 (df=358)	0.99 (0.95, 1.03)
MMSE, mean (s.d.)	27 (2.7)	27 (2.6)	27 (2.8)	0.135 (df=358)	0.90 (0.84, 0.95)
Past history of MDD, n (%)	184 (49)	128 (48)	56 (49)	0.884 (df=359)	0.67 (0.44, 1.00)
Anxiety disorder, n (%)	64 (17)	44 (17)	20 (18)	0.823 (df=359)	1.05 (0.63, 1.75)
Hopelessness, mean (s.d.)	8.5 (4.7)	7.6 (4.3)	10.5 (4.8)	<0.001(df=305)	1.00 (0.96, 1.04)
Treatment Assignment					
Intervention practice, n (%)	204 (54)	132 (50)	72 (63)	<0.001(df=359)	0.90 (0.58, 1.40)

CI, confidence interval; HDRS, Hamilton Depression Rating Scale without suicidal ideation item; MMSE, Mini-Mental State Examination; s.d., standard deviation. Unless noted otherwise, entries represent numbers with percents based on the total number in the corresponding column in parentheses;

[1] t-test from bivariate logistic regression model with random effects;

[2] Wald Chi-square (df=1) 95% confidence intervals based on bivariate Cox proportional hazards model.

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Table 2

Characteristics of the minor depression study sample, and associations with time to death

	Minor depressed (n =200)	No Wish-to-Die (n =178)	Wish-to-Die (n =22)	Test of equality across groups (p-value and degress of freedom)[1]	Association with time to death (hazard ratio and 95% CI)[2]
Sociodemographic characteristics					
Age, mean in years (s.d.)	72 (8.1)	71 (8.1)	74 (7.8)	0.218 (df=180)	1.07 (1.03, 1.12)
Education, mean in years (s.d.)	13 (3.3)	13 (3.3)	14 (3.6)	0.181 (df=179)	0.98 (0.91, 1.07)
Women, n (%)	143 (71)	128 (72)	15 (68)	0.717 (df=181)	0.47 (0.25, 0.89)
Ethnic minority, n (%)	55 (28)	48 (27)	7 (32)	0.656 (df=180)	1.03 (0.53, 1.99)
Married, n (%)	79 (40)	70 (40)	9 (41)	0.560 (df=179)	0.99 (0.57, 1.72)
Smoking					
Current smoker at baseline, n (%)	34 (17)	27 (16)	7 (33)	0.053 (df=175)	1.68 (0.83, 3.43)
Medical and functional status					
Medical conditions, mean (s.d.)	2.4 (2.3)	2.4 (2.3)	2.2 (2.0)	0.723 (df=180)	1.28 (1.16, 1.41)
Disabilities, mean (s.d.)	2.3 (1.9)	2.3 (1.8)	2.4 (2.3)	0.831 (df=159)	1.45 (1.27, 1.66)
Baseline psychiatric and cognitive status					
HDRS, mean (s.d.)	13 (3.5)	13 (3.4)	14 (4.2)	0.727 (df=180)	1.02 (0.93, 1.12)
MMSE, mean (s.d.)	28 (2.1)	28 (2.1)	28 (2.2)	0.712 (df=180)	0.86 (0.75, 0.98)
Past history of MDD, n (%)	35 (17)	27 (15)	8 (36)	0.019 (df=181)	0.64 (0.35, 1.17)
Anxiety disorder, n (%)	22 (11)	20 (11)	2(9)	0.764 (df=181)	0.43 (0.11, 1.66)
Hopelessness, mean (s.d.)	5.9 (3.7)	5.8 (3.4)	7.4 (4.8)	0.112 (df=159)	1.05 (1.00, 1.10)
Treatment Assignment					
Intervention practice, n (%)	104 (52)	90 (51)	14 (64)	0.035 (df=181)	1.00 (0.51, 1.95)

CI, confidence interval; HDRS, Hamilton Depression Rating Scale without suicidal ideation item; MMSE, Mini-Mental State Examination; s.d., standard deviation. Unless noted otherwise, entries represent numbers with percents based on the total number in the corresponding column in parentheses;

[1] t-test from bivariate logistic regression model with random effects;

[2] Wald Chi-square (df=1) 95% confidence intervals based on bivariate Cox proportional hazards model.

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Table 3

Characteristics of the non-depressed study sample, and associations with time to death

	Non-depressed (n =610)	No Wish-to-Die (n =568)	Wish-to-Die (n =42)	Test of equality across groups (p-value and degress of freedom)[1]	Association with time to death (hazard ratio and 95% CI)[2]
Sociodemographic characteristics					
Age, mean in years (s.d.)	72 (7.7)	72 (7.6)	73 (8.5)	0.455 (df=589)	1.08 (1.06, 1.10)
Education, mean in years (s.d.)	13 (3.8)	13 (3.8)	13 (4.0)	0.586 (df=581)	0.94 (0.89, 0.98)
Women, n (%)	418 (69)	388 (68)	30 (71)	0.687 (df=589)	0.46 (0.33, 0.64)
Ethnic minority, n (%)	190 (31)	181 (32)	9 (21)	0.477 (df=589)	0.91 (0.60, 1.39)
Married, n (%)	244 (40)	226 (40)	18 (43)	0.889 (df=588)	1.29 (0.89, 1.87)
Smoking					
Current smoker at baseline, n (%)	70 (12)	65 (12)	5 (12)	0.852 (df=583)	1.58 (1.05, 2.36)
Medical and functional status					
Medical conditions, mean (s.d.)	2.3 (2.1)	2.3 (2.1)	2.3 (2.2)	0.873 (df=589)	1.10 (1.01, 1.21)
Disabilities, mean (s.d.)	1.8 (1.9)	1.8 (1.9)	2.3 (1.8)	0.027 (df=552)	1.29 (1.22, 1.36)
Baseline psychiatric and cognitive status					
HDRS, mean (s.d.)	5 (3.8)	5 (3.8)	7 (3.9)	<0.001 (df=589)	1.03 (1.00, 1.07)
MMSE, mean (s.d.)	27 (3.1)	27 (3.2)	27 (2.2)	0.581 (df=589)	0.92 (0.89, 0.96)
Past history of MDD, n (%)	85 (14)	77 (14)	8 (19)	0.290 (df=590)	0.44 (0.20, 0.97)
Anxiety disorder, n (%)	33 (5)	29 (5)	4 (10)	0.231 (df=590)	0.15 (0.02, 0.95)
Hopelessness, mean (s.d.)	4.1 (2.7)	4.0 (2.5)	6.5 (3.6)	<0.001 (df=549)	1.02 (0.94, 1.10)
Treatment Assignment					
Intervention practice, n (%)	282 (46)	265 (47)	17 (40)	0.001 (df=590)	1.12 (0.85, 1.48)

CI, confidence interval; HDRS, Hamilton Depression Rating Scale without suicidal ideation item; MMSE, Mini-Mental State Examination; s.d., standard deviation. Unless noted otherwise, entries represent numbers with percents based on the total number in the corresponding column in parentheses;

[1] t-test from bivariate logistic regression model with random effects;

[2] Wald Chi-square (df=1) 95% confidence intervals based on bivariate Cox proportional hazards model.

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Table 4

Relationship of baseline wish-to-die and mortality, by patient baseline depression status and practice intervention group, during a 5-year follow-up interval.

Patient baseline depression status	Adjusted hazard ratio (Wish-to-Die vs. No Wish-to-Die) stratified by depression status and practice intervention group	
	Usual Care	Intervention
Major	1.62 [0.75, 3.47]	0.68 [0.40, 1.18]
Minor	1.66 [1.11, 2.49]	1.06 [0.64, 1.76]
Non-depressed	1.71 [1.11, 2.62]	1.64 [0.74, 3.65]

Note: Hazard ratio estimates are adjusted for baseline disability, Hamilton Depression Score, and baseline smoking status. Wald Chi-square (df=1) 95% confidence intervals shown in brackets.