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Psychological distress and the risk of drug overdose death

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Abstract

Background: Previous research has shown an association between psychological distress and overdose death among specific populations. However, few studies have examined this relationship in a large US population-based cohort.

Methods: Data from the 2010–2018 NHIS were linked to mortality data from the National Death Index through 2019. Psychological distress was measured using the Kessler 6 scale. Drug overdose deaths were examined, and deaths from all other causes were included as a comparison group. Cox proportional hazards regression was used to estimate mortality risk by psychological distress level.

Results: The study population included 272,561 adults. Adjusting for demographic covariates and using no psychological distress as the reference, distress level was positively associated with the risk of overdose death: low (HR = 1.8, 95 % CI = 1.1–2.8), moderate (HR = 4.1, 95 % CI = 2.5–6.7), high (HR = 10.3, 95 % CI = 6.5–16.1). A similar pattern was observed for deaths from all other causes: low (HR = 1.2, 95 % CI = 1.1–1.2), moderate (HR = 1.9, 95 % CI = 1.7–2.0), high (HR = 2.6, 95 % CI = 2.4–2.8).

Limitations: Limited substance use information prevented adjustment for this potentially important covariate.

Discussion: Adults with psychological distress were at greater risk of drug overdose death, relative to those without psychological distress. Adults with psychological distress were also at increased risk of death due to other causes, though the association was not as strong.

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CRediT authorship contribution statement

Jonathan W. Aram first conceived of this research question, identified the data source, reviewed the literature, analyzed the data, and led the writing of the manuscript.

Merianne R. Spencer helped refine the research question, analyze the data, and revise the manuscript.

Matthew F. Garnett also helped refine the research question, interpret the findings, and write the manuscript.

Holly B. Hedegaard oversaw the formulation of the research question, interpretation of the results, and the writing of the manuscript. Dr. Hedegaard provided subject matter expertise in drug overdose epidemiology.

Conflict of interest

The authors have no conflicts of interest to declare.

Keywords

National Center for Health Statistics; National Health Interview Survey; Linked Mortality Files; Survival analysis; Data linkage; National Death Index

1. Introduction

From 1999 to 2020, the age-adjusted drug overdose death rate in the US more than quadrupled, from 6.1 to 28.3 per 100,000 (Hedegaard et al., 2021; Hedegaard et al., 2020b). Prior research has informed drug overdose prevention efforts by identifying people who are at higher risk (Hedegaard et al., 2020a) and preventable risk factors, such as the prescribing of high-dose opioids (Baumblatt et al., 2014; Dasgupta et al., 2016). Studies have also shown an association among mental health conditions, drug use and drug-related morbidity and mortality (Bartoli et al., 2014; Becker et al., 2008; Bohnert et al., 2012; Katz et al., 2013; Kuo et al., 2019; Magidson et al., 2012). For example, a cross-sectional study found higher rates of non-medical opioid use among adults who report psychiatric symptoms compared to those without such symptoms (Becker et al., 2008). A pooled analysis of seven similar studies found a positive association between depression and non-fatal drug overdose in both clinical and non-clinical settings in several regions of the world (Bartoli et al., 2014). A study of Medicare beneficiaries with disability reported increased risk of drug overdose death among those with mental health conditions, compared to those without mental health conditions (Kuo et al., 2019). Similar results have also been reported for studies of veterans (Bohnert et al., 2012; Bohnert et al., 2011). One study of veterans found that the risk of fatal drug overdose may be elevated among those with depression, independent of the severity of their substance use disorder (Bohnert et al., 2012). Although each of these studies makes a contribution to the literature, they are limited by the age of the data or the limited generalizability of the findings.

One of the difficulties in conducting large, population-level studies of mental health conditions and their sequelae is the time and training required to make psychiatric diagnoses. In response to this obstacle, Kessler et al. developed a six-item scale, often referred to as the “K6,” for surveillance of experiences of non-specific psychological distress, such as anxiety and depression, which has been used in population-based studies in the US and abroad (Kessler et al., 2002). The K6 can be administered by non-clinicians, and it strongly discriminates between cases and non-cases of Diagnostic and Statistical Manual of Mental Disorders, fourth edition disorders (Kessler et al., 2002). Since 1997, the K6 has been included in the National Health Interview Survey (NHIS), a nationally-representative household interview survey of non-institutionalized civilians (Botman et al., 2000; Kessler et al., 2002; National Center for Health Statistics, 1997; Parsons et al., 2014). The results from analysis of responses to the K6 in NHIS data show that psychological distress varies by age, sex, race and Hispanic origin, among other characteristics (Pratt, 2009; Pratt et al., 2007; Weissman et al., 2015). Published analyses of NHIS data linked to mortality outcomes data have also shown associations between psychological distress and all-cause mortality, as well as deaths from cardiovascular disease and cancer (Lee and Singh, 2021; Yang et al., 2020). Another study examined the association between psychological distress and assaults,

accidents, and unintentional poisonings combined using NHIS data from 1997 to 2004 with mortality follow-up through 2006 (Forman-Hoffman et al., 2014). Lastly, an ecologic study that included deaths through 2017 reported an association between distress and drug overdose death at the county level (Hernández et al., 2021). However, the study did not determine whether such an association exists at the individual level. To our knowledge, no published analyses have focused on the individual-level association between psychological distress and drug overdose deaths in a sample of US adults.

In this study, we use a cohort design and data from a representative sample of US adults to generate hazard ratios that: 1) estimate the association between psychological distress and death from drug overdose; 2) estimate the association between psychological distress and death from all other causes, and 3) compare the risk of drug overdose death to the risk of death from all other causes among adults with psychological distress.

2. Methods

2.1. Data source

We analyzed pooled data from the 2010–2018 NHIS for this analysis. The NHIS samples households for in-person interviews by the Census Bureau. Families are identified, and a family respondent completes a brief interview on family demographics and health. NHIS interviews are conducted in respondents' homes, but follow-up interviews to complete the survey may be done over the telephone. Based on information provided by the family respondent, one sample adult aged 18 or older is randomly selected to complete the adult core questionnaire. Detailed information regarding the design, content, and annual sample sizes and response rates of the NHIS are available in the annual NHIS Survey Description document (National Center for Health Statistics, 2018). This analysis used the sample adult component. The response rate for the sample adult component of the NHIS ranged from 60.8 % in 2010 to 53.1 % in 2018.

The National Center for Health Statistics (NCHS) has a longstanding data linkage program that integrates data collected from national surveys such as the NHIS with data from death certificates from the National Death Index (National Center for Health Statistics, 2021b). In this study, all NHIS sample adults with sufficient identifying data were eligible for mortality linkage. Mortality information is based on the results of a probabilistic linkage between NHIS and the National Death Index (NDI) records for deaths occurring through December 2019 (National Center for Health Statistics, 2021a). Among those eligible for linkage, individuals whose records link are assumed to be deceased, and those whose records do not link are assumed to be alive. Only linkage-eligible survey participants were included in the analysis and their survey weights were adjusted to account for linkage eligibility using a process similar to non-response adjustment (National Center for Health Statistics, 2021a). Because nine years of data were combined, we divided single-year survey weights by nine, per the analytic guideline for pooling samples (National Center for Health Statistics, 2018). Because survey weights are adjusted for the probability of selection and further for linkage eligibility, our results are nationally representative and generalizable to the noninstitutionalized, civilian adult US population (Parsons et al., 2014). Approval for the linkage was provided by the National Center for Health Statistics (NCHS) Research Ethics

Review Board (ERB). The NCHS Research ERB, also known as an Institutional Review Board or IRB, is an administrative body of scientists and non-scientists that is established to protect the rights and welfare of human research subjects.

2.2. Study population

Our study population was the randomly selected sample adult aged 18 or older from each participating NHIS household who answered questions about psychological distress (Botman et al., 2000). Analyses in this report were based on a total of 279,730 sample adults in 2010–2018 who were eligible for linkage (98.2 % of all sample adults who completed the survey). Among those eligible for linkage to the NDI, 272,561 (97.4 %) had no missing values for the exposure variable and covariates and were included in the analysis. Records missing values for the exposure variable or covariates were excluded.

2.3. Exposure

The main exposure is self-reported psychological distress, which is measured with six questions on the K6 scale. The stem of each K6 question is, “During the past 30 days, how often did you feel…,” followed by either “So sad nothing could cheer you up,” “Nervous,” “Restless or fidgety,” “Hopeless,” “That everything was an effort,” or “Worthless.” Ordinal response options refer to the frequency of experiencing each feeling and are scored such that four is assigned to responses of “all of the time”; three is assigned to responses of “most of the time”; two is assigned to responses of “some of the time”; one is assigned to responses of “a little of the time”; and zero is assigned to responses of “none of the time.” This produces a continuous range of 0–24 when responses to all six questions are summed. We created a four-category measure of psychological distress: 0 (none), 1–5 (low), 6–10 (moderate), and 11–24 (high). These categories were developed to preserve adults who report no psychological distress (K6 = 0) as a distinct group, given that at least three studies determined that approximately 50 % of adults fall into this category (Forman-Hoffman et al., 2014; Pratt, 2009; Yang et al., 2020), and to have sufficient sample sizes within the groups.

2.4. Outcomes

We defined drug overdose deaths using the International Classification of Diseases, 10th revision (*ICD-10*) underlying cause-of-death codes: X40-X44, X60-X64, X85, Y10-Y14 (Hedegaard et al., 2018). These include drug overdose deaths of all intents (*i.e.*, unintentional, suicide, homicide, or undetermined intent) and involving all types of drugs. Within the study population 84.3 % of drug overdose deaths were unintentional, 8.9 % were suicide, 6.9 % were of undetermined intent, and none were homicides. Unfortunately, small cell sizes prevented the disaggregation of multivariable analyses by intent. We defined deaths from all other causes, which were included as a comparison or “control” group, as any death with an underlying cause-of-death code other than those listed above.

2.5. Covariates

Age at interview, sex and race/Hispanic origin were included as covariates. Age at interview was ordinal: 18–29, 30–39, 40–49, 50–64, 65 and over. Sex was dichotomous: female, male. Race/Hispanic origin was nominal: Hispanic, Non-Hispanic Black, Non-Hispanic

White, non-Hispanic other. Non-Hispanic other included non-Hispanic American Indian, Alaska Native, Asian, and multiple races. These groups were combined into one category due to small cell size. Values for all covariates come from the NHIS interview, not death certificates. These non-time varying covariates were selected based on prior research showing they are associated with drug overdose mortality (Becker et al., 2008; Bohnert et al., 2011; Hedegaard et al., 2018; Kuo et al., 2019; Pratt et al., 2007). Other variables which may be associated with drug overdose deaths were not included as covariates due to concerns over small sample sizes in the number of drug overdose deaths, and the potential for changes in value during the study period.

2.6. Descriptive statistics

We tabulated demographic characteristics, drug overdose deaths, and deaths from all other causes. We assessed reported proportions to assure compliance with NCHS reliability standards (Parker et al., 2017) and used *t*-tests to compare the demographic characteristics and psychological distress level of adults who died from drug overdose and all other causes. To account for the sampling design of the NHIS, estimates and standard errors presented in this report use design variables to estimate variance, and are based on weighted data that were analyzed using SAS survey commands.

2.7. Survival analysis

To calculate person-time, we measured the time between the date of the NHIS interview and death. Individuals in the study population who did not die during the study observation period were censored on December 31, 2019. For the analysis of deaths from drug overdose, those who died of a cause other than drug overdose were right censored at their dates of death. For the analysis of deaths from all other causes, those who died from a drug overdose were right censored at their dates of death. As a sensitivity analysis, we used a competing risk model to determine the effect of deaths from other causes on drug overdose death hazard ratio estimates. Next, we plotted weighted cumulative incidence curves to visualize drug overdose rates by psychological distress level. Cumulative incidence was defined as one minus the Kaplan-Meier survival function. We then used Cox proportional hazards regression models (SAS SURVEYPHREG) to estimate the risk of mortality while controlling for covariates (SAS Institute, 2017). The first model was unadjusted; the second was adjusted for age, sex, and race/Hispanic origin. For consistency, we used the same reference groups for our analysis of drug overdose deaths and for all other causes of death. We assessed the proportional hazard assumption using a plot of the negative log of the survivor function.

3. Results

3.1. Description of study population

The 2010–2018 NHIS includes 272,561 sample adults eligible for linkage to the NDI with no missing values for variables included in this analysis. The sample size and weighted percent distribution of psychological distress was: 122,966 (45.6 %) no distress, 102,492 (37.9 %) low distress, 30,258 (10.8 %) moderate distress, 16,845 (5.7 %) high distress. The demographic characteristics of the study population are shown in Table 1.

3.2. Mortality outcomes by psychological distress level

There were 284 drug overdose deaths within the study population. The unweighted number and weighted percent distribution of drug overdose deaths among psychological distress groups was: 58 (21.9 %) in the no distress group, 84 (32.0 %) low distress, 61 (19.9 %) moderate distress, 81 (26.2 %) high distress. There were 18,582 deaths from all other causes. The unweighted number and weighted percent distribution was: 8067 (43.9 %) no distress, 6449 (34.3 %) low distress, 2373 (12.7 %) moderate distress, 1693 (9.1 %) high distress. The percent distribution of psychological distress, sex and age group was significantly different among adults who died of drug overdose and those who died from all other causes ($p < 0.05$). Specifically, drug overdose decedents had higher levels of distress, a larger percentage of males, and a larger percentage of adults younger than 65 (Table 1).

3.3. Drug overdose survival analysis

The weighted cumulative incidence curves for risk of fatal drug overdose show that distress is associated with overdose risk throughout the study period. The cumulative incidence of drug overdose death ranged from 0.1 % among adults with no distress to 0.8 % among adults with high distress (Fig. 1).

Plots of the negative log of the four survivor functions showed no qualitative difference (crossing of the lines) in the association between distress and drug overdose risk throughout the study period. Sensitivity analyses using competing risk models resulted in negligible changes to the estimated hazard ratios.

Psychological distress was also associated with drug overdose deaths in the crude and adjusted Cox models (Table 2). In the adjusted model, age, sex, and race/Hispanic origin were also associated with drug overdose death. However, adjusting for these covariates had little effect on the association between psychological distress and drug overdose death. Using no psychological distress as the reference in the adjusted model, the risk of drug overdose death increased incrementally with each level of distress: low (HR = 1.8, 95 % CI = 1.1–2.8), moderate (HR = 4.1, 95 % CI = 2.5–6.7), high (HR = 10.3, 95 % CI = 6.5–16.1). The covariates, sex and race/Hispanic origin were also independently associated with drug overdose risk. Adjusting for all other variables, risk was elevated for men (HR = 1.9, 95 % CI = 1.4–2.6), relative to women; and non-Hispanic White (HR = 2.3, 95 % CI = 1.4–3.8), relative to Hispanic adults. Unlike deaths from all other causes, the risk of drug overdose death was lower among adults aged 65+ relative to those aged 18–29 (HR = 0.3, 95 % CI = 0.2–0.5) (Table 2).

3.4. Mortality from all other causes

There were 18,582 deaths from all other causes within the study population. Psychological distress was independently associated with all causes of death other than drug overdoses. In both models, higher levels of distress were associated with increased risk of death. Using no psychological distress as the reference the adjusted model, the risk of mortality for all causes other than drug overdose by psychological distress level was: low (HR = 1.2, 95 % CI = 1.1–1.2), moderate (HR = 1.9, 95 % CI = 1.7–2.0), high (HR = 2.6, 95 % CI = 2.4–2.8). In this model, the risk was also higher for adults aged 65 and over, relative to those aged

18–29; men, relative to women; and non-Hispanic Black adults, relative to Hispanic adults. The large age gradient in deaths from all causes other than drug overdose mirrors all-cause mortality, which increases with age (Table 3).

4. Discussion

This study examines the association of psychological distress with drug overdose mortality using nationally representative data from adults in the United States. We found that higher levels of psychological distress are associated with incremental increases in drug overdose risk in unadjusted analyses. We also found that controlling for age group, sex and race/Hispanic origin resulted in little change in the psychological-distress-overdose association.

Our results also show that the association between psychological distress and mortality is not limited to drug overdose deaths. Psychological distress level is also associated with incremental increases in the risk of death from all other causes, which was treated as a comparison group, although we did not formally test the differences in the effect of psychological distress on the two outcomes. As a result, the psychological-distress-mortality association is not specific to drug overdose death. However, the magnitude of the association between psychological distress and mortality is greater for drug overdose death than it is for all other causes. The difference in magnitude is most evident in the highest distress categories where those who reported a high level of psychological distress had a risk of drug overdose death that was almost four times higher than death from all other causes. For those reporting moderate levels of psychological distress, the risk was more than twice as high.

The results of this study are consistent with findings reported elsewhere. Prior research has demonstrated the relationship between specific psychologic conditions, such as anxiety and depressive disorders, with higher rates and risks of both fatal and non-fatal drug overdoses (Bartoli et al., 2014; Bohnert et al., 2012; Kuo et al., 2019). The findings reported here support this, showing that psychological distress, which may represent a variety of mental health conditions, is associated with drug overdose death. The observed increased risk of death from all-cause mortality among persons with high levels of psychological distress is also supported by prior research (Forman-Hoffman et al., 2014; Lee and Singh, 2021).

The exploratory design of our study does not provide information about events that might happen during the time between the NHIS interview and drug overdose death. Our point in time measurement of psychological distress in the 30 days prior to the interview might not be reflective of survey participant's long-term psychological distress level. However, prior studies may give insights into reasons why psychological distress is associated with drug overdose mortality. Longitudinal studies report increased incidence of drug misuse among adults with a range of psychological conditions (Katz et al., 2013; Swendsen et al., 2010). Mental illness may also interfere with substance use treatment (Smith and Book, 2010).

Our exploratory findings are subject to several limitations. The small number of drug overdose deaths in these data limited the number of covariates that could be included in the analysis and prevented disaggregation of drug overdose deaths by intent. Relatedly, the information collected on substance use in the NHIS is limited; therefore, the analysis did

not adjust for drug use. Consequently, we could not assess the association between distress and drug overdose death independent of drug use nor could we rule out the possibility that past substance use may have affected psychological distress levels, which could confound the association between psychological distress and drug overdose. Similarly, a larger sample could have enabled a more robust exploration of covariates and reveal distinct associations between psychological distress and drug overdose deaths deemed unintentional, suicide and undetermined intent. Also, during the study period, the placement of the psychological distress questions changed on the NHIS questionnaire. This change could have affected estimates of psychological distress (Schiller et al., 2014). There were also changes in drug overdose death rates and the drugs most often involved during our study period. By pooling years, our approach may mask some year-to-year differences in the association between psychological distress and drug overdose mortality. Lastly, because the NHIS does not include adults in correctional facilities, state hospitals and other mental health institutions, our results are not generalizable to institutionalized adults who report psychological distress.

In conclusion, this research builds on previous studies by assessing a risk factor for drug overdose mortality. It also shows that the connection between distress and mortality is not specific to drug overdose deaths. However, the strength of the association is greater for drug overdose than it is for all other causes of death. These results may inform other research that seeks to examine this relationship further.

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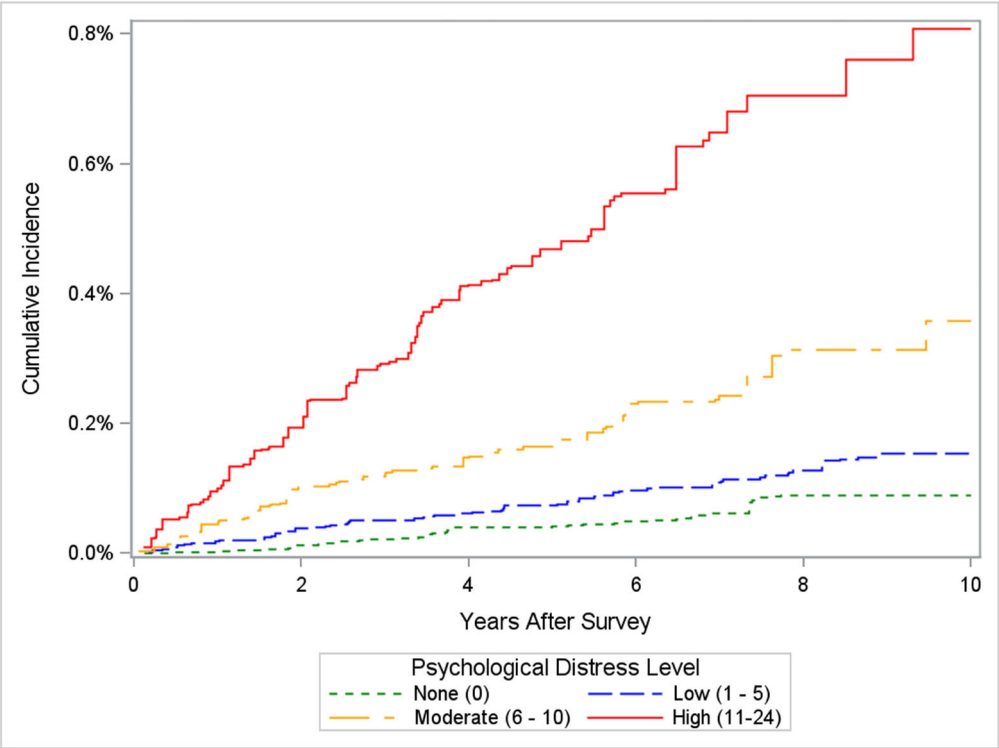

Fig. 1. Risk of fatal drug overdose by psychological distress[1] among adults aged ≥18: 2010–2018 (combined) NHIS Linked Mortality Files.

[1] Psychological distress is measured using the six questions on the K6 scale. We created a four-category measure of psychological distress: 0 (none), 1–5 (low), 6–10 (moderate), and 11–24 (high).

Table 1

Baseline characteristics of the study population and decedents, US adults aged ≥18 years: NHIS 2010–2018 with deaths through 2019.

Sample characteristics	Study population	Death from drug overdose	Death from all other causes	Significant difference[d]
Total unweighted	272,561	284	18,582	
Psychological distress %[a,b] (SE)				
None	45.6 (0.2)	21.9 (3.5)	43.9 (0.5)	*
Low (1–5)	37.9 (0.2)	32.0 (3.9)	34.3 (0.4)	
Moderate (6–10)	10.8 (0.1)	19.9 (3.0)	12.7 (0.3)	*
High (11–24)	5.7 (0.1)	26.2 (3.3)	9.1 (0.3)	*
Sex %[b] (SE)				
Female	51.7 (0.1)	38.8 (3.8)	48.0 (0.5)	*
Male	48.3 (0.1)	61.2 (3.8)	52.0 (0.5)	*
Age group[c] %[b] (SE)				
18–29	21.4 (0.2)	19.9 (3.5)	1.8 (0.2)	*
30–39	17.1 (0.1)	22.4 (3.1)	2.4 (0.2)	*
40–49	17.3 (0.1)	21.8 (3.2)	5.4 (0.2)	*
50–64	25.6 (0.1)	32.1 (3.7)	22.3 (0.4)	*
65 and over	18.6 (0.1)	3.7 (0.9)	68.1 (0.5)	*
Race/Hispanic origin %[b] (SE)				
Hispanic	15.3 (0.3)	8.2 (1.8)	7.1 (0.3)	
Non-Hispanic Black	11.5 (0.2)	10.1 (2.0)	11.1 (0.4)	
Non-Hispanic White	65.6 (0.3)	76.6 (3.0)	77.0 (0.5)	
Non-Hispanic other	7.6 (0.1)	5.1 (1.5)	4.7 (0.2)	

Note: 98.2 % of participants were linkage-eligible. 97.4 % of linkage-eligible observations had no missing values for psychological distress, age, race/ethnicity and sex and were included in this analysis.

[a] Psychological distress is measured using the six questions on the K6 scale. We created a four-category measure of psychological distress: 0 (none), 1–5 (low), 6–10 (moderate), and 11–24 (high).

[b] Proportion represented by each category was calculated using eligibility-adjusted survey weights. SEs estimated by complex design.

[c] Age in years at time of interview.

[d] Comparison of adults who died from drug overdose and those who died of all other causes using *t*-tests.

Source: National Center for Health Statistics, National Health Interview Survey Linked Mortality Files.

Table 2

Cox regression hazard ratios of drug overdose death by psychological distress[a], adults (aged ≥18) 2010–2018. n = 272,561.

Sample characteristic	Unadjusted hazard ratio (95 % CI)	Adjusted hazard ratio (95 % CI)
Psychological distress level		
High (11–24)	10.2 (6.6–15.9)	10.3 (6.5–16.1)
Moderate (6–10)	4.1 (2.5–6.6)	4.1 (2.5–6.7)
Low (1–5)	1.8 (1.1–2.9)	1.8 (1.1–2.8)
None	(Ref)	(Ref)
Age group[b]		
65 and over		0.3 (0.2–0.5)
50–64	–	1.3 (0.8–2.1)
40–49	–	1.3 (0.8–2.2)
30–39	–	1.5 (0.9–2.4)
18–29	–	(Ref)
Sex		
Male	–	1.9 (1.4–2.6)
Female	–	(Ref)
Race/Hispanic origin		
Hispanic	–	(Ref)
Non-Hispanic other	–	1.4 (0.7–2.9)
Non-Hispanic Black	–	1.7 (0.9–3.1)
Non-Hispanic White	–	2.3 (1.4–3.8)

Note: 98.2 % of participants were linkage-eligible. 97.4 % of linkage-eligible observations had no missing values and were included in this analysis.

[a]Psychological distress is measured using the six questions on the K6 scale. We created a four-category measure of psychological distress: 0 (none), 1–5 (low), 6–10 (moderate), and 11–24 (high).

[b]Age in years at time of interview.

Source: National Center for Health Statistics, National Health Interview Survey Linked Mortality Files.

Table 3

Cox regression hazard ratios of all causes other than drug overdose death by psychological distress[a], adults (aged 18+) 2010–2018. n = 272,561.

Sample characteristic	Unadjusted hazard ratio (95 % CI)	Adjusted hazard ratio (95 % CI)
Psychological distress level		
High (11–24)	1.8 (1.7–1.9)	2.6 (2.4–2.8)
Moderate (6–10)	1.3 (1.2–1.4)	1.9 (1.7–2.0)
Low (1–5)	1.0 (0.9–1.00)	1.2 (1.1–1.2)
None	(Ref)	(Ref)
Age group[b]		
65 and over		54.2(45.9–63.9)
50–64	–	10.3 (8.7–12.2)
40–49	–	3.6 (3.0–4.3)
30–39	–	1.7 (1.4–2.1)
18–29	–	(Ref)
Sex		
Male	–	1.4 (1.4–1.5)
Female	–	(Ref)
Race/Hispanic origin		
Hispanic	–	(Ref)
Non-Hispanic other	–	1.2 (1.0–1.3)
Non-Hispanic Black	–	1.7 (1.5–1.8)
Non-Hispanic White	–	1.4 (1.3–1.6)

Note: 98.2 % of participants were linkage-eligible. 97.4 % of linkage-eligible observations had no missing values and were included in this analysis.

[a]Psychological distress is measured using the six questions on the K6 scale. We created a four-category measure of psychological distress: 0 (none), 1–5 (low), 6–10 (moderate), and 11–24 (high).

[b]Age in years at time of interview.

Source: National Center for Health Statistics, National Health Interview Survey Linked Mortality Files.