

October 2024

Suicidal Ideation by Selected Mental Health Conditions and Demographic Variables among Workers in a Large Non-Profit Organization in the United States

McKay Ashton

Brigham Young University, mckayasthon4@gmail.com

Ray M. Merrill

Brigham Young University, ray_merrill@byu.edu

Follow this and additional works at: <https://newprairiepress.org/hbr>



Part of the [Psychiatric and Mental Health Commons](#)



This work is licensed under a [Creative Commons Attribution-Noncommercial 4.0 License](#)

Recommended Citation

Ashton, McKay and Merrill, Ray M. (2024) "Suicidal Ideation by Selected Mental Health Conditions and Demographic Variables among Workers in a Large Non-Profit Organization in the United States," *Health Behavior Research*: Vol. 7: No. 4. <https://doi.org/10.4148/2572-1836.1248>

This Research Article is brought to you for free and open access by New Prairie Press. It has been accepted for inclusion in Health Behavior Research by an authorized administrator of New Prairie Press. For more information, please contact cads@k-state.edu.

Suicidal Ideation by Selected Mental Health Conditions and Demographic Variables among Workers in a Large Non-Profit Organization in the United States

Abstract

This paper identifies rates of suicidal ideation by certain demographic variables and selected mental health conditions. Analyses utilize medical claims data for adult employees aged 18-64 years in a large corporation during 2017-2021. Rates are calculated and adjusted by age, sex, and marital status. Among employees, significantly higher rates of suicidal ideation are in ages 18-39 years, women, and singles. Significantly higher rates also occur in those experiencing one of several mental health conditions, after adjusting for demographic variables. Associations involving ADHD and OCD become insignificant after further adjustment for comorbid mental illness. The higher rate of suicidal ideation for women is not significant in ages 50-64 and significantly decreases for anxiety and depression with older age. Further, the associations involving age, adjustment disorders, and schizophrenia significantly depend on sex. Suicidal ideation rates are significantly lower in ages 50-64 for women, and the higher rates of suicidal ideation for employees with adjustment disorders or schizophrenia are significantly greater for men than women. Higher rates of suicidal ideation occur in younger age, women, and singles. Adjustment disorders, anxiety, depression, bipolar disorder, and schizophrenia are associated with suicidal ideation after adjusting for demographic variables and comorbid mental health conditions. The strongest associations involve depression and schizophrenia.

Keywords

Medical claims; mental illness; rates; suicide ideation.

Acknowledgements/Disclaimers/Disclosures

Conflict of interest None declared.

Suicidal Ideation by Selected Mental Health Conditions and Demographic Variables among Workers in a Large Non-profit Organization in the United States

McKay K. Ashton, BS
Ray M. Merrill, PhD, MPH., MS, FACE, FAAHB*

Abstract

This paper identifies rates of suicidal ideation by certain demographic variables and selected mental health conditions. Analyses utilize medical claims data for adult employees aged 18-64 years in a large corporation during 2017-2021. Rates are calculated and adjusted by age, sex, and marital status. Among employees, significantly higher rates of suicidal ideation are in ages 18-39 years, women, and singles. Significantly higher rates also occur in those experiencing one of several mental health conditions, after adjusting for demographic variables. Associations involving ADHD and OCD become statistically non-significant after further adjustment for comorbid mental illness. The higher rate of suicidal ideation for women is not statistically significant in ages 50-64 and significantly decreases for anxiety and depression with older age. Furthermore, the associations involving age, adjustment disorders, and schizophrenia significantly depend on sex. Suicidal ideation rates are significantly lower in ages 50-64 for women, and the higher rates of suicidal ideation for employees with adjustment disorders or schizophrenia are significantly greater for men than women. Higher rates of suicidal ideation occur in younger age, women, and singles. Adjustment disorders, anxiety, depression, bipolar disorder, and schizophrenia are associated with suicidal ideation after adjusting for demographic variables and comorbid mental health conditions. The strongest associations involve depression and schizophrenia.

Keywords: medical claims; mental illness; rates; suicide ideation

* Corresponding author may be reached at Ray_Merrill@byu.edu

Introduction

In 2021, a total of 37,602 (17.8 per 100,000) persons aged 16-64 years in the United States (U.S.) died from suicide, a rate ~ 33% greater than in 2001 (Sussell et al., 2023). This public health problem is preceded by suicidal ideation, which clinicians can monitor in their care of at-risk individuals. Suicidal ideation, also known as suicidal thoughts, concerns thoughts about or an unusual preoccupation with suicide. The scope of suicidal ideation in the U.S. is summarized in the 2015-2019 National Survey on Drug Use and Health (NSDUH) data from 254,767 respondents, with

prevalence in the past year of 4.3%, which is highest in the Western U.S. region (4.8%) and in Utah (6.9%) (Ivey-Stephenson et al., 2022).

There are several known health risk factors for suicidal ideation, which include mental illness, injuries, and chronic diseases (Lutz et al., 2016; Kudva et al., 2021; Zhu et al., 2022). Additionally, certain demographic factors such as age, sex, and marital status have been associated with suicidal ideation (Ivey-Stephenson et al., 2022; Huang et al., 2017). Whereas several studies have been conducted evaluating the relationship of demographics or mental illness on suicidality, some studies have adjusted for

certain demographic factors, such as age, and found no statistically significant association (Renemane et al., 2021; Bell et al., 2022). Other studies lacked crucial aspects important to understanding suicidal ideation, such as not combining both categorical factors in their studies or being performed outside the U.S. (Huang et al., 2017; Zhu et al., 2022; Kudva et al., 202). More study is needed to improve understanding of the relative impact of mental illnesses on suicidal ideation after adjusting for demographic variables such as age, sex, marital status, and dependent children, and whether these demographic variables modify the associations between mental health conditions and suicidal ideation in the U.S.

There is evidence that work stress is positively associated with suicidal ideation (Loerbroks et al., 2016). Although this association appears to exist, previous studies have focused only on work generally and have not evaluated any specific organizational company or non-profit, which the current study will attempt. Other studies also have identified anxiety, depression, attention-deficit/hyperactivity disorder (ADHD), bipolar disorder, obsessive-compulsive disorder (OCD), and schizophrenia as each is independently and positively associated with suicidal ideation (Nepon et al., 2010; Cai et al., 2021; Balazs and Keresztesy, 2017; Rihmer and Kiss, 2002; Benatti et al., 2021; Albert et al., 2019; Sher and Kahn, 2019). A person's age, sex, and marital status also influence suicidal ideation.

In 2021, the past year prevalence of suicidal ideation among adults in the U.S. was 13.0% for ages 18-25, 5.4% for ages 26-49, and 2.0% for ages 50 or older (National Institute of Mental Health, 2023). Individuals aged 18-25 years also have the highest rate of suicide attempts, but those aged 45-64 years are more likely to have fatal suicide attempts (Piscopo, 2017). The inclusion of older

middle-aged adults aged 40-64 years in the current study is especially important because of the increasing size of the older adult population fueled by the baby boomer cohort, which carries an increased risk of suicide later in life compared to earlier or later cohorts (Conwell et al., 2011).

Women are more likely than men to have suicidal ideation (Ivey-Stephenson et al., 2022). In 2021, the prevalence of suicidal thoughts in the past year in the U.S. was higher for females than for males (5.2% vs. 4.5%) (National Institute of Mental Health, 2023). However, the suicide rate that year in males was four times greater than for females (22.8 vs. 5.7 per 100,000) (CDC, 2023). The disparity between suicidal ideation and suicide may be due to several factors, such as reporting bias and social stigma around mental health.

Marriage in general protects against suicidal ideation (Øien-Ødegaard et al., 2021; Stephenson et al., 2023). The NHDUH data found that adults who had never been married had a higher prevalence of suicidal thoughts than married or previously married (Ivey-Stephenson et al., 2022). In a study considering women aged 20-30 and 31-49, single (vs. married or cohabitating) women had higher lifetime suicidal ideation (Lövestad et al., 2019).

Better understanding the characteristics of those experiencing suicidal ideation is relevant as the public health issue of suicide needs to be addressed from an upstream approach to make effective change. The purpose of this study was to evaluate the rate of suicidal ideation among employees in a large non-profit organization residing primarily in Utah and other U.S. western states, according to major mental health conditions, adjusting for age, sex, and marital status. The findings from this study can help gain greater insight into the relatively higher rates of suicidal ideation found in the region (Ivey-Stephenson et al., 2022). It was also to

assess whether these demographic variables modify the associations between mental health conditions and suicidal ideation. The results are meant to inform mental health professionals so they can identify and treat individuals who are thinking about or planning suicide.

Methods

Analyses were based on 29,662 employees of the Church of Jesus Christ of Latter-day Saints aged 18-64 years receiving health insurance from the Deseret Mutual Benefit Administrator (DMBA) in 2017-2021. All employees were eligible for healthcare coverage and Employee Assistance Program (EAP) benefits. The EAP provides access to highly trained licensed professionals to assist in managing anxiety and stress, addressing relationship troubles, assisting with financial issues, and finding legal advice and referrals. The DMBA is a subsidiary of the Deseret Management Corporation, the global operating company over the church's for-profit entities. It has been in operation since 1970 to provide health insurance and retirement income to employees and their families. Electronic claims data were retrieved for the years 2017-2021. A "claim" is a notification to DMBA requesting a medical benefit payment. Geographic areas represented by the employees were 21,382 (72%) in Utah, 2,653 (9%) in Idaho, 2,783 (9%) in Pacific states, and 2,844 (10%) in other American states. Among employees, 10,729 (36%) worked in the Church education system, seminaries, and institutes; 9,782 (33%) as manual laborers; 3,156 (11%) in other companies; and the remaining 5,996 (20%) worked in other capacities. Individuals aged 65 years or older are not considered in this study because they often opt out of enrollment as they retire.

The number of employees for the study years ranged from 20,891 to 21,835. The percentages of individuals employed for 1, 2, 3, 4, or 5 years were 16.4%, 13.7%, 11.0%, 11.2%, and 47.7%, respectively. The average number of years employed was 0.39 ($p < .0001$) greater for males, 1.02 ($p < .0001$) greater for married, and compared with those aged 18-39 years was 0.71 ($p < .0001$) greater for those aged 40-49, and 0.88 ($p < .0001$) greater for those aged 50-64 years.

The employee eligibility data were linked to automated medical claims records using a common identifying number for each individual. After linking the data and prior to analysis, the database was de-identified according to Health Insurance Portability and Accountability Act (HIPAA) guidelines. The need for ethical approval and informed consent to participate were waived by the authors' institutional review board because personal identifying information was removed prior to data analysis (IRB2021-157).

International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) was used for medical billing of the conditions considered in this study (CDC, 2022).

The *Diagnostic and Statistical Manual of Mental Disorders* (DSM) helps psychiatrists, physicians, clinical psychologists, and other health professionals diagnose mental disorders. It is a handbook that contains descriptions, symptoms, and other criteria. The DSM diagnostic criteria serve as a guide in determining billing codes according to the ICD-10-CM. Codes used to classify these conditions are F20-F29 for schizophrenia, delusional, and other non-mood-psychotic disorders (hereafter called schizophrenia); F31 for bipolar disorder; F32-F33 for depression; F40-F41 for anxiety; F42 for obsessive-compulsive disorder (OCD); F43 for adjustment disorders (acute stress reaction; post-traumatic stress disorder;

adjustment disorders); and F90 for attention deficit hyperactivity disorder (ADHD). The code used to classify suicidal ideation is R45.851.

Incidence rates for the specific types of conditions each year consist of the number of enrollees filing one or more claims for each disorder divided by the number of enrollees. If multiple claims are filed in a year for a specific condition, it is only counted once in the numerator of the rate calculation. However, an individual may contribute to more than one type of mental illness each year.

Other variables considered in this study are age ($M = 46.1$, $SD = 11.8$), sex (66.4% men, 33.6% women), marital status (77.4% married, 22.6% single), and dependent children status (59.4% yes, 40.6% no) (Table 1).

The study design is a retrospective cohort, with percentages, means (M), standard deviations (SD), and incidence rates used to describe the variables. Rate ratios measure the association between suicidal ideation and selected mental health conditions and demographic variables. Poisson regression is used to estimate rate ratios, with person time based on years employed during the study period. Rate ratios were adjusted for age, sex, marital status, and dependent children. In Figures 1 and 2, the rate of suicidal ideation for each mental health condition (vs. no mental health condition) was adjusted for the demographic variables as well as the other mental health conditions. Two-sided tests of statistical significance are used with the level of significance of .05. Rate ratios are presented with their corresponding 95% confidence intervals. If the bound of the interval does not contain 1.0, the association measured by the rate ratio is statistically significant. Statistical analyses were derived from Statistical Analysis System (SAS) software, version 9.4 (SAS Institute Inc., Cary, NC, 2012).

Results

The number of employees with at least one of the mental health conditions listed in Table 1 is 8,197 (27.6%). The most common is anxiety, followed by depression and then adjustment disorders. Suicide ideation occurs in 138 (0.47%) of employees. The highest levels of suicidal ideation are in employees who are aged 18-39 years, women, single, and without dependent children. The latter becomes statistically non-significant after adjustment for age, sex, and marital status. Each of the mental health conditions is significantly associated with a higher risk of suicidal ideation after adjustment. Schizophrenia, depression, and bipolar disorder are significantly more likely to be associated with suicidal ideation than adjustment disorders, anxiety, ADHD, or OCD. In a model with suicidal ideation regressed on age, sex, marital status, and each of the mental health conditions, ADHD and OCD become statistically insignificant (data not reported).

The rates of suicidal ideation for sex, marital status, dependent children, and selected mental health conditions appear by age group in Table 2. The rates significantly vary by age for sex, anxiety, depression, ADHD, and OCD. The higher rate for women than men is not significant in those aged 50-65 years. The higher rates for anxiety and depression decrease with age, whereas for ADHD it is significantly greater for those aged 50-64, and for OCD it is significantly greater for those aged 40-49 years. After additional adjustment for each of the mental health conditions, there is no longer a significant decrease with age for anxiety but there is for depression (Figure 1). ADHD is only significant in the age group 50-64 years and OCD in the age group 40-49 years. Suicidal ideation is only significantly associated with adjustment disorders in the age group 40-49 years, with

Table 1

Rates of suicide ideation according to the level of selected demographic and mental health variables

			Suicidal Ideation			Suicidal Ideation		
	No.	%	Rate Ratio	95% LCL	95% UCL	Rate Ratio [†]	95% LCL [†]	95% UCL [†]
Age								
18-39	11236	37.88	1.00			1.00		
40-49	7006	23.62	0.64	0.42	0.97	0.70	0.46	1.07
50-64	11420	38.50	0.49	0.33	0.73	0.52	0.35	0.77
Sex								
Women	9974	33.63	1.80	1.29	2.52	1.53	1.06	2.20
Men	19688	66.37	1.00			1.00		
Married (or cohabitating)								
No	6709	22.62	2.11	1.47	3.02	1.63	1.10	2.42
Yes	22953	77.38	1.00			1.00		
Dependent Children								
No	12044	40.60	1.83	1.31	2.56	1.32	0.87	2.00
Yes	17618	59.40	1.00			1.00		
Adjustment disorders								
Yes	1576	5.31	7.88	5.54	11.21	7.38	5.17	10.54
No	28086	94.69	1.00			1.00		
Anxiety								
Yes	5322	17.94	15.39	10.16	23.31	14.66	9.65	22.26
No	24340	82.06	1.00			1.00		
Depression								
Yes	4568	15.40	38.91	22.76	66.50	38.06	22.22	65.21
No	25094	84.60	1.00			1.00		
ADHD								
Yes	986	3.32	4.75	2.99	7.56	4.62	2.90	7.36
No	28676	96.68	1.00			1.00		
Bipolar Disorder								
Yes	145	1.08	33.30	22.92	48.38	31.86	21.91	46.34

No	29341	98.92	1.00			1.00		
OCD								
Yes	245	0.83	6.56	3.21	13.39	5.96	2.91	12.20
No	29417	47.63	1.00			1.00		
Schizophrenia								
Yes	60	0.20	120.05	79.28	181.77	119.46	77.98	183.02
No	29602	99.80	1.00			1.00		

Note.

ADHD: Attention-Deficit/Hyperactivity Disorder. OCD: Obsessive-Compulsive Disorder. †Adjusted for age, sex, and marital status.

Data source: 2017-2021 Deseret Mutual Benefit Administrator (DMBA).

anxiety in the age groups 18-39 and 50-64 years, and with depression, bipolar disorder, and schizophrenia in each age group.

The rate of suicidal ideation for age, marital status, dependent children, and selected mental health conditions appear by sex in Table 3. The rates significantly vary by sex for age, adjustment disorders, and schizophrenia. The lower rate for older employees is only significant for women. The higher rates for adjustment disorders and schizophrenia are significantly greater for

men than women. The rates of suicidal ideation for adjustment disorders and schizophrenia are no longer significantly higher for men than women after adjusting for the other mental health conditions (Figure 2). With the same adjustment, bipolar disorder may be more strongly associated with suicidal ideation in women than in men. Rate ratios are no longer significant for ADHD, OCD, or adjustment disorders in women.

Table 2

Rate of suicidal ideation by selected demographics and mental health conditions stratified by age

	Ages 18-39			Ages 40-49			Ages 50-64		
	Rate Ratio	95% LCL	95% UCL	Rate Ratio	95% LCL	95% UCL	Rate Ratio	95% LCL	95% UCL
Women vs. Men	2.09	1.28	3.40	2.93	1.48	5.81	0.88	0.45	1.74
Single vs. Married	1.56	0.93	2.60	2.22	1.00	4.92	2.68	1.38	5.18
Adjustment disorders	7.10	4.22	11.94	11.70	5.90	23.22	6.27	3.13	12.54
Anxiety	29.96	13.67	65.63	8.35	3.97	17.53	11.65	5.82	23.32
Depression	98.04	30.78	312.33	43.78	13.36	143.44	17.25	8.21	36.23
ADHD	3.34	1.65	6.75	2.48	0.76	8.14	10.37	4.94	21.78
Bipolar Disorder	30.70	17.66	53.38	29.13	13.54	62.67	41.31	21.00	81.23
OCD	3.37	1.06	10.75	18.77	7.25	48.61			
Schizophrenia	95.38	47.18	192.81	133.47	60.21	295.91	165.47	82.66	331.23

Note.

ADHD: Attention-Deficit/Hyperactivity Disorder. OCD: Obsessive-Compulsive Disorder. Estimates in this table are unadjusted.

Data source: 2017-2021 Deseret Mutual Benefit Administrator (DMBA).

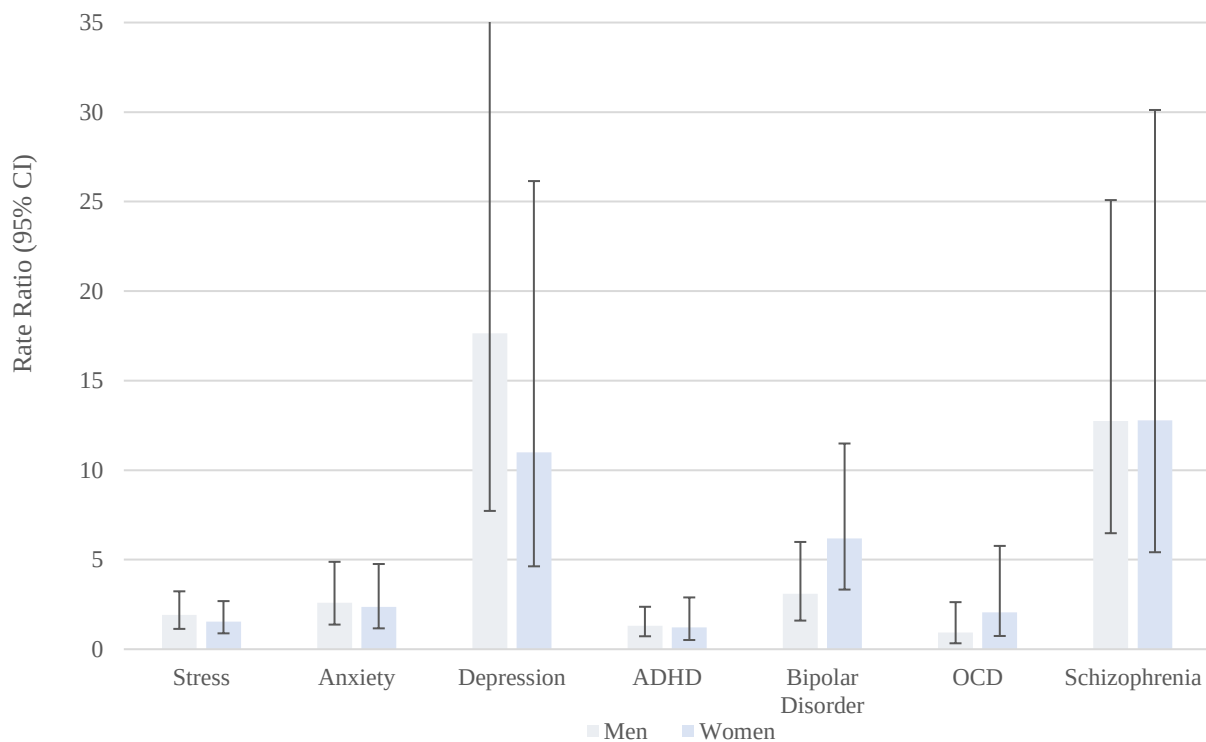
Table 3*Rate of suicidal ideation by selected demographics and mental health conditions stratified by sex*

	Men			Women		
	Rate Ratio	95% LCL	95% UCL	Rate Ratio	95% LCL	95% UCL
Age 40-49 vs. Age 18-39	0.57	0.31	1.04	0.80	0.45	1.44
Age 50-64 vs. Age 18-39	0.70	0.42	1.16	0.30	0.15	0.57
Single vs. Married	2.40	1.35	4.29	1.45	0.88	2.39
No DC vs. DC	1.56	0.97	2.52	1.61	0.94	2.76
Adjustment disorders	11.29	7.08	17.99	4.54	2.65	7.79
Anxiety	17.96	10.35	31.18	11.21	5.97	21.06
Depression	49.82	23.95	103.65	25.36	11.55	55.68
ADHD	6.12	3.48	10.77	3.30	1.42	7.65
Bipolar Disorder	38.90	23.84	63.45	26.66	14.91	47.68
OCD	5.61	2.05	15.35	8.38	3.04	23.07
Schizophrenia	190.52	115.24	314.99	53.54	24.38	117.55

Note.

DC: Dependent Children. ADHD: Attention-Deficit/Hyperactivity Disorder. OCD: Obsessive-Compulsive Disorder. Estimates in this table are unadjusted.

Data source: 2017-2021 Deseret Mutual Benefit Administrator (DMBA).

Figure 2*Suicidal ideation according to mental health conditions for men and women*

Data source: 2017-2021 Deseret Mutual Benefit Administrator (DMBA).

Discussion

In this study, we evaluated the rate of suicidal ideation according to certain demographics and major mental health conditions. Modifying effects of the demographic variables on the associations between mental health conditions and suicidal ideation were also assessed. Being younger, a woman, and single were each associated with higher rates of suicidal ideation, as consistent with previous research (National Institute of Mental Health, 2023; CDC, 2023; Øien-Ødegaard et al., 2021; Stephenson et al., 2023, Lövestad et al., 2019). Due to the increased association of each of these demographic characteristics on their own, clinicians should make a particular effort to obtain suicidal ideation screenings for patients who have all three characteristics.

Having dependent children significantly lowered the risk of suicidal ideation until we adjusted for age, sex, and marital status. Previous research has been conflicting on the effects of having children and the risk of suicidality, where some studies claim having children is a protective factor against suicide death (Andrés et al., 2010; Denney 2010; Frey & Cerel, 2013). However, other studies have shown higher suicidal ideation and behavior in parents when compared to non-parents (Borges et al., 2008; Kessler et al., 1999).

The current study identified higher rates of suicidal ideation for those experiencing adjustment disorders, anxiety, depression, ADHD, bipolar disorder, OCD, and schizophrenia, after adjusting for age, sex, and marital status, as is consistent with previous research (Loerbroks et al., 2016, Nepon et al., 2010; Cai et al., 2021; Balazs and Keresztesy, 2017; Rihmer and Kiss, 2002; Benatti et al., 2021; Albert et al., 2019; Sher and Kahn, 2019). Schizophrenia, depression, and bipolar disorder are significantly more likely to be associated

with suicidal ideation than adjustment disorders, anxiety, ADHD, and OCD, and when further adjusted for the selected mental health conditions, associations involving ADHD and OCD became statistically non-significant. This suggests that the risk of suicide ideation from these disorders is indirectly affected by other mental health conditions. A previous study found anxiety to have a weak but significant positive association with suicidal ideation (Bentley et al., 2016). Another study found that anxiety did not contribute to suicidal ideation in the presence of bipolar disorder (Persons et al., 2022). However, in the current study, there remained a strong positive association between anxiety and suicidal ideation after adjustment for age, sex, marital status, bipolar disorder, and other mental health conditions. This persistent association would indicate anxiety should be considered by clinicians as a risk for suicidal ideation.

The higher rates of suicidal ideation for women than men become statistically non-significant in those aged 50-64 years. This is consistent with a previous study involving national data showing similar rates of suicidal ideation between men and women in this later age group (Piscopo, 2017). Higher rates of suicidal ideation for anxiety and depression decreased with age. However, the decrease in anxiety was explained when we adjusted for other mental illnesses.

The higher rate of suicidal ideation for ADHD was greatest for those aged 50-64 and for OCD was greatest for those aged 40-49. Previous research identified increased suicidal ideation among all age groups and concluded that other comorbid psychiatric disorders mediate between ADHD and suicidality (Balazs & Keresztesy, 2017). This is supported by the current study, where after adjusting for other mental health conditions, the rate ratio became 1.31 (95% CI 0.81-2.13). However, in this fully adjusted model for sex, marital status, and other mental

health conditions, there persists a significant association for ADHD (Rate Ratio = 2.62, 95% CI 1.16-5.92), indicating that consideration of ADHD is important for suicidal ideation, but only for those aged 50-64.

OCD was associated with increased rates of suicidal ideation for those aged 40-49. Previous research found that OCD remained significantly associated with suicidal ideation after adjusting for comorbid mental illness (Fernández de la Cruz et al., 2017). We did not find this in the fully adjusted model for age, sex, marital status, and other mental health conditions (Rate Ratio = 1.23, 95% CI 0.59-2.55). However, we did find this in our fully adjusted model for those aged 40-49 (Rate Ratio = 6.83, 95% CI 2.41-19.37).

The rates of suicidal ideation significantly vary by sex for age, adjustment disorders, and schizophrenia. Higher rates of suicidal ideation for adjustment disorders and schizophrenia are significantly greater for men than women. However, these higher rates are explained by comorbid mental health conditions. After adjusting for these comorbid mental conditions, the significant differences no longer remain.

Limitations

This study has some limitations. First, the results are based on an employee population, which is generally healthier than a nonworking population. Second, the results are based on employees of the Church of Jesus Christ of Latter-day Saints. Whereas not all employees are members of the Church, those who are often follow a health code of refraining from tobacco use and alcohol consumption (Merrill & Salazar, 2002). Additionally, the strong influence of the religious community in the DMBA database may positively impact life satisfaction and mental health (Allen et al., 2023). Authors of a review article found that

studies typically show Latter-day Saints as having lower depression, anxiety, and suicidal thoughts compared with other religious groups or no religion (Dyer et al., 2023). Third, although studies show that religious attendance is related to lower odds of illicit drug use, it is unrelated to opioid misuse (Burdette et al., 2018; Kerry et al., 2016), and one study shows high opioid use among Latter-day Saints and corresponding increased risk of depression (Merrill and Sloan, 2014). Fourth, race/ethnicity was not available in the DMBA database, which primarily reflected Caucasians. The study population for the region is approximately 90% Caucasian (United States Census Bureau, 2024). Fifth, the database also did not contain information about sexual orientation, educational attainment, lifestyle factors, spirituality, and social determinants of health, so they could not be included in the study. Finally, those aged 65 years or older are not considered because as employees retire, many opt out of DMBA and do not have medical claims data available.

All employees in our sample were eligible for comprehensive insurance coverage. DMBA gives mental health services and related benefits to all medical plans, so no selective representation of subgroups is likely to bias the results. A mental health diagnosis under DMBA does not lead to insurance loss. The study only includes suicidal ideation and mental illness data serious enough to be reported to a healthcare provider. Accurate mental health diagnoses can be complicated and inconsistent, leading to potential inconsistency in data. We must presume physicians and healthcare practitioners who submit claims follow all diagnostic regulations.

Conclusion

Among employees in a large non-profit organization in the West Region of the U.S.,

being younger, a woman, and single correspond with higher rates of suicidal ideation. After adjusting for age, sex, and marital status, higher rates of suicidal ideation occur in those experiencing adjustment disorders, anxiety, depression, ADHD, bipolar disorder, OCD, and schizophrenia. Suicidal ideation is significantly associated with depression, bipolar disorder, and schizophrenia in each age group. Bipolar disorder may be more strongly associated with suicidal ideation in women than in men. These findings may inform mental health professionals so they can more effectively identify and treat individuals who are thinking about or planning suicide. One application may include a more comprehensive screening of suicidal tendencies for individuals who fall into these high-risk categories.

Implications for Health Behavior Research

Being younger, a woman, and single are each associated with higher rates of suicidal ideation. This is of particular significance for practitioners. Although they likely have standardized mental health screenings for all their patients, it might be prudent for the practitioners to address suicidal ideation with individuals who fall into these categories, especially for those who fall into all three. These findings are also of significance to researchers. Whereas studies have been conducted looking at these characteristics separately, it would be prudent to evaluate the social factors that may predispose young, single women to have an increased association with suicidal ideation compared to other groups.

Contrary to prior research, after adjusting for demographic variables and other mental health conditions, there remained a strong, positive correlation between anxiety and suicidal ideation. As the most prevalent

mental health condition in the U.S., this is an important finding that requires further investigation. Future studies are needed to delineate if this association exists in other areas of the country besides the West, or if it is exclusive to this region.

Among the major mental health variables considered, depression, bipolar disorder, and schizophrenia have the strongest positive associations with suicidal ideation within each age group and sex. While the association between both depression and bipolar disorder with suicidal ideation may be more intuitive to practitioners, the association with schizophrenia is likely less well-known. Additionally, it is also essential for practitioners to recognize that the risk of suicidal ideation with all these mental health disorders is independent of age or sex, so screenings and interventions should be just as rigorous for a middle-aged man with depression as they would be for a younger female with depression.

Ethics Approval

The need for ethical approval and informed consent to participate were waived by the authors' institutional review board because personal identifying information was removed prior to data analysis (IRB2021-157).

Conflict of Interest

The authors state no potential conflicts of interest.

Discussion Questions

- Our findings indicate that being younger, a woman, and single are all associated with higher rates of suicidal ideation. What social support efforts could we implement to help in addressing suicidal ideation, especially for individuals who

fall into all three of these demographic groups?

- While the associations we established in both demographics and mental health conditions with suicidal ideation exist, change is unlikely to occur if practitioners do not effectively address suicidal ideation in their visits with patients. Are practitioners, especially primary medicine practitioners, comfortable and confident in addressing suicidal ideation?

References

- Albert, U., De Ronchi, D., Maina, G., & Pompili, M. (2019). Suicide risk in obsessive-compulsive disorder and exploration of risk factors: A systematic review. *Current Neuropsychopharmacology*, 17(8), 681-696. <https://doi.org/10.2174/1570159X16666180620155941>
- Allen, G. E. Ming, M., Hyde, S., Bozzelli, A., Rodgers, G., Sagebin, F. M., & Thompson, M. (2023). Investigating religious commitment, perceived religious oppression, self-esteem, depression, and life satisfaction among Latter-day Saint women. *Journal of Spirituality in Mental Health*, 26(1), 50-60. <https://doi.org/10.1080/19349637.2022.2163956>
- Andrés, A. R., Collings, S., & Qin, P. (2010). Sex-specific impact of socio-economic factors on suicide risk: a population-based case-control study in Denmark. *European Journal of Public Health*, 20(3), 265-270. <https://doi.org/10.1093/eurpub/ckp183>
- Balazs, J., & Keresztesy, A. (2017). Attention-deficit/hyperactivity disorder and suicide: a systematic review. *World Journal of Psychiatry*, 7(1), 44-59. <https://doi.org/10.5498/wjp.v7.i1.44>
- Bell, C., Williman, J., Beaglehole, B., Stanley, J., Jenkins, M., Gendall, P., Rapsey, C., & Every-Palmer, S. (2022). Psychological distress, loneliness, alcohol use and suicidality in New Zealanders with mental illness during a strict COVID-19 lockdown. *Australian & New Zealand Journal of Psychiatry*, 56(7):800-810. <https://doi.org/10.1177/00048674211034317>
- Benatti, B., Dell'Osso, B., Shen, H., Filippou-Frye, M., Varias, A., Sanchez, C., Jo, B., Hollander, E., Fineberg, N. A., Stein, D. J., Nicolini, H., Lanzagorta, N., Marazziti, D., Pallanti, S., Van Ameringen, M., Lochner, C., Karamustafalioglu, O., Hranov, L., Figee, M., . . . Rodriguez, C. I. (2021). Prevalence and correlates of current suicide risk in an international sample of OCD adults: a report from the International College of Obsessive-Compulsive Spectrum Disorders (ICOCS) network and Obsessive Compulsive and Related Disorders Network (OCRN) of the European College of Neuropsychopharmacology. *Journal of Psychiatric Research*, 140, 357-363. <https://doi.org/10.1016/j.jpsychires.2021.05.054>
- Bentley, K. H., Franklin, J. C., Ribeiro, J. D., Kleiman, E. M., Fox, K. R., & Nock, M. K. (2016). Anxiety and its disorders as risk factors for suicidal thoughts and behaviors: a meta-analytic review. *Clinical Psychology Review*, 43, 30-46. <https://doi.org/10.1016/j.cpr.2015.11.008>
- Borges, G., Angst, J., Nock, M. K., Ruscio, A. M., & Kessler, R. C. (2008). Risk factors for the incidence and persistence of suicide-related outcomes: a 10-year follow-up study using the National Comorbidity Surveys. *Journal of Affective Disorders*, 105(1-3), 25-33. <https://doi.org/10.1016/j.jad.2007.01.036>
- Burdette, A. M., Hill, T. D., Webb, N. S., Ford, J. A., Haynes, S. H. (2018). Religious involvement and substance use

- among urban mothers. *JSSR*, 57(1):156-172. <https://doi.org/10.1111/jssr.12501>
- Cai, H., Xie, X. M., Zhang, Q., Cui, X., Lin, J. X., Sim, K., Ungvari, G. S., Zhang, L., & Xiang, Y. T. (2021). Prevalence of suicidality in major depressive disorder: A systematic review and meta-analysis of comparative studies. *Frontiers in Psychiatry*, 12, 690130. <https://doi.org/10.3389/fpsyt.2021.690130>
- Centers for Disease Control and Prevention. (2022, April). *ICD-10-CM international classification of diseases, Tenth Revision, Clinical Modification (ICD-10-CM)*. <https://www.cdc.gov/nchs/icd/icd-10-cm.htm>
- Centers for Disease Control and Prevention. (2023, November). *Suicide Prevention: Suicide Data and Statistics*. <https://www.cdc.gov/suicide/suicide-data-statistics.html>
- Conwell, Y., Van Orden, K., & Caine, E. D. (2011). Suicide in older adults. *Psychiatric Clinics of North America*, 34(2), 451-ix. <https://doi.org/10.1016/j.psc.2011.02.002>
- Denney, J. T. (2010). Family and household formations and suicide in the United States. *Journal of Marriage and Family*, 72(1), 202-213. <https://doi.org/10.1111/j.1741-3737.2009.00692.x>
- Dyer, W. J., Judd, D. K., Gale, M, Ginlinson, H. G. (2023). Religion, mental health, and the Latter-day Saints: A review of literature 2005-2022. *Religions*, 14(6):701. <https://doi.org/10.3390/rel14060701>
- Fernández de la Cruz, L., Rydell, M., Runeson, B., D'Onofrio, B. M., Brander, G., Rück, C., Lichtenstein, P., Larsson, H., & Mataix-Cols, D. (2017). Suicide in obsessive-compulsive disorder: a population-based study of 36 788 Swedish patients. *Molecular Psychiatry*, 22(11), 1626-1632. <https://doi.org/10.1038/mp.2016.115>
- Frey, L. M., & Cerel, J. (2015). Risk for suicide and the role of family: a narrative review. *Journal of Family Issues*, 36(6), 716-736. <https://doi.org/10.1177/0192513X13515885>
- Kudva, K. G., Abidin, E., Vaingankar, J. A., Chua, B. Y., Shafie, S., Verma, S. K., Fung, D. S. S., Heng Mok Kwee, D., Chong, S. A., & Subramaniam, M. (2021). The relationship between suicidality and socio-demographic variables, physical disorders, and psychiatric disorders: results from the Singapore Mental Health Study 2016. *International Journal of Environmental Research and Public Health*, 18(8), 4365. <https://doi.org/10.3390/ijerph18084365>
- Huang, X., Ribeiro, J. D., Musacchio, K. M., & Franklin, J. C. (2017). Demographics as predictors of suicidal thoughts and behaviors: a meta-analysis. *PLoS One*, 12(7), e0180793. <https://doi.org/10.1371/journal.pone.0180793>
- Ivey-Stephenson, A. Z., Crosby, A. E., Hoenig, J. M., Gyawali, S., Park-Lee, E., & Hedden, S. L. (2022). Suicidal thoughts and behaviors among adults aged ≥18 Years – United States, 2015-2019. *Morbidity and Mortality Weekly Report. Surveillance Summaries*, 71(1), 1-19. <https://doi.org/10.15585/mmwr.ss7101a1>
- Kerry, R., Goovaerts, P., Vowles, M., & Ingram, B. (2016). Spatial analysis of drug poisoning deaths in the American West, particularly Utah. *International Journal on Drug Policy*, 33, 44-55. <https://doi.org/10.1016/j.drugpo.2016.05.004>
- Kessler, R. C., Borges, G., & Walters, E. E. (1999). Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Archives of General*

- Psychiatry*, 56(7), 617-626. <https://doi.org/10.1001/archpsyc.56.7.617>
- Loerbroeks, A., Cho, S. I., Dollard, M. F., Zou, J., Fischer, J. E., Jiang, Y., Angerer, P., Herr, R. M., & Li, J. (2016). Associations between work stress and suicidal ideation: Individual-participant data from six cross-sectional studies. *Journal of Psychosomatic Research*, 90, 62-69. <https://doi.org/10.1016/j.jpsychores.2016.09.008>
- Lövestad, S., Löve, J., Vaez, M., Waern, M., Hensing, G., & Krantz, G. (2019). Suicidal ideation and attempts in population-based samples of women: temporal changes between 1989 and 2015. *BMC Public Health*, 19(1), 351. <https://doi.org/10.1186/s12889-019-6685-5>
- Lutz, J., Morton, K., Turiano, N. A., & Fiske, A. (2016). Health conditions and passive suicidal ideation in the survey of health, ageing, and retirement in Europe. *Journals of Gerontology. Series B, Psychological Sciences and Social Sciences*, 71(5), 936-946. <https://doi.org/10.1093/geronb/gbw019>
- Merrill, R. M., & Salazar, R. D. (2002). Relationship between church attendance and mental health among Mormons and non-Mormons in Utah. *Mental Health, Religion & Culture*, 5(1), 17-33. <https://doi.org/10.1080/13674670110059569>
- Merrill, R. M., & Sloan, A. A. (2014). Association between the use of antidepressants and other medications. *Open Journal of Depression*, 3(1):24-31. <https://doi.org/10.4236/ojd.2014.31007>
- National Institute of Mental Health. (2023, May). *Mental Health Information: Suicide*. https://www.nimh.nih.gov/health/statistics/suicide#part_2561
- Nepon, J., Belik, S. L., Bolton, J., & Sareen, J. (2010). The relationship between anxiety disorders and suicide attempts: findings from the National Epidemiologic Survey on Alcohol and Related Conditions. *Depression and Anxiety*, 27(9), 791-798. <https://doi.org/10.1002/da.20674>
- Persons, J. E., Lodder, P., Coryell, W. H., Nurnberger, J. I., & Fiedorowicz, J. G. (2022). Symptoms of mania and anxiety do not contribute to suicidal ideation or behavior in the presence of bipolar depression. *Psychiatry Research*, 307, 114296. <https://doi.org/10.1016/j.psychres.2021.114296>
- Piscopo, K. D. (2017). Suicidality and Death by Suicide Among Middle-Aged Adults in the United States. In *The CBHSQ Report*. (pp. 1-27). Substance Abuse and Mental Health Services Administration (US). <https://www.ncbi.nlm.nih.gov/books/NBK470850/>
- Øien-Ødegaard, C., Hauge, L. J., & Reneflot, A. (2021). Marital status, educational attainment, and suicide risk: a Norwegian register-based population study. *Population Health Metrics*, 19(1), 33. <https://doi.org/10.1186/s12963-021-00263-2>
- Renemane, L., Kivite-Urtane, A., & Fancans, E. (2021). Suicidality and its relation with physical and mental conditions: results from a cross-sectional study of the nationwide primary care population sample in Latvia. *Medicina (Kaunas)*, 57(9), 970. <https://doi.org/10.3390/medicina57090970>
- Rihmer, Z., & Kiss, K. (2002). Bipolar disorders and suicidal behaviour. *Bipolar Disorders*, 4 Supplement, 1, 21-25. <https://doi.org/10.1034/j.1399-5618.4.s1.3.x>
- Sher, L., & Kahn, R. S. (2019). Suicide in schizophrenia: An educational

overview. *Medicina* (Kaunas, Lithuania), 55(7), 361.
<https://doi.org/10.3390/medicina55070361>

Stephenson, M., Prom-Wormley, E., Lannoy, S., & Edwards, A. C. (2023). The temporal relationship between marriage and risk for suicidal ideation. *Journal of Affective Disorders*, 343, 129-135.
<https://doi.org/10.1016/j.jad.2023.10.007>

Sussell, A., Peterson, C., Li, J., Miniño, A., Scott, K. A., & Stone, D. M. (2023). Suicide rates by industry and occupation - National Vital Statistics System, United States, 2021. *Morbidity and Mortality Weekly Report*, 72(50), 1346-1350.
<https://doi.org/10.15585/mmwr.mm7250a2>

United States Census Bureau. (2024). *Quick Facts Utah*.
<https://www.census.gov/quickfacts/fact/table/UT/RHI125222#RHI125222>

Zhu, Y., Li, Y., & Xu, X. (2022). Suicidal ideation and suicide attempts in psychiatric patients during the COVID-19: a systematic review and meta-analysis. *Psychiatry Research*, 317, 114837.
<https://doi.org/10.1016/j.psychres.2022.114837>