Suicide and Life-Threatening Behavior

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Factors Associated With Achieving Complete Mental Health Among Individuals With Lifetime Suicide Ideation

2,3 PHILIP BAIDEN, XXX, AND ESME FULLER-THOMSON, XXX

The objective of this study was to identify factors associated with complete mental health among Canadians who had ever seriously considered suicide. Data for this study were obtained from Statistics Canada's 2012 Canadian Community Health Survey—Mental Health (n = 2,844). The outcome variable examined in this study was complete mental health and was analyzed using binary logistic regression. Of the 2,844 respondents with lifetime suicide ideation, 1,088 (38.2%) had complete mental health (i.e., had flourishing mental health, no mental illness, and no suicide ideation in the past 12 months). Those who had a confidant were seven times more likely to have complete mental health. Other factors associated with achieving complete mental health among formerly suicidal respondents include being older, being a woman, having higher income, use of religious coping, and never previously having a mental illness. Considering the importance of these protective factors in formulating public health policies will allow for a more wide-reaching approach to suicide prevention.

The World Health Organization (WHO) has estimated that globally, over 800,000 people committed suicide in 2012 (WHO, 2014). Suicide has been identified as one of the leading causes of death among Canadians and Americans (Burrows, Auger, Roy, & Alix, 2010; Miller, Azrael, Hepburn, Hemenway, & Lippmann, 2006; Vogel, 2011). The extant literature has identified a number of risk factors associated with suicide. Two of the strongest predictors of future death by suicide are prior suicide attempt and suicide ideation (Blackmore et al., 2008; Muehlenkamp, 2014; Muehlenkamp & Gutierrez, 2007; Nock, Joiner, Gordon, Lloyd-Richardson, & Prinstein, 2006; WHO, 2014). A large prospective US study that followed patients between 2009 and 2011 concluded that those who had ever seriously considered suicide at baseline were four times more likely to have engaged in suicidal behaviors during the study period (Mundt et al., 2013).

Additional risk factors known to be associated with suicide include age, with older individuals more likely to engage in suicidal behaviors (WHO, 2014) and gender, with women more likely to attempt and men more likely to complete suicide (Schrijvers, Bollen, & Sabbe, 2012). With respect to the effect of income and education on suicide ideation, numerous studies have observed an inverse relationship between income and suicide ideation (e.g., Borges et al., 2006; Cohen et al., 2010; Lemstra et al., 2009; Pan, Stewart, & Chang, 2013), whereas the relationship between education and suicide-related behaviors remains inconclusive. For

PHILIP BAIDEN and ESME FULLER-THOMSON, Factor-Inwentash Faculty of Social Work, University of Toronto, Toronto, ON, Canada.

Address correspondence to Philip Baiden, Factor-Inwentash Faculty of Social Work, University of Toronto, Toronto, ON, Canada; E-mail: philip.baiden@mail.utoronto.ca

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instance, Cohen et al. (2010) followed over 500 participants aged 65 years and older from Rochester, New York, and found no significant association between education and suicide ideation. Other studies (e.g., Borges et al., 2006; Pan et al., 2013) have also found similar results. However, Lemstra et al. (2009) found significant association between education and suicide ideation with respondents with lower education more likely to exhibit suicide ideation.

Past studies have also found nightmares and sleep-related problems are related to suicide ideation (Malik et al., 2014; Nadorff, Nazem, & Fiske, 2013; Pigeon, Pinquart, & Conner, 2012). The extant literature has also established a relationship between chronic pain (see e.g., Bender, Gordon, Bresin, & Joiner, 2011; Fuller-Thomson, Hamelin, & Granger, 2013; Joiner, 2005) and functional limitations (see e.g., Rowe, Bruce, & Conwell, 2006) and suicide-related behaviors. Moreover, mental health disorders such as major depression, anxiety, posttraumatic stress, and substance-related disorder (Blackmore et al., 2008; Clifford, Doran, & Tsey, 2013; Cougle, Resnick, & Kilpatrick, 2009; Joiner et al., 2007; Panagioti, Gooding, & Tarrier, 2012; Sareen, Houlahan, Cox, & Asmundson, 2005) as well as adverse childhood experience, particularly sexual abuse (Klonsky & Moyer, 2008; Rosenberg et al., 2005) have all been found to increase the risk of future death from suicide.

However, some studies also show that not all individuals who engaged in suicide ideation exhibit suicidal behaviors later in life (Malone et al., 2000; Roy, Sarchiapone, & Carli, 2007). Thus, it is possible that there may be protective factors that reduce the risk of an individual with suicide ideation from attempting suicide (Kleiman, Riskind, & Schaefer, 2014). Such protective factors may include individual characteristics such as marital status, education, and income as well as social characteristics such as religion and social support (Hovey, Hurtado, Morales, & Seligman, 2014; Koenig, King, & Carson, 2012; Myers, 2012). Recovery from suicide ideation, which is defined as complete absence of suicidal thoughts and actions, warrants additional investigation. However, we further propose that focusing solely on recovery from suicide ideation, as a marker of mental health, is insufficient.

A key question for health practitioners, researchers, suicidal individuals, and their loved ones is to identify factors that predict remission from suicide ideation and also predict complete mental health. From a public health perspective, identifying these factors could help in the design of policies and treatment interventions relating to suicide prevention. Thus, using a large national data set, this study sought to examine factors associated with complete mental health among Canadians who had previously considered taking their own life.

THE CONCEPT OF COMPLETE MENTAL HEALTH

Keyes (2002) identifies mental health and mental illness as two separate but related latent constructs. The absence of mental illness does not guarantee the presence of mental health or vice versa (Keyes, 2002, 2007, 2009; Lamers, Westerhof, Bohlmeijer, ten Klooster, & Keyes, 2011). Keyes (2002) proposes that "flourishing mental health" is composed of three elements: (1) happiness and/or life satisfaction, (2) psychological well-being (e.g., one's life is meaningful and has a sense of direction), and (3) social well-being (e.g., having warm and supportive relationships with others). The concept of complete mental health thus refers to having flourishing mental health and being free of suicide ideation and of mental illness such as anxiety, depression, bipolar disorder, and addictions (Gilmour, 2014; Keyes, 2003, 2005, 2007).

Various studies have found well-being and complete mental health to be important factors in monitoring health-related quality of life (Howell & Buro, 2015; Kahneman & Krueger, 2006; Keyes,

2002, 2007, 2009; Keyes & Simoes, 2012; Lamers et al., 2011). A comprehensive meta-analysis of 225 studies comprising over 275,000 participants found that well-being precedes various successful life outcomes. Individuals with better well-being are more likely to be healthier both physically and mentally, have higher job satisfaction, and have satisfying romantic relationships (Lyubomirsky, King, & Diener, 2005). Also, a review on the relationship between positive mental health and physical health found that, controlling for objective markers of disease, individuals with high levels of positive mental health reported fewer physical health symptoms (Pressman & Cohen, 2005). The authors also found a direct positive relationship between positive mental health and life expectancy suggesting that as positive mental health increases, so does life expectancy (Pressman & Cohen, 2005). Another study investigated the relationship between flourishing mental health and suicidal behaviors among college students and found that suicidal behaviors were lowest among those with flourishing mental health (Keyes et al., 2012). This study builds on past research by examining factors associated with complete mental health among Canadians who had ever seriously considered suicide.

METHODS

Data Set

Data for this study were obtained from Statistics Canada's 2012 Canadian Community Health Survey-Mental Health (CCHS-MH) public use microdata files (PUMF). The CCHS-MH is a cross-sectional survey that gathers information on factors that influence mental health through a multidisciplinary approach focusing on social and economic determinants of health (Statistics Canada, 2013). This population-based survey covers individuals, aged 15 and above, living in the 10 provinces in Canada. Residents of the three territories, individuals living on reserves or other Aboriginal settlements, full-time members of the Canadian Forces, and institutionalized population are excluded from the survey's coverage area. Together, this exclusion constitutes less than 3% of the target population (Statistics Canada, 2013). The CCHS-MH uses a multistage cluster sampling design with a random sampling method to select a sample that is representative of the Canadian population (Statistics Canada, 2013). There were 25,113 (unweighted) respondents representing 28,314,716 Canadians in the 2012 CCHS-MH data set.

Two samples were used in this study. First, we established the association between lifetime suicide ideation and complete mental health, net the effect of sociodemographic and other key predictors on 21,270 respondents aged 20 and over with complete data on all the characteristics under investigation. Subsequent analyses sought to examine complete mental health among respondents with lifetime suicide ideation. Lifetime suicide ideation classifies the respondent based on whether he/she ever thought about committing suicide or taking his/her own life. Of the 21,270 respondents, 2,844 ever thought about committing suicide or taking their own life and therefore constitute the second sample for analysis.

A normalized sampling weight was created by dividing each respondent's raw weight value by the mean weight for the sample, in a commonly accepted practice that has been recommended by other scholars (see e.g., Hahs-Vaughn, 2005; Thomas & Heck, 2001). This was performed so as to maintain the original sample's size while at the same time keeping the weighting structure recommended by Statistics Canada. The normalized weight was used in all the analyses.

Variables

Outcome Variable. The outcome variable examined in this study was complete

mental health and was measured as a binary variable based on the absence of suicide ideation and of mental illness, and the presence of flourishing mental health as measured by the Mental Health Continuum—Short Form (MHC-SF) (Keyes, 2009). The MHC-SF is a 14-item standardized instrument measuring three dimensions of positive mental health, namely emotional well-being (e.g., during the past month, how often did you feel: happy; satisfied with your own life; and interested in life?), social well-being (e.g., during the past month, how often did you feel that you had something important to contribute to society?), and psychological well-being (e.g., during the past month, how often did you feel that you liked most parts of your personality?) (Keyes, 2009; Keyes et al., 2012). Psychometric properties of the MHC-SF have been well established (Keyes, 2007; Lamers et al., 2011; Robitschek & Keyes, 2009), and the MHC-SF has been used in studying suicidal behaviors (Keyes et al., 2012). In this study, the MHC-SF was slightly modified by taking out "interested in life." Thus, individuals who experienced at least 1 of the 2 measures of emotional well-being and at least 6 of the 11 measures of psychological and social well-being "every day" or "almost every day" during the past month were considered as having flourishing mental health. In this study, internal consistency (Cronbach's α) for the 13-items was $\alpha = .89$. For the purposes of this study, respondents were considered to have complete mental health if they were flourishing and were free of suicide ideation and the following mental illness within the past 12 months: bipolar disorder, major depressive episode, general anxiety disorder, alcohol dependence, cannabis dependence, other drug dependence. These mental illness and substance dependence variables were determined based on the rigorous WHO version of the Composite International Diagnostic Interview (WHO-CIDI), a structured diagnostic interview that generates diagnosis according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) and the International Classification of Disease (ICD-10) (Statistics Canada, 2013). Suicide ideation was defined based on the question in the past 12 months: "Have you seriously thought about committing suicide or taking your own life?" For a detailed description of these measures, we refer the reader to 2012 CCHS-MH User Guide Microdata Files (Statistics Canada, 2013).

Explanatory Variables. Explanatory variables examined include demographic factors such as age, gender, and race. Socioeconomic factors examined include postsecondary graduate (no versus yes) and income quintile: poor (bottom 10%), low-middle (10% to 50%), upper-middle (50% to 90%), and rich (top 10%). Social support factors examined include marital status and respondents who answered "strongly agree" or "agree" (versus "disagree" or "strongly disagree") to the question "I have close relationships that provide me with a sense of emotional security and well-being" were considered as having a confidant.

The following physical health, mental illness, and substance dependence factors were examined: chronic pain, trouble sleeping, functional limitations, as well as lifetime diagnosis of bipolar disorder, major depressive episode, general anxiety disorder, alcohol dependence, cannabis dependence, and other drug dependence. Chronic pain refers to the degree of pain that is usually felt by the respondents and the extent to which such pain prevents the respondent from performing certain daily activities. It was coded as pain prevents some or many daily activities = 0, versus pain prevents none or few daily activities = 1, versus no pain = 2.

Survey respondents were also asked how often they have trouble going to sleep or staying asleep. Respondents who indicated having trouble sleeping "most of the time" and "all of the time" were coded as 0 versus respondents who indicated "none of the time," "a little of the time," and "some of the time" who were coded as 1. Functional limitations was assessed by asking

respondents "In the last 30 days, how much difficulty did you have in taking care of your household responsibilities?" and was coded as a binary variable (none/mild versus moderate/severe). Each of the lifetime mental illness and substance dependence diagnoses was also coded as a binary variable based on the WHO standardized measure. For a detailed description, see 2012 CCHS-MH User Guide Microdata Files (Statistics Canada, 2013).

Religious coping strategy was assessed based on the question "To what extent do your religious or spiritual beliefs give you the strength to face everyday difficulties?" and categorized as "a little," "somewhat," and "a lot" versus "not at all."

Lastly, adverse childhood experiences were measured using six questions that asked respondents about things that may have happened to them before they turned 16 either in their school, neighborhood, or family (i.e., exposure to parental domestic violence; hit, spanked, or slapped; pushed, grabbed, or shoved; physical attack; forced or unwanted sexual activity; and unwanted touching, grabbing, kissing, or fondling). This variable was coded 0, 1, 2, and ≥3. The decision to treat some of the ordinal variables as dichotomous variables ~~to a greater extent~~ was informed by cell size consideration.

Statistical Analyses

Data were analyzed using Pearson chi-square and binary logistic regression. The association between lifetime suicide ideation and complete mental health in the entire sample was first examined using two binary logistic regressions with complete mental health as the outcome and lifetime suicide ideation as the key explanatory variable. Lifetime suicide ideation, age, gender, and race were entered in Block 1 and all the other predictors, which the literature, discussed above, had suggested might be linked to both suicidal history and complete mental health, were entered in Block 2. This was followed by bivariate analyses among respondents with lifetime suicide ideation to indicate the percentage of respondents with complete mental health by particular characteristic (e.g., gender, marital status). Pearson chi-square tests were used to determine statistical significance. Statistical significance of these chi-square tests should be interpreted with caution due to the large sample size and concomitant substantial statistical power of the analyses.

Lastly, we conducted a series of binary logistic regression analyses, based on the extant literature, to identify the predictors of complete mental health among respondents with lifetime suicide ideation and to determine the relative explanatory value of each model. Nine logistic regression models were conducted with age, gender, and race entered in Model 1 and subsequent models. Socioeconomic variables, social support, health, lifetime mental illness diagnoses, substance dependence diagnoses, coping, and adverse childhood experiences were entered in Models 2 through 8, respectively. Model 9 consists of all the explanatory variables discussed above. Model fitness was assessed based on the Nagelkerke pseudo R square and the omnibus chi-square value. Adjusted odds ratios are reported together with their 95% confidence intervals (95% C.I.) and variables were considered significant if $p < .05$. All statistical analyses were conducted using SPSS version 22 for Windows (SPSS Inc., Chicago, IL, USA).

RESULTS

The proportion of respondents with lifetime suicide ideation who had complete mental health was lower (38.2%) than the proportion of respondents with no lifetime suicide ideation who had complete mental health (77.0%) ($\chi^2(1) = 1629.61$ $p < .001$). Results in Table 1 indicate that respondents with no lifetime suicide ideation had more than five times the odds of having complete mental health when compared to respondents with lifetime suicide ideation

TABLE 1
Multivariate Logistic Regression Predicting Complete Mental Health (Entire Sample, N = 21,270)

Variables	AOR (95% CI)	AOR (95% CI)
Suicide ideation: lifetime (Yes)		
No	5.32 (4.87–5.82)***	2.31 (2.08–2.56)***
Demographic variables		
Age (20 to 30 years)		
30 to 39 years	1.29 (1.17–1.43)***	1.19 (1.06–1.35)**
40 to 49 years	1.29 (1.16–1.42)***	1.29 (1.14–1.46)***
50 to 59 years	1.40 (1.27–1.55)***	1.34 (1.18–1.52)***
60 years and above	1.56 (1.42–1.72)***	1.51 (1.32–1.71)***
Gender (Male)		
Female	1.05 (0.99–1.12)	1.12 (1.04–1.20)**
Race (non-White)		
White	1.07 (0.99–1.16)	1.15 (1.05–1.25)**
Socioeconomic status		
Postsecondary graduate (No)		
Yes		0.99 (0.93–1.08)
Income (Poor)		
Lower-middle income		1.20 (1.06–1.37)**
Upper-middle income		1.37 (1.21–1.55)***
Rich		1.72 (1.46–2.02)***
Social Support		
Marital status (Single/never married)		
Married		1.34 (1.21–1.49)***
Common-law		1.24 (1.10–1.40)***
Formerly married		1.17 (1.02–1.33)*
Has a confidant (No)		
Yes		6.24 (5.05–7.70)***
Health		
Functional limitations (Yes)		
No		1.98 (1.74–2.26)***
Chronic pain (Pain prevents some or many activities)		
Pain prevents none or a few activities		1.08 (0.93–1.25)
No pain		1.34 (1.18–1.53)***
Trouble sleeping (Yes)		
No		1.46 (1.32–1.60)***
Mental health		
Major depressive episode (Ever diagnosed)		
Not diagnosed		2.56 (2.31–2.85)***
General anxiety disorder (Ever diagnosed)		
Not diagnosed		2.08 (1.84–2.34)***
Bipolar disorder (Ever diagnosed)		
Not diagnosed		2.80 (2.21–3.54)***
Substance use		
Alcohol dependence (Ever diagnosed)		
Not diagnosed		1.92 (1.58–2.32)***
Cannabis dependence (Ever diagnosed)		
Not diagnosed		1.14 (0.87–1.50)
Other drugs dependence (Ever diagnosed)		
Not diagnosed		1.29 (0.99–1.68)

(continued)

TABLE 1
(continued)

Variables	AOR (95% CI)	AOR (95% CI)
Coping		
Religious coping (No)		
Yes		1.33 (1.23–1.43)***
Adverse childhood Experiences		
Adverse childhood Experiences (Three or more)		
Two		0.90 (0.79–1.02)
One		1.11 (0.99–1.24)
None		1.54 (1.39–1.70)***
Nagelkerke R Square	.101	.243
Change in Nagelkerke R Square		.142
Block chi-square (sig)	1543.26 (.001)	2369.58 (.001)

AOR, adjusted odds ratio.
Reference categories are identified in brackets.
*$p < .05$; **$p < .01$; ***$p < .001$.

(OR = 5.32, 95% CI = 4.87–5.82), net the effect of age, gender, and race. This effect was partially attenuated with the addition of other predictors in Model 2. Controlling for all other 19 factors, respondents with no lifetime suicide ideation were 2.31 times more likely to have complete mental health when compared to respondents with lifetime suicide ideation (95% CI = 2.08–2.56).

Sample Characteristics of Respondents With Lifetime Suicide Ideation

Of the 2,844 respondents with lifetime suicide ideation, 1,088 (38.2%) had complete mental health (i.e., have flourishing mental health, no mental illness, and no suicide ideation in the past 12 months). More than half of the respondents (56%) were women. A significant bivariate association was found between complete mental health and most of the explanatory variables with the exception of education and lifetime diagnosis of cannabis dependence (see Table 2). Respondents were more likely to have complete mental health if they were older, women, White, rich, married, and/or had a confidant. The proportion of respondents with complete mental health was greater among those who had no functional limitations, no chronic pain, no trouble sleeping, as well as no lifetime diagnosis of major depressive episode, general anxiety disorder, bipolar disorder, alcohol dependence, or other drug dependence. Also, respondents who used religious coping strategies in facing everyday difficulties or experienced no adverse childhood experiences were more likely to have complete mental health.

Multivariate Logistic Regression Predicting Complete Mental Health Among Respondents With Lifetime Suicide Ideation

All demographic factors except race were significantly associated with having complete mental health among respondents who had ever seriously considered taking their own life. Controlling for all other factors in the final model, respondents who were older were more likely to have complete mental health. Compared to men, women had 1.58 times higher odds of having complete mental health (95% CI = 1.32–1.89). With regard to socioeconomic factors, we found that postsecondary graduates had 25% decreased odds of having complete mental health (95%

TABLE 2
Bivariate Association Between Complete Mental Health and Categorical Explanatory Variables Among Respondents With Lifetime Suicide Ideation (n = 2,844)

Variables	*n*	% Complete Mental Health	Test (sig.)
Age			
20 to 30 years	589	28.7	χ^2 = 44.70***
30 to 39 years	531	36.9	
40 to 49 years	660	37.1	
50 to 59 years	617	43.6	
60 years and above	447	46.8	
Gender			
Male	1260	34.3	χ^2 = 14.84***
Female	1584	41.4	
Race			
Non-White	506	30.0	χ^2 = 17.50***
White	2337	40.0	
Postsecondary graduate			
No	1108	38.2	χ^2 = 0.003 ns
Yes	1735	38.3	
Income quintile			
Poor	394	25.1	χ^2 = 92.59***
Low-middle	918	30.7	
Upper-middle	1321	45.6	
Rich	211	49.8	
Marital status			
Single/never married	835	29.6	χ^2 = 39.68***
Married	1090	43.3	
Common-Law	437	40.3	
Formerly married	481	39.9	
Has a confidant			
No	249	5.2	χ^2 = 126.08***
Yes	2595	41.4	
Functional limitations			
Yes	491	18.3	χ^2 = 99.76***
No	2353	42.4	
Chronic pain			
Pain prevents some or many activities	508	22.6	χ^2 = 73.25***
Pain prevents none or a few activities	542	36.0	
No pain	1793	43.3	
Trouble sleeping			
Yes	876	25.3	χ^2 = 88.92***
No	1968	44.0	
Major depressive episode			
Ever diagnosed	1140	25.0	χ^2 = 140.84***
Not diagnosed	1704	47.1	
General anxiety disorder			
Ever diagnosed	901	26.9	χ^2 = 72.27***
Not diagnosed	1942	43.5	
Bipolar disorder			
Ever diagnosed	303	15.5	χ^2 = 74.15***
Not diagnosed	2540	40.9	

(continued)

TABLE 2
(continued)

Variables	*n*	% Complete Mental Health	Test (sig.)
Alcohol dependence			
Ever diagnosed	318	23.6	$\chi^2 = 32.63$***
Not diagnosed	2526	40.1	
Cannabis dependence			
Ever diagnosed	151	32.5	$\chi^2 = 2.28$ (.131)
Not diagnosed	2693	38.6	
Other drug dependence			
Ever diagnosed	201	26.9	$\chi^2 = 11.88$***
Not diagnosed	2643	39.1	
Religious coping			
No	899	30.5	$\chi^2 = 33.55$***
Yes	1946	41.8	
Adverse childhood Experiences			
Three or more	1048	32.3	$\chi^2 = 34.71$***
Two	442	35.7	
One	640	41.9	
None	715	45.2	

***$p < .001$; ns, not significant.

CI = 0.62–0.90) compared to those without postsecondary education. However, compared to respondents who are poor, those in the upper-middle income group were 1.66 times more likely to have complete mental health (95% CI = 1.22–2.24) and those who are rich were 1.91 times more likely to have complete mental health (95% CI = 1.26–2.90). Respondents who had a confidant were 7.45 times more likely to have complete mental health (95% CI = 4.12–13.48). Respondents who did not have functional limitations were 2.12 times more likely to have complete mental health when compared to respondents who had functional limitations (95% CI = 1.60–2.80). Similarly, respondents who reported having pain that prevents few or no activities were 1.37 times more likely to have complete mental health (95% CI = 1.00–1.87) and respondents with no chronic pain were 1.69 times more likely to have complete mental health (95% CI = 1.29–2.22) both when compared to respondents with chronic pain that prevents some or many activities.

Respondents were also more likely to have complete mental health if they did not have trouble sleeping or had no lifetime diagnosis of major depressive episode, general anxiety disorder, bipolar disorder, or alcohol dependence. Religious coping was associated with complete mental health such that respondents who derived strength from their religious or spiritual beliefs to cope with everyday difficulties were 1.41 times more likely to have complete mental health when compared to their counterparts who did not (95% CI = 1.16–1.71). Lastly, compared to respondents who experienced three or more adverse childhood events, respondents who experienced no adverse childhood events were 1.3 times more likely to have complete mental health (95% CI = 1.04–1.63).

Furthermore, we tested for a first-order interaction between age and gender on complete mental health to find out whether the effect of gender on complete mental health varies for respondents based on their age. We found that, across all age groups, females were more likely to have

complete mental health when compared to their male counterparts, net the effect of all other factors. For instance, odds were 2.40 times higher for females who were above 60 years old (95% CI = 1.73–3.33), twice more likely for females aged 50 to 59 years (95% CI = 1.52–2.63), 1.58 times more likely for females aged 40 to 49 years (95% CI = 1.20–2.07), and 1.53 times more likely for females aged 30 to 39 years (95% CI = 1.14–2.04) to have complete mental health when compared to their male counterparts of the same age group.

Based on the Nagelkerke pseudo R square, all 18 variables cumulatively explained 25.6% of the variance in complete mental health among those who had ever been suicidal. The change in the omnibus chi-square value for each of the 8 models was also statistically significantly different from the initial model (i.e., the model with age, gender, and race). This suggests that each cluster of factors made significant contributions to the model. The Nagelkerke pseudo R square across the 9 models is informative. The initial model explained 3.3% of the variance in complete mental health. Adding variables related to religious coping, substance dependence, and early childhood adversities added about 2% per cluster to the variance in the initial model. Adjusting for socioeconomic status added 4.6% to the variance. Marital status and confidant added 7.2% to the variance. The greatest contribution to the model was due to mental illness (i.e., lifetime diagnosis of major depressive episode, general anxiety disorder, and bipolar disorder) and physical health characteristics (i.e., functional limitation, pain, and trouble sleeping) which contributed more than 10% to the variance in complete mental health.

DISCUSSION

To our knowledge, this is the first nationally representative Canadian study to examine complete mental health among those who had previously considered taking their own life. We found that 38% of the respondents with lifetime suicide ideation had complete mental health compared to 77% of those who have never considered taking their own life. The finding in the general sample and in the suicide ideation sample that females and older individuals were more likely to have complete mental health is consistent with past studies (Blanchflower & Oswald, 2008; Gilmour, 2014; Inglehart, 2002). Findings regarding marital status and having a confidant are very interesting. Although social support explained 7% of the variance in complete mental health, the significant effect of marital status disappeared once physical health, mental illness, and other factors were taken into account. However, having a confidant remained significant in keeping with the large body of research in personality and social psychology that has consistently demonstrated that individuals with greater social support and who have someone they can count on are less likely to suffer psychological distress and other mental illness compared to their counterparts without the support of a confidant (Diener & Seligman, 2004; Gallagher & Vella-Brodrick, 2008; Oishi, Krochik, & Akimoto, 2010; Siskind, Harris, Pirkis, & Whiteford, 2012). This association is robust across different populations including college students (Gallagher & Vella-Brodrick, 2008) individuals with cancer (Ikeda et al., 2013) individuals with chronic conditions (Ryan et al., 2007) as well as individuals who engage in suicidal behaviors (Kleiman et al., 2014).

The findings of this study also indicate that religious coping behavior offers an important resource for individuals who face stressful life events such as suicide ideation. In trying to understand the link between religious coping and recovery from suicide, various reasons have been given. One relates to the notion that religious involvement prevents the behavioral, physical, psychological, and social factors that drive individuals to commit suicide (Hovey et al., 2014; Koenig et al., 2012). Religion teaches one a sense of self-acceptance and provides

one with a deeper sense of meaning, belongingness, and attachment which then serve as a source of emotional and psychological comfort to individuals in times of stressful and life-threatening situations (Fletcher, 2004; Gall, Miguez de Renart, & Boonstra, 2000; Koenig, 2013). Another reason is that religion may provide a guiding context for how individuals will view, interpret, perceive, and approach stressful life events. It is also possible that the sense of belongingness and attachment individuals derive from participating in religious activities may help increase their self-esteem and sense of control when facing substantial life challenges. Informally, members of religious organizations who worship together support one another through prayer and regularly visit those who are sick (Hummer, Rogers, Nam, & Ellison, 1999).

The finding that respondents with postsecondary education were less likely to have complete mental health is quite perplexing. In the bivariate analysis shown in Table 2, the effect of education on complete mental health was small and nonsignificant. However, adjusting for all other factors in Table 3, we found that the coefficient of education was significant but in the opposite ~~of the~~ hypothesized ~~direction~~. Further research is needed to better understand the effect of education on complete mental among ever suicidal individuals.

Given that the definition of complete mental health includes the requirement of no mental illness in the past 12 months, it is not surprising that absence of lifetime diagnoses of major depression, general anxiety disorder, bipolar disorder, and alcohol dependence increases the likelihood of having complete mental health. It has been established in the literature that previous mental illness is a strong predictor of future mental illness (Fergusson, John Horwood, & Ridder, 2005; Steinhausen, Meier, & Angst, 1998). In addition, individuals with depression, anxiety, bipolar disorder, and substance use problems are at an increased risk of attempting suicide than individuals who do not have these mental diagnoses. In fact, these, as well as previous suicide ideation, are some of the key risk factors examined when assessing an individual's risk of committing suicide (Brown, Beck, Steer, & Grisham, 2000; Cheng, Chen, Chen, & Jenkins, 2000). The physical health factors that were examined relate to health problems present at the time the survey was completed rather than lifetime physical health problems. The extant literature has consistently found an association between health problems, such as chronic pain, trouble sleeping, inability to complete activities of daily living, mental health problems, and lower odds of satisfaction with life (Gilmour, 2014; Penny, Purves, Smith, Chambers, & Smith, 1999; Reimer & Flemons, 2003).

Study Limitations

It is important to keep in mind some limitations when reviewing these findings. First, the use of publicly available data limits the analyses to those factors for which information is available and therefore excludes other factors that may be considered informative to include in the model. In particular, we were unable to examine suicide plans and attempts in this study, because these variables were not available in the public use microdata file. Also, there was no information on the timing and duration of the last episode of suicide ideation. Future research would benefit from more exact information on the timing and duration of previous suicide ideation as well as examination of suicide plans and attempts. Second, the CCHS-MH uses a multistage survey design, and thus, it would have been best to use a bootstrap variance estimate. Unfortunately, this was impossible to do with the public use data set. Thus, our reported confidence intervals may be smaller than would have been the case if we could have bootstrapped.

Third, this study used cross-sectional data which preclude our ability to make causal inferences regarding the association between some of the explanatory variables

TABLE 3
Multivariate Logistic Regression Predicting Complete Mental Health Among Respondents With Lifetime Suicide Ideation (n = 2,844)

Variables	Model 1 Age, Gender, Race AOR (95% CI)	Model 2 Age, Gender, Race + SES AOR (95% CI)	Model 3 Age, Gender, Race + Social Support AOR (95% CI)	Model 4 Age, Gender, Race + Health AOR (95% CI)	Model 5 Age, Gender, Race + Mental Health AOR (95% CI)
Demographic variables					
Age (20 to 30 years)					
30 to 39 years	1.42 (1.11–1.83)**	1.37 (1.06–1.78)*	1.35 (1.03–1.77)*	1.46 (1.13–1.89)**	1.44 (1.11–1.87)**
40 to 49 years	1.43 (1.13–1.82)**	1.40 (1.09–1.78)**	1.34 (1.02–1.74)*	1.68 (1.31–2.16)***	1.49 (1.16–1.91)**
50 to 59 years	1.81 (1.42–2.30)***	1.63 (1.27–2.09)***	1.58 (1.20–2.08)***	2.23 (1.74–2.87)***	1.87 (1.45–2.40)***
60 years and above	2.05 (1.58–2.66)***	2.22 (1.70–2.90)***	1.99 (1.46–2.71)***	2.62 (1.99–3.45)***	1.90 (1.45–2.49)***
Gender (Male)					
Female	1.35 (1.16–1.58)***	1.48 (1.26–1.74)***	1.27 (1.08–1.49)**	1.56 (1.33–1.84)***	1.49 (1.27–1.76)***
Race (non-White)					
White	1.44 (1.16–1.77)***	1.25 (1.00–1.55)*	1.30 (1.05–1.62)*	1.39 (1.12–1.73)**	1.52 (1.22–1.89)***
Socioeconomic status					
Postsecondary graduate (No)					
Yes		0.78 (0.66–0.92)**			
Income (Poor)					
Lower-middle income		1.30 (0.99–1.71)			
Upper-middle income		2.65 (2.04–3.45)***			
Rich		3.35 (2.31–4.85)***			
Social support					
Marital status (Single/never married)					
Married			1.31 (1.05–1.64)*		
Common-law			1.22 (0.95–1.57)		
Formerly married			1.13 (0.85–1.49)		
Has a confidant (No)					
Yes			12.22 (6.90–21.64)***		

(continued)

TABLE 3
(continued)

Variables	Model 1 Age, Gender, Race AOR (95% CI)	Model 2 Age, Gender, Race + SES AOR (95% CI)	Model 3 Age, Gender, Race + Social Support AOR (95% CI)	Model 4 Age, Gender, Race + Health AOR (95% CI)	Model 5 Age, Gender, Race + Mental Health AOR (95% CI)
Health					
Functional limitations (Yes)					
No				2.76 (2.13–3.59)***	
Chronic pain (Pain prevents some or many activities)					
Pain prevents none or a few activities				1.46 (1.09–1.95)*	
No pain				1.90 (1.48–2.45)***	
Trouble sleeping (Yes)					
No				1.92 (1.59–2.32)***	
Mental health					
Major depressive episode (Ever diagnosed)					
Not diagnosed					2.28 (1.91–2.72)***
General anxiety disorder (Ever diagnosed)					
Not diagnosed					1.60 (1.33–1.93)***
Bipolar disorder (Ever diagnosed)					
Not diagnosed					2.62 (1.88–3.66)***
Substance use					
Alcohol dependence (Ever diagnosed)					
Not diagnosed					
Cannabis dependence (Ever diagnosed)					
Not diagnosed					
Other drug dependence (Ever diagnosed)					
Not diagnosed					
Coping					
Religious coping (No)					
Yes					

(continued)

TABLE 3
(continued)

Variables	Model 1 Age, Gender, Race AOR (95% CI)	Model 2 Age, Gender, Race + SES AOR (95% CI)	Model 3 Age, Gender, Race + Social Support AOR (95% CI)	Model 4 Age, Gender, Race + Health AOR (95% CI)	Model 5 Age, Gender, Race + Mental Health AOR (95% CI)
Adverse Childhood Experiences					
Adverse Childhood Experiences (Three or more)					
Two					
One					
None					
Nagelkerke R Square	.033	.079	.105	.135	.133
Change in Nagelkerke R Square		.046	.072	.102	.118
Block chi-square (sig)	70.38 (.001)	99.82 (.001)	159.37 (.001)	228.11 (.001)	222.77 (.001)

Variables	Model 6 Age, Gender, Race + Substance Use AOR (95% CI)	Model 7 Age, Gender, Race + Coping AOR (95% CI)	Model 8 Age, Gender, Race + Early Adversities AOR (95% CI)	Final Model AOR (95% CI)
Demographic				
Age (20 to 30 years)				
30 to 39 years	1.43 (1.11–1.84)**	1.36 (1.05–1.75)*	1.53 (1.18–1.97)***	1.43 (1.06–1.92)*
40 to 49 years	1.46 (1.15–1.86)**	1.30 (1.02–1.66)*	1.60 (1.25–2.04)***	1.55 (1.15–2.08)**
50 to 59 years	1.77 (1.39–2.26)***	1.61 (1.26–2.06)***	1.95 (1.53–2.50)***	1.82 (1.33–2.48)***
60 years and above	2.01 (1.54–2.61)***	1.83 (1.40–2.39)***	2.10 (1.61–2.73)***	2.33 (1.65–3.27)***
Gender (Male)				
Female	1.29 (1.11–1.51)***	1.28 (1.09–1.50)**	1.41 (1.21–1.65)***	1.58 (1.32–1.89)***
Race (non-White)				
White	1.42 (1.15–1.76)***	1.48 (1.20–1.83)***	1.40 (1.13–1.73)**	1.25 (0.98–1.58)
Socioeconomic status				

(continued)

TABLE 3
(continued)

Variables	Model 6 Age, Gender, Race + Substance Use AOR (95% CI)	Model 7 Age, Gender, Race + Coping AOR (95% CI)	Model 8 Age, Gender, Race + Early Adversities AOR (95% CI)	Final Model AOR (95% CI)
Postsecondary graduate (No)				
Yes				0.75 (0.62–0.90)**
Income (Poor)				
Lower-middle income				0.92 (0.68–1.25)
Upper-middle income				1.66 (1.22–2.24)***
Rich				1.91 (1.26–2.90)**
Social support				
Marital status (Single/never married)				
Married				1.04 (0.81–1.34)
Common-law				1.14 (0.86–1.51)
Formerly married				1.20 (0.88–1.63)
Has a confidant (No)				
Yes				7.45 (4.12–13.48)***
Health				
Functional limitations (Yes)				
No				2.12 (1.60–2.80)***
Chronic pain (Pain prevents some or many activities)				
Pain prevents none or a few activities				1.37 (1.00–1.87)*
No pain				1.69 (1.29–2.22)***
Trouble sleeping (Yes)				
No				1.55 (1.27–1.90)***
Mental health				
Major depressive episode (Ever diagnosed)				
Not diagnosed				1.87 (1.55–2.26)***
General anxiety disorder (Ever diagnosed)				
Not diagnosed				1.37 (1.12–1.68)**

(continued)

TABLE 3
(continued)

Variables	Model 6 Age, Gender, Race + Substance Use AOR (95% CI)	Model 7 Age, Gender, Race + Coping AOR (95% CI)	Model 8 Age, Gender, Race + Early Adversities AOR (95% CI)	Final Model AOR (95% CI)
Bipolar disorder (Ever diagnosed)				
Not diagnosed				2.05 (1.44–2.93)***
Substance use				
Alcohol dependence (Ever diagnosed)				
Not diagnosed	1.93 (1.46–2.57)***			1.57 (1.14–2.14)**
Cannabis dependence (Ever diagnosed)				
Not diagnosed	0.87 (0.60–1.28)			0.78 (0.51–1.19)
Other drug dependence (Ever diagnosed)				
Not diagnosed	1.36 (0.96–1.92)			0.97 (0.65–1.44)
Coping				
Religious coping (No)				
Yes		1.44 (1.21–1.72)***		1.41 (1.16–1.71)***
Adverse Childhood Experiences				
Adverse Childhood Experiences (Three or more)				
Two			1.15 (0.90–1.45)	0.91 (0.70–1.18)
One			1.53 (1.24–1.88)***	1.20 (0.96–1.52)
None			1.82 (1.51–2.26)***	1.30 (1.04–1.63)*
Nagelkerke R Square	.047	.041	.052	.256
Change in Nagelkerke R Square	.014	.008	.019	.223
Block chi-square (sig)	30.34 (.001)	16.91 (.001)	40.65 (.001)	594.65 (.001)

AOR, adjusted odds ratio.
Reference categories are identified in brackets.
*$p < .05$; **$p < .01$; ***$p < .001$.

and complete mental health. A study utilizing a longitudinal design that follows individuals is needed to understand complete mental health over the life course among individuals with lifetime suicide ideation. Fourth, whereas the relatively large sample size provides substantial statistical power to reject the null hypothesis when it is not correct, it also increases the likelihood of finding statistical significance for small differences that are not of clinical relevance. Fifth, changing the underlying levels of measurement of an ordinal variable into a dichotomous variable has the potential to affect the coefficient of some of the results reported in this study. However, the decision to recode some ordinal variables into dichotomous variables was informed by cell size consideration. Some of the categories of the ordinal variables had small numbers when analyzed as multilevel categories. Lastly, some of the information collected is self-reported and, thus, may be affected by recall bias.

Study Implications

In conclusion, findings from this population-based study highlight the importance of support, both financial and social support, and absence of sleep problems, physical health, and pain in contributing to complete mental health among all individuals, and, that many individuals with these positive attributes who had previously considered suicide make a full recovery into full mental health, free of suicidal thoughts. These are protective factors that can be targeted from a prevention and intervention standpoint. Taking a holistic perspective and enhancing a suicidal individual's social support and resources, as well as addressing any physical health and mental illness problems, may increase the likelihood that an individual with a history of suicide ideation may recover and potentially prevent future suicidality. Considering these protective factors in designing public health policies will also allow for a more wide-reaching approach to suicide prevention that spans various physical health, mental illness, and community organizations. Ultimately, the findings of this study provide hope to suicidal individuals, their families, and care providers. More than a third of previously suicidal respondents not only had banished their suicide thoughts, they were also free of other mental illness, and enjoyed a high degree of happiness and/or life satisfaction as well as social and psychological well-being.

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