Religiosity as a Protective Factor in Suicidal Behavior

A Case-Control Study

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Abstract: The impact of religiosity in suicidal behavior was evaluated in Brazil through a case-control study in which 110 subjects who had attempted suicide through the use of toxic substances were compared with 114 control subjects with no history of suicide attempts. Religiosity was measured in three aspects: organizational religious activities (ORAs), nonorganizational religious activities (NORAs), and intrinsic religiosity (IR). Multivariate logistic regression was used to evaluate the impact of religiosity on suicide attempts, controlling for sociodemographic variables, impulsivity, and mental illness. Religiosity, in its three dimensions, was shown to be an important protective factor against suicide attempts, even after controlling for relevant risk factors associated with suicidal behavior: ORA: odds ratio (OR), 0.63 (95% confidence interval [CI], 0.45–0.89); NORA: OR, 0.56 (95% CI, 0.42–0.75); and IR: OR, 0.59 (95% CI, 0.49–0.70). These data have important implications for understanding religiosity factors that might protect against suicide.

Key Words: Religiosity, suicide attempt, suicidal behavior, case-control study.

(*J Nerv Ment Dis* 2012;200: 863–867)

Suicidal behavior continues to be one of the leading public health problems worldwide (Fleischmann et al., 2005). According to the World Health Organization (WHO) (2010), it is estimated that approximately 1.53 million people will die as a result of suicide in 2020. Depending on the location, suicide attempts can be 10 to 40 times more frequent than completed suicides (Schmidtke et al., 1996). However, most research on attempted suicides evaluates only the risk factors related to this behavior, such as the presence of mental illness, impulsivity, female sex, youth, and unemployment. Evidence is still scarce on the role of factors that might protect against suicidal behavior (Bertolote, 2004). Since Durkheim (2004), research on the impact of religiosity on suicidal behaviors has tended to favor the idea of an inverse association and protective effect. Although contradictory and controversial findings on this issue cannot be denied, research has shown that a higher level of religiosity corresponds to a lower level of suicidality (Sisask et al., 2010).

Most of the studies performed thus far cannot be directly compared because of conceptual and methodological discrepancies. Most studies have been ecological by design, and relatively few individual-level findings have been reported. Furthermore, few studies have considered suicide attempt as the major focus of their work. Many have not controlled for important factors that may prevent suicidal behavior, nor have they adequately measured religiosity. In addition, most research has been conducted in highly developed countries (Colucci and Martin, 2008; Sisask et al., 2010). Thus, there is a shortage of data in the literature regarding this issue in emerging countries and in countries with substantial religious diversity, such as Brazil (Moreira-Almeida and Neto, 2004).

Therefore, the objective of this study was to evaluate whether religiosity exerts a protective effect in relation to suicide attempts that involve substance use while controlling for important risk factors in suicidal behavior, such as the presence of mental illness and impulsivity. In addition, we sought to determine if there exists a differential pattern of protection for organizational religious activities (ORAs), nonorganizational religious activities (NORAs), and intrinsic religiosity (IR) in relation to suicidal behavior.

SUBJECTS AND METHODS

Subjects

All patients were 18 years or older, admitted to the emergency room at Hospital Geral Roberto Santos (HGRS) because of suicide attempts and treated through the Centro de Informação Anti-Veneno da Bahia. The individuals accompanying the patients were invited to participate in the survey. *Suicide attempt* was defined as any act of self-inflicted injury with the intention of causing one's own death. In this study, only patients who had attempted suicide through the use of toxic substances, such as medications, poisons, and chemical products, were selected. The patients were interviewed in the emergency room or in another location at the HGRS within 15 days of clinical rehabilitation for suicide attempts and, on average, within 5 days after they had attempted suicide.

The control group was made up of the people who accompanied these patients. This group included relatives and unrelated individuals from the same community to prevent bias associated with differences in sociodemographic data between the groups. The selection criteria were that the controls were of the same age and sex as the patients under assessment. Furthermore, those with a history of previous suicide attempts were excluded, as were the patients and controls who were unable to answer the questionnaires adequately.

After applying the inclusion and exclusion criteria, two groups were formed: 110 patients with suicide attempts (cases) and 114 individuals with no history of suicidal behavior (controls). The interviews were held between July 2009 and July 2010 at the same hospital where the patients were treated after the attempted suicides.

This study was approved by the local Medical Review Ethics Committee and performed in accordance with the ethical standards set in the 1964 Declaration of Helsinki. In addition, all patients provided written informed consent before their inclusion in the study.

Methods

Data were collected using the same instruments for both the cases and the controls. The face-to-face interviews were carried out simultaneously with the scale application. The interviews were conducted individually or, when necessary, with the presence of family members. The data gathered from the patient's report were complemented by the data in the medical chart, as appropriate. The evaluations

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ISSN: 0022-3018/12/20010–0863
DOI: 10.1097/NMD.0b013e31826b6d05

were performed by two psychiatrists who had been trained in using the referred instruments and who had more than 4 years of experience in the field.

The four instruments used are described as follows: The first instrument is a questionnaire to collect clinical and sociodemographic characteristics, and the second is the Duke Religious Index–DUREL (DRI; Koenig et al., 1997), which is an easy and brief scale for measuring religiosity (Lucchetti et al., 2012; Yohannes et al., 2008). The DRI is a five-item self-report scale that assesses three domains of religiosity: ORA, NORA, and IR. The ORA domain is measured by one item and defined as the frequency with which one attends formal religious services. The NORA domain is measured by one item and defined in the amount of time spent in private religious activities such as prayer or meditation. The IR domain is measured by three items and conceptualized as the degree to which one integrates their religion into their lives. Response options are on a 5- or 6-point Likert scale. The time frame measured by the religiosity evaluation included the year before the suicide attempts. The third instrument is the Barratt Impulsivity Scale (BIS 11), which was used to assess impulsivity (Patton et al., 1995; von Diemen et al., 2007). The BIS is a 30-item self-report measure of impulsivity, which includes three subscales: a) attentional (problems related to concentrating and/or paying attention), b) motor (fast reactions and/or restlessness), and c) nonplanning (orientation toward the present rather than to the future). The fourth assessment is the Mini International Neuropsychiatric Interview (Sheehan et al., 1998), a short structured interview that was used for the diagnosis of major axis I psychiatric disorders, as listed in the *DSM-IV* and ICD-10 (Amorim, 2000). All instruments were validated in Brazilian Portuguese.

Statistical Analysis

The collected data were digitized using the Statistical Package for Social Sciences (SPSS win, Version 16) and were analyzed in the statistical program Stata v. 9.0. The simple frequencies and percentages of the categorical variables were obtained, as well as measures of central tendency (mean) and diffusion (standard deviation) of the numerical variables. To verify the possible differences in clinical and sociodemographic characteristics between the two groups, the chi-square test and the Student's *t*-tests were used. After this initial analysis, the variables that showed a greater statistical difference ($p < 0.20$) between the groups were adjusted in the multivariate regression.

In the bivariate analysis, the measure of association (odds ratio [OR]) was estimated using a logistic regression model with a respective confidence interval (CI) of 95% between the religiosity variables (ORA, NORA, and IR) and the outcome variable (suicide attempts). By using a multivariate logistic regression, an adjusted measure was obtained that included the following sociodemographic variables: age, sex, occupation, presence or absence of partner, having children or no children, religious affiliation, and psychiatric or psychological treatment (model A). In addition to these variables, the model was adjusted for impulsivity and mental illness (model B). The goodness-of-fit model adjustment was verified by the Akaike information coefficient statistic, and the significance level adopted for the regression analysis was 5% ($p \leq 0.05$).

RESULTS

Participant Characteristics

Of 139 patients with suicide attempts who were eligible to participate in the research, 12 (8.6%) refused to participate and 17 (12.2%) left the hospital too soon to receive a medical reevaluation, leaving a total of 110 cases. Furthermore, it is important to highlight that during the course of the study, 11 patients died because of suicide before they had been evaluated for the research. Of the controls, 124 were eligible to participate, 10 (8.0%) of whom were excluded because of having previously attempted suicide, giving a total of 114 controls.

The mean (SD) age in the patient group was 32.15 (9.89) years (range, 18–69 years), and in the control group, it was 34.82 (11.4) years (range, 18–69 years). There were no significant differences between the groups with respect to age ($p = 0.06$) or sex ($p = 0.52$). Most of the subjects were women; 59 (53.6%) in the patient group and 66 (57.9%) in the control group were women. Compared with the controls, the patients had lower frequencies of work-related activities ($p = 0.03$), fewer children ($p = 0.01$), more psychological or psychiatric monitoring ($p = 0.00$), more mental disease ($p = 0.00$), and higher impulsivity scores ($p = 0.00$). Table 1 describes the social and clinical characteristics of the subjects.

Characteristics of Suicide Attempts

Nearly half of the patients (49; 44.5%) who attempted suicide had tried before. The types of toxic substances most commonly used in the suicide attempts were pesticides of the carbamate group

TABLE 1. Demographic and Clinical Characteristics of Participants

	Patients (n = 110)	Controls (n = 114)	
Variables	**N (%)**	**N (%)**	***p****
Age, mean (SD), yrs	32.15 (9.89)	34.82 (11.4)	0.06
Sex, female	59 (53.6%)	66 (57.9%)	0.52
Schooling			0.48
Up to 4 yrs	19 (17.4%)	16 (14.0%)	
From 4 to 8 yrs	32 (29.3%)	27 (23.6%)	
From 9 to 11 yrs	48 (44.0%)	55 (48.2%)	
More than 12 yrs	10 (9%)	16 (14%)	
Employed	61 (55.5%)	79 (69.2%)	0.03
Has partner	56 (50.9%)	72 (63.2%)	0.06
Has children	42 (38.2%)	63 (55.3%)	0.01
Has religious affiliation	60 (54.5%)	76 (66.7%)	0.06
Type of affiliation			0.32
Catholic	29 (26.4%)	42 (36.8%)	
Evangelical History	11 (10%)	18 (15.8%)	
Evangelical Pentecostal	7 (6.4%)	3 (2.6%)	
Evangelical Neopentec	6 (5.5%)	5 (4.4%)	
Neo-Christian	3 (2.7%)	3 (2.6%)	
Spiritualists	2 (1.8%)	3 (2.6%)	
Afro-Brazilian religions	1 (0.9%)	2 (1.8%)	
Belief in God	106 (96.4%)	113 (99.1%)	0.16
Family History of Suicide	10 (9.1%)	13 (11.4%)	0.58
Family History of Mental Illness	54 (49.1%)	51 (44.7%)	0.51
Psychiatric/psychological treatment	33 (30%)	6 (5.2%)	0.00
Mental Illness			0.00
Current	83 (75.4%)	36 (31.5%)	
Past	10 (9.0%)	17 (14.9%)	
Absence	17 (15.4%)	61 (53.5%)	
Impulsiveness			0.00
Attentional	21.2 (4.47)	17.5 (3.85)	
Motor	23.5 (6.82)	18.6 (5.46)	
Planning	27.7 (6.0)	22.2 (4.85)	
Total	72.5 (15.5)	58.4 (12.3)	

*Chi square or Student's t-test.

TABLE 2. Clinical Characteristics of Patients With Suicide Attempts (n = 110)

Variables	N (%)
Previous suicide attempts	49 (44.5%)
Substance used in last attempt	
Carbamate	54 (49%)
Medicines	43 (39%)
Other Substances	13 (11.8%)
Treatment	
None/observation	3 (2.7%)
Symptomatic/support	20 (18.2%)
Intervention/advanced support	87 (79.1%)
Hospitalization (>24 hours)	65 (59.1%)
Current Mental Illness	83 (75.4%)
Major Depressive Disorder	47 (42.7%)
Generalized Anxiety Disorder	20 (18.2%)
Alcohol Dependence	13 (11.8%)
Bipolar Disorder	9 (8.2%)
No Alcohol Drug Dependence	8 (7.3%)
Schizophrenia	7 (6.4%)
Panic Disorder	6 (5.5%)
Dysthymic Disorder	2 (1.8%)
Pain Disorder	2 (1.8%)
Dysphoric Premenstrual Disorder	2 (1.8%)
Others	7 (6.3%)
Past Mental Illness	10 (9.0%)
Major Depressive Disorder	10 (9.0%)
Alcohol Dependence	5 (4.5%)
Attention Deficit Disorder	4 (3.6%)
Panic Disorder	2 (1.8%)
Post Traumatic Stress Disorder	2 (1.8%)
Others	5 (4.5%)

The sum total does not equal 100% because some patients have more than one diagnosis.

(54; 49%) followed by medications (43; 39%). Most of these patients (87; 79.1%) needed medical intervention, which included gastric pumping, the use of antidotes, or respiratory support. Furthermore, 65 (59.1%) required hospitalization for more than 24 hours. Of the patient group, 83 (75.4%) had a mental illness at the time of evaluation, and 48 (57.8%) of these patients presented with more than one diagnosis. The most prevalent illnesses were major depressive disorder (MDD; 47 patients; 42.7%) and generalized anxiety disorder (GAD; 20 patients; 18.2%). Of those who presented with depression, 30 (63.8%) had another comorbid diagnosis, and of those who had GAD, 17 (85%) presented with comorbidities. The same diagnoses were seen in the controls; that is, MDD was present in 16 (14%) of the controls, and GAD, in 9 (7.9%) of the controls (Table 2).

Impact of Religiosity

In the bivariate analysis, the comparison between the two groups, without controlling for the sociodemographic and clinical variables, showed that religiosity in its three dimensions wielded a protective effect with regard to suicide attempts. The results were as follows: ORA (OR, 0.69; 95% CI, 0.57–0.83), NORA (OR, 0.58; 95% CI, 0.48–0.69), and IR (OR, 0.60; 95% CI, 0.53–0.67). In the multivariate analysis, after controlling for the sociodemographic variables, it was verified that religiosity continued to be a protective factor in its three dimensions: ORA (OR, 0.61; 95% CI, 0.46–0.80), NORA (OR, 0.59; 95% CI, 0.48–0.73), and IR (OR, 0.56; 95% CI, 0.48–0.66; model A). With adjustment for mental illness and impulsivity (model B), a small decrease in the protective effect of ORA and IR occurred; nonetheless, this effect continued to be significant for the three dimensions: ORA (OR, 0.63; 95% CI, 0.45–0.89), NORA (OR, 0.56; 95% CI, 0.42–0.75), and IR (OR, 0.59; 95% CI, 0.49–0.70; Table 3).

DISCUSSION

The purpose of this study was to examine the role of religiosity in suicidal behavior through a case-control study. Consistent with findings from the literature, a higher percentage of patients with suicide attempts in our study were unemployed, childless, and without a set partner compared with the controls. This corroborates previous reports that indicate that these factors are associated with suicidal behavior (Kposowa, 2001; Luoma and Pearson, 2002; Qin and Mortensen, 2003). Within this context, other studies also show that fewer social bonds, greater isolation, and less participation in the job market are characteristics found in patients presenting with suicidal behavior as compared with the rest of the population (Meleiros and Teng, 2004).

In this study, it was observed that the patients had less religious affiliation than the controls. In this regard, it is generally known that individuals who ascribe to any kind of religion are less tolerant of suicidal behavior than those who ascribe to no religion at all (Koenig et al., 2001). This protection might be caused by alleged cognitive dissonance in that religious beliefs are incompatible with ideas of suicide, thus fostering little acceptance of this behavior (Hoelter, 1979). However, other findings have demonstrated that religious involvement is more important than simple religious affiliation, emphasizing the way in which an individual lives out his/her religiosity and spirituality regardless of whether he/she is a follower of a specific religion. This level of religious involvement could vary among people of the same religion or even among those with no specific religious affiliation (Jarvis and Northcott, 1987).

In the present study, it is important to point out that nearly half of the patients had previously attempted suicide; many had made

TABLE 3. Bivariate and Multivariate Logistic Regression

	Bivariate Analysis[a]			Multivariate Analysis					
				Model A[b]			Model B[c]		
Variables	OR	P	IC 95%	OR	*p*	IC 95%	OR	*p*	IC 95%
Organizational religious activities	0.69	0.00	(0.57–0.83)	0.61	0.00	(0.46–0.80)	0.63	0.01	(0.45–0.89)
No organizational religious activities	0.58	0.00	(0.48–0.69)	0.59	0.00	(0.48–0.73)	0.56	0.00	(0.42–0.75)
Intrinsic religiosity	0.60	0.00	(0.53–0.67)	0.56	0.00	(0.48–0.66)	0.59	0.00	(0.49–0.70)

[a]Association between religiosity and suicide attempt.
[b]Adjusted for socio-demographic variables.
[c]Adjusted for Mental Disease, impulsiveness and socio-demographic variables.
OR indicates odds ratio; IC, Intervals Confidence.

several previous attempts. This factor indicates a risk per se, for it is known that a suicide attempt is an important predictor of new attempts and death from a completed suicide (Corrêa and Barreto, 2006; Rich et al., 1986). Unfortunately, the great majority of people who attempt suicide receive only care for their physical condition at the time of the attempt; they are not treated with long-term follow-up, as they should be. This lack of follow-up perpetuates the cycle of attempts and death by suicide in most countries (Rapeli and Botega, 2005). In fact, despite the finding that 83 (75.4%) of the patients in this study had a current mental illness, only 33 (30%) of them were receiving psychiatric or psychological follow-up treatment.

As to the seriousness of these attempts, the results of this research show that a significant number of patients (65; 59.1%) had to be admitted to the emergency room and required specialized medical treatment. In contrast to social perceptions of patients who attempt suicide, these data reflect the moderate to serious intent of the attempts, especially with the use of carbamates, which are highly toxic and used illegally in Brazil as rat poison. Another intriguing result was the closeness of the percentages between men and women, which differs from the literature in which there is a clear predominance of women in suicide attempts, especially attempts involving toxic substance use (Schmidtke et.al., 1996; Stack and Wasserman, 2009). However, similar rates of suicide attempts between men and women have previously been described in a sample of patients diagnosed with depression in South Korea (Park et al., 2010). These results reveal the importance of evaluating in more depth the question of sex differences with regard to suicide attempts.

Beyond sex, another important finding that is consistent with previous reports is that the large majority of patients either had a current mental illness (83; 75.4%) or had had one in the past (9.0%). In fact, according to data in the literature, the prevalence of mental disorders in people who attempt suicide varies from 53% to 90% (Aghanwa, 2004; Bernal et al., 2007; Kumar et al., 2006; Novack et al., 2006), indicating that mental illness exerts a crucial role as a risk factor for suicide attempts and completed suicide.

It is known, however, that mental disease in and of itself does not explain the whole complexity of suicidality. Explanations must also take into account factors such as genetic vulnerability linked to impulsive-aggressive behavior, regardless of whether mental illness is present (McGirr and Turecki, 2007). In this regard, our data confirm this association, demonstrating that individuals who attempt suicide show greater motor and attentional impulsivity and a lack of planning compared with the controls, regardless of whether there is mental illness present. These results show that impulsive-aggressive behavior has a noteworthy role in the mediation between mental illness and suicide, possibly making such behavior one of the causal links of this relation (Chachamovich et al., 2009).

Despite the strong association between mental illness, impulsivity, and suicide attempts, our results show a protective effect of religiosity in suicidal behavior. This result remained significant for all three dimensions of the Duke scale, gaining even more significance in the NORA. These data corroborate other research that found an inverse association between NORA and suicidal ideation or attempts (Nonnemaker et al., 2003). This inverse relation might be explained by the beneficial effect of NORA, which involves the private practice of prayer, meditation, or readings, independent from institutions or specific liturgy. The importance of NORA has been increasing since the second half of the 20th century because of growing disillusionment with western religious institutions (Hill and Pargament, 2003). However, more study is necessary to confirm whether there is, in fact, a predominance of a protective effect from NORA on suicidal behavior relative to the other DRI dominions.

ORA reflects the social aspects of religiosity and has proven to be relevant to health outcomes in that belonging to a religious group can grant support in times of stress and suffering (Moreira-Almeida et al., 2006). However, the protective effect of religiosity does not seem to be caused solely by social contact established among the participants. This was demonstrated in a study where control of the social contact factor did not nullify the protective effect of religion against suicidal behavior, suggesting that there is another more specific and intrinsic factor to the religious experience (Nisbet et al., 2000). The RI domain measures the integration of religiosity into the life of the individual and tries to capture the extent to which the person is committed internally to his/her religion. Positive outcomes in mental health have been reported whether RI is evaluated separately or combined with other aspects of religiosity (Storch and Storch, 2002; Yohannes et al., 2008).

Although it was verified that the three dimensions of religiosity measured by the Duke scale were negatively associated with suicide attempts, the exact explanation of the mechanisms by which religion affects mental health and, more specifically, suicidality continues to be a great challenge for future research (Moreira-Almeida et al., 2006). Some preliminary studies show that individuals with greater religiosity present a set of characteristics that might mediate this protective effect, such as family relationships with greater stability and psychological well-being (Koenig et al., 2001), optimism, hope, and compassion, all of which could be used as tools of coping in times of difficulty (Park, 2007). Moreover, these individuals present fewer self-harming or risk behaviors, are more careful about their health, use drugs less (Mahoney et al., 2005; Park, 2007), believe in life after death (Flannelly et al., 2006), and have a feeling of self-control (Koenig et al., 2001).

Thus, religious practice may lead one to cope with mental illnesses and thus may alter the prognoses and duration of these illnesses. In this way, religious practice may minimize the potential risk of a prolonged and serious mental illness that would cause an individual to attempt suicide (Jarbin and von Knorring, 2004; Koenig, 2007; Mohr et al., 2007; Sanchez and Nappo, 2008).

However, these findings must be interpreted with caution. The research was carried out with a small sample of patients who had attempted suicide through substance use, excluding other types of suicide attempts and thus preventing the generalization of the results. Furthermore, we did not subdivide the control group into relatives and nonrelatives, so we could not adjust the model for possible genetic vulnerability. There was also some loss of patients to follow-up, which may have caused a selected sample in which less severe cases were discharged quickly from the hospital and more serious cases led to death before any evaluation was possible.

CONCLUSIONS

Our data reveal that religiosity exerts a protective effect against suicidal behavior, even with control for variables that are fundamental to the outcome in question. This signals the need for broader research in this field to identify which specific aspects of religiosity mediate this relationship. Such findings could be applied to clinical practice in the future, mainly with populations at risk of suicide.

ACKNOWLEDGMENTS

The authors thank Carlos Teles for the statistical analysis and the Centro de Informação Anti-Veneno da Bahia (CIAVE) team for technical assistance. The authors would also like to thank all patients and volunteers who consented to be included in this study for their cooperation in completing the assessments.

DISCLOSURE

This study was supported, in part, by the Program of Mood and Anxiety Disorders (CETHA).The authors do not have any actual or potential conflict of interest, including any financial, personal, or other relationships with other people or organizations.

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