



## Depressed mood and antisocial behavior problems as correlates for suicide-related behaviors in Mexico

Kimberly B. Roth<sup>a,\*</sup>, Guilherme Borges<sup>b</sup>, Maria-Elena Medina-Mora<sup>c</sup>, Ricardo Orozco<sup>b</sup>, Christiane Ouéda<sup>d</sup>, Holly C. Wilcox<sup>e</sup>

<sup>a</sup> Department of Mental Health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore MD, USA

<sup>b</sup> Dirección de Investigaciones Epidemiológicas y Psicosociales del Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Mexico

<sup>c</sup> Directora General del Instituto Nacional de Psiquiatría Ramón de la Fuente Muñiz, Mexico

<sup>d</sup> Directora de Investigaciones y Estudios sobre Juventud del Instituto Mexicano de la Juventud, Mexico

<sup>e</sup> Department of Psychiatry & Behavioral Sciences, Johns Hopkins University School of Medicine, Baltimore MD, USA

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### ABSTRACT

Suicide rates in Mexico have been rising steadily for several decades. This study examined the relationship of depressed mood and antisocial behavior problems with thoughts of death, suicide plans and attempts. Data from 22,966 individuals who participated in a population-based nationally-representative survey in Mexico were analyzed. After adjusting for covariates, all odds ratios for thoughts of death and suicidal behaviors were statistically significant in relation to antisocial behavior problems and depressed mood, both moderate and severe. Multiplicative effects of depressed mood and antisocial problems were found, with comorbid individuals showing increased risk of thoughts of death and suicidal plans and attempts, compared to individuals displaying none. Possible explanations, particularly for the multiplicative effect of both mood and problem behaviors on suicide-related behaviors, are discussed in the context of prior findings and directions for future research.

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### 1. Introduction

In terms of global mortality and burden of disease, suicide has been identified as the 14th leading cause of death in 2002, and is projected to rise to take the 12th spot by 2030 (Mathers and Loncar, 2006). The World Health Organization (WHO) reported that an estimated one million deaths were due to suicide in 2000, translating to a global suicide rate of 16 deaths per 100,000 persons (World Health Organization, 2008). Self-inflicted injuries are among the top 20 leading causes of Disability Adjusted Life Years (DALYs) globally (World Health Organization, 2001). Hence it is crucial to identify determinants of suicide and implement interventions to reduce suicide rates worldwide.

Mexico is no exception to these changing trends, having seen steady increases in the rate of completed suicide in the last several decades (Borges et al., 2006b), especially among youth. In a study where 28 countries were considered, the rise in Mexico's suicide

rates was one of the most dramatic (Bridge et al., 2006). In this context of increasing suicide mortality, the study of suicide-related behaviors (i.e. thoughts of death, plans and suicide attempts) is especially relevant. Suicide planning and attempts may be immediate precursors to death by suicide and independent risk factors of subsequent suicide attempts and completions. Even episodes that do not result in death can lead to serious, long-term consequences in one's physical health, as well as can be an important cause of psychological suffering on the part of the individual and his or her family.

Prior research in adults and adolescents in Mexico (Borges et al., 2005, 2008b) has suggested that, besides depression, the so-called impulse control disorders may have special importance in the risk of suicide-related behaviors among Mexicans. Cross-national research among a series of developed and developing countries participating in the World Mental Health Surveys (Nock et al., 2008, 2009a) have also pointed to differences in the role of psychiatric disorders and suicide-related behaviors in these two groups of nations. In the analyses conducted by Nock and colleagues, mood disorders were found to be the strongest predictor of suicidal behaviors in high-income countries, whereas in low- and

\* Corresponding author. Tel.: +1 443 287 4956; fax: +1 410 614 7469.  
E-mail address: [kroth@jhsph.edu](mailto:kroth@jhsph.edu) (K.B. Roth).

middle-income countries DSM-IV impulse control disorders, such as conduct and oppositional defiant disorders, were more predictive.

Two limitations are apparent in prior research in this area. First, most studies in samples of the general population are based on lifetime suicidal behaviors, while current or recent suicidal behaviors – of great importance for clinical and prevention purposes – has traditionally been understudied. While lifetime prevalences are an important starting point in understanding suicidal behavior, the fact that suicide risk varies across the lifespan makes the identification of recent behaviors more relevant for prevention (Borges et al., 2006a). Second, even though comorbidity is a main risk factor for suicidal behaviors (Kessler et al., 1999), few studies have looked at specific comorbidities among disorders. These are especially relevant issues as it is estimated that in the United States over 90 percent of those who take their lives to suicide had a diagnosable psychiatric disorder at the time of death, although this may not translate cross-culturally (Conwell et al., 1996; Harris and Barraclough, 1997; Bhatia et al., 1987). Another limitation is that most studies fail to assess or account for two important risk factors for suicidal behaviors: alcohol and drug use disorders and traumatic life events, such as sexual abuse. And while much research has been conducted in developed countries, surprisingly few resources have been invested to assist in a better understanding of the risk and protective factors for suicide in developing nations.

## 2. Objectives

The goal of this study is to explore depressed mood and antisocial behavior problems as correlates for current thoughts of death, plans and suicide attempts. In addition, the impact of their comorbidity will be examined as depressive symptomatology and antisocial behaviors often co-occur, particularly in children and adolescents (Ge et al., 1996; Bird et al., 1993; Ritakallio et al., 2005; Ruchkin et al., 2006; Angold and Costello, 1993). If these internalizing and externalizing behaviors are strong predictors of suicidal behaviors, the implications for prevention include the opportunity to identify and treat individuals at high risk before suicidal behaviors manifest.

## 3. Methods

### 3.1. Sample

The “Encuesta Nacional de Adicciones (ENA) 2008” (Consejo Nacional contra las Adicciones, 2008) [National Addiction Survey] is a random, multistage area probability sample of 50,688 residences across the entire country of Mexico. Information was gathered via interviewer-administered computerized interview in the home of an adult between the ages of 18 and 65 and an adolescent between 12 and 17 years of age. The ENA 2008, conducted in Spanish, is a household survey that is representative on both the national and state levels, in which rural and urban populations are represented. With a response rate of 77%, the final sample size of the ENA 2008 totaled 51,227 interviews. All the individuals interviewed in the ENA 2008 answered twelve main survey sections that included, among others, a battery of socio-demographic questions as well as sections regarding tobacco, alcohol and drug consumption. In addition to completing the twelve main sections, a random subsample of 22,966 individuals answered a series of additional questions, including a section on suicidal behavior (long version). These 22,966 participants are the subject of this study. More details about the methodology of the ENA and suicide-related events in this sample are available elsewhere (Borges et al., 2009).

### 3.2. Measures

#### 3.2.1. Suicide-related behaviors

An entire section of the structured interview evaluated suicide-related behaviors in the past 12 months. This section was based on prior work carried out in nationally-representative adult samples (Borges et al., 2005) and in a representative sample of adolescents in the metropolitan region of Mexico City (Borges et al., 2008b). Thoughts of death were ascertained through three questions: “Have you felt that life is not worth living?”, “Have there been times in which you have wanted to stop existing?” and finally “Have you thought that you are better off dying than living?” From these three questions we created a composite variable of thoughts of death in the past 12 months. Suicide plan was assessed via the question: “In the last 12 months, have you made a plan to end your life?” and suicide attempt: “In the last 12 months, have you tried to end your life?”

#### 3.2.2. Depressive symptomatology

The Center for Epidemiologic Studies–Depression Scale (CES-D; (Radloff, 1977)) was included in the ENA 2008 to assess depressive symptomatology in the past week. The CES-D is considered a valid tool in English-speaking populations. It has also been shown to have high internal consistency and external validity in Spanish-speaking subgroups (Salgado de Snyder and Maldonado, 1994; Gonzalez-Forteza et al., 2008). Total scores were calculated for each individual, and two depression variables were constructed: one with a cutoff of moderately depressed mood as a score greater than or equal to 16, the second with a cutoff of 20 for severely depressed mood. Although a score of 16 is the standard cutoff for considering an individual to have clinically significant depressive symptoms (Radloff, 1977; Radloff and Locke, 1986), a higher score is often used to be more conservative. Higher cutoffs have also been shown to be more valid in studies of Hispanic populations in Mexico and other Latin American countries (Salgado de Snyder and Maldonado, 1994; Benjet et al., 2004; Campo-Arias et al., 2007).

#### 3.2.3. Antisocial behavior problems

The ENA 2008 specifically inquired about five behaviors that are considered to be conduct problems or antisocial behaviors: stealing money or valuable items, attacking someone with a weapon, selling drugs, taking part in fights, or using a knife or gun to obtain an object from another person. A sixth open-ended question allowed participants to report any other activity that could cause problems with the police. These specific activities can be found among the defining criteria for DSM-IV diagnoses such as Conduct Disorder, Antisocial Personality Disorder, or some Impulse Control Disorders (American Psychiatric Association, 2000), although individually they are neither necessary nor sufficient for a clinical diagnosis. All behaviors were assessed in the past 12 months. A binary composite variable was then created for any versus no antisocial behavior problems (ASBP) in the past 12 months. A second ASBP variable was created that added 12-month drug use problems to the previously-mentioned criteria.

#### 3.2.4. Sociodemographic factors

The ENA 2008 includes standard demographic characteristics such as sex, age, marital status, years of education, knowledge of indigenous language, family income, occupation and current employment status. Using a series of household characteristics, an index of living conditions (INCOVI) was constructed from the type of residence, type of floor, availability of clean drinking water and waste disposal methods in the home. In addition to this INCOVI two indexes measuring socioeconomic level were created, each one divided into tertiles: the first was calculated using the education

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