

# SUICIDAL BEHAVIOR IN THE MEXICAN NATIONAL COMORBIDITY SURVEY (M-NCS): LIFETIME AND 12-MONTH PREVALENCE, PSYCHIATRIC FACTORS AND SERVICE UTILIZATION

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## SUMMARY

**Background:** Nationally representative data from Mexico are presented on the lifetime and 12-month prevalence of the onset of suicide ideation, suicide plans and suicide attempt, as well as associated DSM-IV psychiatric disorders and service utilization.

**Methods:** Data are from the Mexican National Comorbidity Survey (M-NCS). This population survey was carried out in 2001-2003 in a sample of 5,782 respondents of 18 years and older. Onset of ideation, a plan, and suicide attempt, as well as psychiatric and service use correlates were estimated using survival analysis.

**Results:** Of the respondents, 8.3% reported lifetime ideation, 3.2% reported a lifetime plan and 2.8% reported lifetime suicide attempt(s). The prevalence for 12-month suicidal behaviors was 2.3%, 1.0% and 0.6%, respectively. Suicidal behaviors were more prevalent in early adolescence and early adulthood and became less common after the mid-thirties, with the exception of suicidal ideation that continues into older ages. Having met criteria for one or more of the DSM-IV disorders assessed in the survey was common among suicide ideators (60.9%), planners (75.6%) and attempters (74.6%), and was a strong risk factor for suicidal behaviors, with odds ratios of 4.8 for ideation, 10.2 for plan and 9.6 for attempt. Approximately one of every four lifetime attempters reported to have ever seen a psychiatrist.

**Conclusions:** As in many other countries, mental disorders have an important impact on suicidal behaviors in Mexico. Intervention efforts aimed at identifying and treating persons at or before the onset of suicidal ideation is strongly recommended.

**Key words:** Suicide, suicide attempt, risk factors, epidemiology, survey, psychiatric disorder.

## RESUMEN

**Antecedentes:** Se documentan datos representativos a nivel nacional en México sobre las prevalencias para inicio de ideación,

plan e intento suicidas, así como trastornos psiquiátricos (de acuerdo con el DSM-IV) y uso de servicios asociados a estos comportamientos suicidas.

**Métodos:** Los datos fueron tomados de la Encuesta Nacional de Epidemiología Psiquiátrica de México (ENEP). La población fue tomada de una muestra de 5,782 entrevistados de 18 o más años de edad, durante el periodo 2001-2003. Se estimaron inicios para ideación, plan e intento suicida, así como factores psiquiátricos y de uso de servicios mediante el análisis de supervivencia.

**Resultados:** De los entrevistados, el comportamiento suicida alguna vez en la vida fue como sigue: el 8.3% reportó haber tenido ideación, el 3.2% reportó haber tenido un plan y el 2.8% reportó haber tenido intento(s) suicida(s). La prevalencia para los comportamientos suicidas los 12 meses previos a la entrevista fue de 2.3%, 1.0% y 0.6%, respectivamente. Dichos comportamientos prevalecieron en la adolescencia y adultez temprana y fueron menos comunes después de los 35 años de edad, con excepción de la ideación suicida que se mantuvo presente en edades más avanzadas. El presentar uno o más trastornos, evaluados en la encuesta de acuerdo con el DSM-IV, fue común entre las personas con ideación (60.9%), plan (75.6%) e intento (74.6%) suicidas y se encontró que este hecho es un factor de riesgo fuerte para el comportamiento suicida, incrementando en 4.8 veces el riesgo para ideación, 10.2 para plan y 9.6 para intento. Aproximadamente una de cada cuatro personas con intento suicida reportó haber consultado alguna vez un psiquiatra.

**Conclusiones:** Como en muchos otros países, en México los trastornos mentales tienen un impacto importante en los comportamientos suicidas. Se recomiendan ampliamente los esfuerzos de intervención enfocados a la identificación y al tratamiento de personas antes o durante el inicio de la ideación suicida.

**Palabras clave:** Suicidio, intento de suicidio, factor de riesgo, encuesta, epidemiología, trastornos psiquiátricos.

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## INTRODUCTION

This report presents nationally representative data from Mexico on the 12-month and lifetime prevalence of suicidal ideation, plans and attempts, cumulative occurrence of onset, psychiatric factors and service utilization for lifetime suicidal behaviors among adults in the Mexican National Comorbidity Survey (M-NCS) (25), that is part of the World Health Organization's (WHO) World Mental Health Surveys Initiative (21,39). Prior to this report, nationally representative data on the prevalence of suicidal behavior (i.e., suicidal ideation, plans and attempts) was not available in Mexico. However, research on adult and student populations in Mexico (reviewed in 27) suggests a lifetime prevalence of suicide ideation in the 6.4-10% range and a lifetime prevalence of suicide attempts in the 1.9-3.9% range. Up to this point, data was unavailable on the ages of onset of suicidality for the Mexican population, but limited research suggests that suicidal behavior may be a common problem among youth in Mexico City (13). Several studies, all conducted in other countries, have documented the impact of mental disorders on the onset of suicidal behaviors (20), and a high prevalence of service use has been reported among completed suicides (24) and among selected clinical samples of suicide attempters (10, 36). Until now, no nationally representative data on suicidal behaviors and associated psychiatric disorders and service use was available despite the recent increase in suicide and corresponding new proposed programs to address the problem (5).

The goal of this report is to present data on the descriptive epidemiology of suicidal behavior in Mexico. Using data from the M-NCS we present estimates of lifetime and 12-month prevalence of suicide ideation, suicide plans and attempts and ages of onset for these behaviors. We examined DSM-IV psychiatric disorders as risk factors for lifetime suicidal behaviors. Finally, we examine the prevalence and timing of service use reported in this nationally representative urban sample in Mexico.

## METHODS

### *Sample*

A general description of the M-NCS has been presented elsewhere (25). The survey was based on a stratified, multistage area probability sample of noninstitutionalized persons aged 18 to 65 years old living in urban areas (population 2,500+) of Mexico. About 75% of the Mexican population is urban and meets the above definition. Data collection took place in two phases

from September 2001 through May 2002. The response rate was 76.6%, within the scope of other surveys from the World Mental Health Surveys Initiative (50.6%-87.7% response rate range) (39), for a total of 5,826 interviews, well above the original targeted sample size of 5,000 interviews. All respondents were administered a part I interview and a selected sub-sample of 2,362 received a Part II interview which included questions on risk factors and supplemental mental disorders. The sample receiving part II consisted of all respondents who screened positive for any disorder on part I plus a probability subsample of other part I respondents. For this paper, we report all data on part II sample (n=2,362). All interviews were conducted at the respondent's home after a careful description of the study goals was provided and informed consent was obtained. No financial incentives were given for respondents' participation.

### *Measures*

The instrument used assessed DSM-IV disorders with Version 3.0 of the WHO Composite International Diagnostic Instrument (CIDI), a fully structured lay-administered diagnostic interview (21, 33). This structured diagnostic interview was interviewer-administered by face-to-face interviews using a laptop computer version (i.e., CAPI), that yielded DSM-IV diagnoses (1). The CIDI used in Mexico was based on the translation of the instrument into Spanish according to WHO recommendations, utilizing material currently in use in Spanish (ICD-10, DSM-IV) and the previous Diagnostic Interview Schedule and the CIDI itself. These instruments showed good performance in validity studies in Mexico (6,7) and in other Spanish speaking countries (reviewed in 40). The fieldwork was conducted by Berumen and Associates, an established survey research firm in Mexico that employed a group of interviewers who had received training in the CIDI.

### *Suicidal behaviors*

The questions about suicide ideation, plans and attempts were included in a section on suicidal behavior in the Part II interview. Separate questions were asked about the lifetime occurrence of suicide ideation ("Have you ever seriously thought about committing suicide?"), suicide plans ("Have you ever made a plan for committing suicide?") and suicide attempts ("Have you ever attempted suicide?"). For each of these outcomes, information was obtained about age at first occurrence and the recency of occurrence. Those respondents that reported a suicidal question within the last 12 months are considered active cases.

### *DSM-IV Psychiatric Disorders*

The psychiatric disorders assessed include the three broad classes of disorder in previous CIDI surveys - anxiety disorders, mood disorders, and substance use disorders- plus a group of disorders that share a common feature of difficulties with impulse control. The anxiety disorders studied include panic disorder (PD), agoraphobia without panic disorder (AG), specific phobia (SP), social phobia (SoP), generalized anxiety disorder (GAD), post-traumatic stress disorder (PTSD), and separation anxiety disorder (SAD). The mood disorders studied include major depressive disorder (MDD), dysthymia (DYS), and bipolar I and II disorders (BPD). The substance use disorders studied include alcohol abuse (AA), drug abuse (DA), alcohol dependence (AD), and drug dependence (DD). The impulse-control disorders studied include three disorders typically manifested during childhood and adolescence: oppositional-defiant disorder (ODD), conduct disorder (CD), and attention deficit/hyperactivity disorder (ADHD). All diagnoses were made with DSM-IV organic exclusion rules. Diagnostic hierarchy rules were used in making all diagnoses other than those involving substance use disorders, where abuse was defined with or without dependence.

### *Treatment sectors*

The CIDI contained a comprehensive section on treatments received for mental disorders. For this paper, information about the receipt of life-time treatment for emotional, alcohol, or drug problems, the type and context of professional visited, as well as the use of self-help or support groups and hotlines, was employed. Respondents could select as many professionals and treatment options as they used in their lifetime.

Mental health care was divided into the following five sectors:

1. Psychiatrist;
2. Other mental health specialty: consisting of psychologists, counselors, psychotherapists, mental health nurses, or social workers in a mental health specialty setting;
3. General medical: consisting of family physicians, general practitioners, other medical doctors such as cardiologists, or gynecologists (for women) and urologists (for men), nurses, occupational therapists or other health care professionals.
4. Human services: outpatient treatment with a social worker or counselor in any setting other than a specialty mental health setting; Visits to a religious or spiritual advisor like a minister, priest, or rabbi.
5. Alternative-Complementary Medicine (CAM):

Internet use, self-help groups, herbalist, chiropractor, spiritualist and other alternative therapy.

We grouped the psychiatrist and mental health specialty under "Any Mental Health Sector", the psychiatrist, mental health specialty, and the general medical under "Any Health Care" and the human services and CAM professionals under "Non Healthcare".

### *Data analysis methods*

The M-NCS data were weighted to adjust for: 1) differences in probabilities of selection of respondents within households; 2) residual differences between the sample and the Mexican urban population on socio-demographic variables (age and sex). An additional weight was used in the part II sample to adjust for the over-sampling of part I cases. These procedures are described in more detail elsewhere (25).

Separate estimates are presented for suicide ideation, plans and attempts. The Kaplan-Meier method (18) was used to generate cumulative occurrence curves based on age-of-onset of each suicidal behavior. Psychiatric risk factors for lifetime suicidal behavior were estimated with discrete time survival analyses adjusting for age, sex and controls for person-year. Details of this form of analyses as applied to suicidal behavior can be consulted elsewhere (20). Standard errors and significance tests were estimated using methods that adjust for the weighting and clustering of the M-NCS data. The standard errors of 12-month and lifetime prevalence and discrete time survival analysis (17) coefficients were estimated using the Taylor series linearization method (41), implemented in the SUDAAN software system (34). Multivariate significance tests were made with Wald  $\chi^2$  tests using Taylor series design-based coefficient variance-covariance matrices. All significance tests were evaluated at the .05 level of significance with two sided tests.

## RESULTS

The sample of the M-NCS was predominantly female, of young ages, with little formal education, mostly married or cohabiting, and currently working (table 1).

Table 2 presents the prevalence of lifetime and 12-month suicidal behavior in the M-NCS. Among the total sample, 8.3% reported a lifetime suicidal ideation, 3.2% a plan and 2.8% an attempt. Much lower 12-month prevalences were reported: 2.3%, 1.0% and 0.6%, respectively. Females tended to report higher lifetime prevalences of suicidal behavior, and a higher 12-month prevalence of ideation (but no plan or attempt).

TABLE 1. Socio-demographic distribution of the sample in the Mexican National Comorbidity Survey (M-NCS) (n=2,362).

	N	%
<b>Sex</b>		
Male	1127	47.7
Female	1235	52.3
<b>Age</b>		
18-29	975	41.3
30-44	816	34.6
45-59	447	18.9
64-65	124	5.2
<b>Education</b>		
None/primary	1616	68.5
Secondary	301	12.8
Some college	159	6.8
University graduated	281	11.9
<b>Marital status</b>		
Married/cohabitating	1590	67.3
Separated/widowed/divorced	167	7.1
Never married	605	25.6
<b>Employment status</b>		
Working	1379	58.4
Student	163	6.9
Homemaker	680	28.8
Retired	34	1.5
Other	106	4.5

Cumulative occurrence of suicide ideation, plan and attempt are presented on figure 1. As apparent from this figure, suicidal behavior is rarely reported prior to 12 years old and the ideation curve is steepest from age 15 to 21. A suicidal plan and a suicidal attempt are reported within the interval from 12-35 years old, and after this period these behaviors are less common. After the age of 40, the plan and attempt curves are more differentiated, which could indicate that although plans are made, they are less likely to be carried out. On the other hand, reports of ideation persist through all the life-course.

A lifetime history of a psychiatric disorder was common among the group of respondents with suicidal behaviors. Among suicide ideators, 60.9% reported any lifetime disorder; among planners this prevalence was 75.6% and among attempters the lifetime prevalence of any psychiatric disorder was 74.6%. Table 3 presents the results of discrete time survival analyses for each individual disorder, any disorder in each of the four disorder groups, any

TABLE 2. Prevalence of Lifetime and 12-month suicide ideation, plan and attempt in the Mexican National Comorbidity Survey (M-NCS) (n=2,362)

	Lifetime						12-Month					
	Ideation		Plan		Attempt		Ideation		Plan		Attempt	
	%	%(se)	%	%(se)	%	%(se)	%	%(se)	%	%(se)	%	%(se)
Male	6.1	0.8	2.4	0.5	2.0	0.4	1.9	0.5	1.0	0.4	0.6	0.4
Female	10.4	0.8	3.9	0.4	3.5	0.5	2.7	0.4	0.9	0.2	0.5	0.1
Total	8.3	0.6	3.2	0.3	2.8	0.3	2.3	0.4	1.0	0.2	0.6	0.2

se: standard error

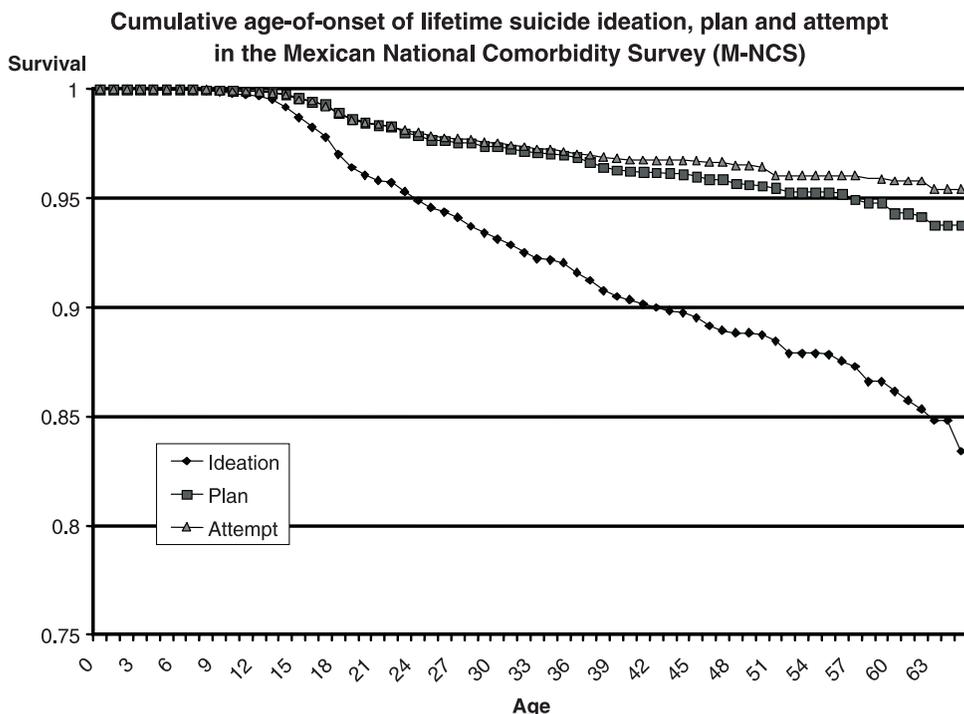


TABLE 3. Psychiatric disorders as predictors of lifetime suicide ideation, plan and attempt, in the Mexican National Comorbidity Survey (M-NCS). (Discrete time survival analyses adjusted by sex, age and person-year)

Effect	Total Sample in Mexico								
	Ideation (unweight n=416)			7Plan (unweight n=188)			Attempt (unweight n=162)		
	Odds ratio	95%	CI	Odds ratio	95%	CI	Odds ratio	95%	CI
<b>Anxiety Disorders</b>									
Agoraphobia without panic	3.69	2.01	6.80	4.48	1.99	10.05	6.47	3.03	13.82
Generalized anxiety disorder	1.52	0.52	4.42	2.62	0.63	10.86	4.45	1.25	15.86
Panic disorder	4.48	2.10	9.54	7.45	2.89	19.23	4.91	2.14	11.27
Post-traumatic stress disorder	8.07	4.05	16.08	9.79	4.48	21.41	9.62	4.76	19.43
Social phobia	4.50	3.10	6.54	5.50	3.34	9.06	5.69	3.55	9.12
Specific phobia	3.33	2.53	4.40	4.32	2.69	6.96	4.93	3.11	7.82
Separation anxiety disorder	2.86	1.56	5.24	4.28	1.98	9.23	5.61	2.83	11.14
Any anxiety	3.92	3.10	4.96	5.71	3.83	8.53	5.63	3.67	8.66
<b>Mood Disorders</b>									
Major depressive disorder	10.15	7.82	13.17	11.97	8.80	16.28	11.61	8.11	16.61
Dysthymia	9.86	5.21	18.64	25.03	11.76	53.28	21.72	10.07	46.82
Bipolar 1-II disorders	9.81	5.16	18.66	13.50	6.32	28.82	11.90	5.68	24.93
Any mood	11.21	8.62	14.56	16.19	11.26	23.26	15.68	10.65	23.08
<b>Impulse Control Disorder</b>									
Attention-deficit/hyperactivity disorder	3.22	1.98	5.22	4.28	2.36	7.78	5.62	3.12	10.12
Conduct disorder	10.79	4.20	27.70	14.89	3.96	56.01	22.07	7.05	69.14
Oppositional-defiant disorder	5.89	3.31	10.50	12.06	6.19	23.51	8.57	4.41	16.63
Any impulse control disorder	5.02	3.31	7.60	9.93	5.34	18.47	9.22	4.86	17.47
<b>Substance Disorder</b>									
Alcohol abuse	6.88	4.31	11.01	17.00	7.92	36.47	19.18	8.84	41.64
Alcohol dependence	4.96	2.51	9.79	13.42	5.92	30.42	12.26	5.00	30.09
Drug abuse	13.54	7.37	24.85	7.36	2.92	18.55	17.21	7.81	37.94
Alcohol dependence	16.79	6.32	44.59	12.04	4.36	33.27	17.59	5.54	55.84
Any substance disorder	7.42	4.70	11.73	16.46	7.96	34.01	19.30	9.24	40.31
<b>Any Disorder</b>									
Any lifetime disorder	4.80	3.75	6.15	10.24	6.68	15.69	9.58	6.23	14.73
One disorder	2.40	1.84	3.13	2.46	1.68	3.62	1.86	1.12	3.08
Two disorders	4.66	3.22	6.76	5.93	3.42	10.27	6.57	3.75	11.49
Three + disorders	10.93	7.61	15.69	19.09	11.4	32.00	23.39	13.85	39.50

disorder overall and the number of psychiatric disorders (exactly one, two, and three or more disorders) as predictors of lifetime ideation, plan and attempt. Several points are worth mentioning. First, any lifetime psychiatric disorder was a strong risk factor for a suicidal ideation, a plan and an attempt, with odds ratios of 4.8, 10.2 and 9.6. The risk associated with the number of lifetime disorders increased from ideation, to plan, to attempt, but in all behaviors increasing comorbidity was associated with increased levels of risk. Three or more disorders were associated with a 23.4 increase in the odds ratio of suicide attempt. The individual disorder mostly associated with suicidality varied across ideation (drug dependence), plan (dysthymia) and attempt (behavior disorder). Anxiety disorders were not as prominent as other disorders in this sample. As a group, all the mood disorders studied have a consistent association with plan and attempt, and substance dependence had also a prominent role in this sample.

Table 4 presents the use of services among respondents with a suicidal behavior and, for comparative purposes, among the total M-NCS sample. It is clear from this table that suicidal behavior is associated with the use of services in this sample.

For instance, among the general sample of respondents only 15.9% ever used any services for the treatment of their emotional problems, the prevalence of service use was 53% among the sample of respondents with a lifetime suicide attempt. This difference is particularly striking for use of specialized sectors, such as a psychiatrist: only 3.4% of the total sample ever consulted a psychiatrist but one in every five attempters did so, and one in every four attempters consulted with other mental health specialists.

An analysis of timing of any service use in relation to suicidal behavior showed that 69% made an attempt prior to any service use, 17% had used any service prior to their attempt and 14% attempted suicide and consulted with any service within the same year.

## DISCUSSION

In this nationally representative urban sample of respondents from Mexico, we found that 8.3% reported a lifetime ideation, 3.2% reported a lifetime plan and 2.8% reported a lifetime suicide attempt. The prevalence for 12-month suicidal behaviors was 2.3%,

Table 4. Lifetime service use among respondents with lifetime suicidality in the Mexican National Comorbidity Survey (M-NCS)

Type of service	Ideation		Plan		Attempt		Total sample	
	%	%(se)	%	%(se)	%	%(se)	%	%(se)
Psychiatrist	13.7	1.2	21.7	3.7	21.4	3.8	3.4	0.3
Other mental health	18.8	2.2	19.7	3.6	26.0	4.2	7.4	0.6
General medical	14.6	1.9	19.5	3.7	18.1	4.0	6.3	0.6
Any human service	1.2	0.6	2.9	1.5	3.4	1.7	0.9	0.2
CAM	9.2	1.9	12.9	4.1	12.5	3.2	1.9	0.3
Any professional	41.3	3.0	50.0	5.4	53.0	5.6	15.9	1.0

se: standard error

1.0% and 0.6%, respectively. Suicidal behavior tended to start early in life (around the beginning of teens agehood) and subsided after the middle thirties, with the exception of suicidal ideation that continues being reported at older ages. About 75% of all cases of suicide attempt qualified for a lifetime psychiatric disorder. Having met criteria for one or more of the DSM-IV disorders assessed in the survey was a strong risk factor for all suicidal behaviors and respondents with more lifetime disorders (three or more) had a very high likelihood of a suicide attempt (OR=23.4). Approximately one of every four lifetime attempters reported to have ever seen a psychiatrist. It is the first time that data are presented on a representative sample of the Mexican population and it is especially timely because suicide is now becoming an important component of the epidemiological profile in the country.

These findings should be evaluated in the context of several study limitations. First, the M-NCS is a household survey that excluded homeless and institutionalized people; both populations are known to have high prevalences of suicidal behavior (10). Second, the diagnostic instrument used in the M-NCS did not include an assessment of all DSM-IV disorders, some of which have been linked to increased risk of suicidal behavior; e.g., schizophrenia or other non-affective psychosis (15, 20). Validity and reliability data were not obtained on the measures of ideation, plans and attempts. Finally, these analyses used data on retrospectively reported ages of onset that are subject to recall errors. In all likelihood, the outcomes studied here have been under-reported.

Despite these limitations, the lifetime prevalence rates presented here are consistent with two prior studies of suicidal behavior in Mexico City that reported lifetime prevalence of attempt of 3.0% and 3.9%, and prevalence of suicidal ideation of 6.5% and 6.7% (27). Our prevalences are lower than those found previously in the US National Comorbidity Survey that reported a prevalence of lifetime ideation of 13.5%, 3.5% prevalence of a plan and 4.6% of attempt (20). They are also lower than the prevalences for a population survey in Australia that reported a lifetime prevalence

of 16.0% for ideation and 3.6% of lifetime attempts, and 3.4% of 12-month prevalence of ideation, but slightly higher than the 0.4% prevalence of attempt in Australia (30). Distributions of ages of onset are infrequently reported in the literature, but our results are basically similar to the figures in Kessler et al. (20) that also found most of the onset of both plans and attempts to be concentrated during the early teens through the middle thirties. A comparison of the Mexican prevalence of lifetime suicide ideation and attempts with a series of countries (38) places Mexico in low levels of suicidality. Further cross-national research that focus on differences of prevalences of suicidal behavior are strongly recommended.

Our finding that as many as 75% of suicidal respondents have a current psychiatric disorder is consistent with other research on completed suicides (3, 8, 16, 35). Many cross sectional (4, 12, 14, 20, 37) and longitudinal studies (2, 11, 19, 23, 28) have documented strong associations between psychiatric problems and suicidal thoughts and behaviors. The NIMH Epidemiologic Catchment Area Program (ECA) showed that a lifetime psychiatric diagnosis was the strongest risk factor for suicide attempts (OR=8.4; 95% CI 5.3-13.5). The ECA study also reported that the risk of making a suicide attempt was independently associated with being an active case of major depression, an active case of alcohol-abuse-dependence, or a user of cocaine (28). Depression is the psychiatric disorder most commonly noted in studies of suicidal behavior; those with a history of major depression have as high as a 10-fold greater odds of attempting suicide (32). Prior research has found that alcohol and drug misuse (2, 19, 22, 32); major depression (2, 4, 11, 23, 28, 32); simple phobia (32); disruptive behavior disorders (2, 14, 37); aggression and antisocial behavior (12, 42) are important correlates and risk factors for suicidal behavior. Comparatively, anxiety disorders were not as prominent as other disorders in this sample. All the mood disorders studied have a consistent association with plan and attempt. Conduct disorder seems to be influential to all outcomes, while drug and alcohol dependence is strongly associated with suicide attempt.

It has been estimated that the average rate of contact with a primary care provider a year prior to a completed suicide is of 77% (24). In a sample of medically treated suicide attempters in Helsinki, 88% had some form of treatment within the 12-month prior to the attempt and 92% within the 12-month after the attempt (36). Seventy percent of attempters in Stockholm and 87% in Bern visited their GPs within the year prior to their attempt (26). In a survey of the general population in Australia, similar to our own survey, it was reported that 64% of ideators and 80% of attempters had any mental health service utilization within the 12-month (30). Our findings show that most attempts in Mexico occurred prior to any consultation with a specialist. Since 41% of those with suicide ideation have consulted with any service provider, efforts to identify and treat persons prior to or at the early stages of suicidal ideation are strongly recommended. Also our data show that a large proportion of attempters are seeking help from general medical and CAM sources. Given the seriousness of suicidal behaviors, it is also recommended that a shift in allocation of care be encouraged among patients to a specialized professional (psychiatrist and/or psychologist).

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#### REFERENCES

1. AMERICAN PSYCHIATRIC ASSOCIATION: *Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV)*. Fourth Edition ed. Washington, 1994.
2. ANDREWS JA, LEWINSOHN PM: Suicidal attempts among older adolescents: prevalence and co-occurrence with psychiatric disorders. *J Am Acad Child Adolesc Psychiatry*, 31(4):655-62, 1992.
3. BEAUTRAIS AL, JOYCE PR, MULDER RT, FERGUSSON DM, DEAVOLL BJ, NIGHTINGALE SK: Prevalence and comorbidity of mental disorders in persons making serious suicide attempts: a case-control study. *Am J Psychiatry*, 153(8):1009-14, 1996.
4. BEAUTRAIS AL, JOYCE PR, MULDER RT: Psychiatric illness in a New Zealand sample of young people making serious suicide attempts. *N Z Med J*, 111(1060):44-8, 1998.
5. BORGES G, MEDINA-MORA ME, ZAMBRANO J, GARRIDO G: Epidemiología de la conducta suicida en México. Capítulo para el Informe Nacional sobre la Violencia y la Salud en México, Secretaría de Salud, 2004.
6. CARAVEO AJ, MARTINEZ N, RIVERA E: Un modelo para estudios epidemiológicos sobre la salud mental y la morbilidad psiquiátrica. *Salud Mental*, 21(1):48-57, 1998.
7. CARAVEO J, GONZALEZ C, RAMOS L: The concurrent validity of the DIS: Experience with psychiatric patients in Mexico city. *Hispanic J Behav Sci*, 13:63-77, 1991.
8. CONWELL Y, DUBERSTEIN PR, COX C, HERRMANN JH, FORBES NT, CAINE ED: Relationships of age and axis I diagnoses in victims of completed suicide: a psychological autopsy study. *Am J Psychiatry*, 153(8):1001-8, 1996.
9. DESAI RA, LIU-MARES W, DAUSEY DJ, ROSENHECK RA: Suicidal ideation and suicide attempts in a sample of homeless people with mental illness. *J Nerv Ment Dis*, 191(6):365-71, 2003.
10. DESAI RA, LIU-MARES W, DAUSEY DJ, ROSENHECK RA: Suicidal ideation and suicide attempts in a sample of homeless people with mental illness. *J Nerv Ment Dis*, 191(6):365-71, 2003.
11. FERGUSSON DM, LYNKEY MT: Childhood circumstances, adolescent adjustment, and suicide attempts in a New Zealand birth cohort. *J Am Acad Child Adolesc Psychiatry*, 34(5):612-22, 1995.
12. GARRISON CZ, MCKEOWN RE, VALOIS RF, VINCENT ML: Aggression, substance use, and suicidal behaviors in high school students. *Am J Public Health*, 83(2):179-84 1993.
13. GONZALEZ-FORTEZA C, VILLATORO J, ALCANTAR I, MEDINA-MORA ME, FLEIZ C, BERMUDEZ P, AMADOR BN: *Salud Mental*, 25(6.):1-12, 2002.
14. GROHOLT B, EKEBERG O, WICHSTROM L, HALDORSEN T: Young suicide attempters: a comparison between a clinical and an epidemiological sample. *J Am Acad Child Adolesc Psychiatry*, 39(7):868-75, 2000.
15. HARKAVY-FRIEDMAN JM, NELSON EA, VENARDE DF, MANN JJ: Suicidal behavior in schizophrenia and schizoaffective disorder: examining the role of depression. *Suicide Life Threat Behav*, 34(1):66-76, 2004.
16. HARRIS EC, BARRACLOUGH B: Suicide as an outcome for mental disorders. A meta-analysis. *Br J Psychiatry*, 170:205-28, 1997.
17. HOSMER DW, LEMESHOW S: *Applied Logistic Regression*. Second edition ed. John Wiley & Sons, New York, 2000.
18. HOSMER DW, LEMESHOW S: *Applied Survival Analysis. Regression Modeling of Time to Event Data*. John Wiley & Sons, New York, 1999.
19. JUON HS, ENSMINGER ME: Childhood, adolescent, and young adult predictors of suicidal behaviors: a prospective study of African Americans. *J Child Psychol Psychiatry*, 38(5):553-63, 1997.
20. KESSLER RC, BORGES G, WALTERS EE. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. *Arch Gen Psychiatry*, 56(7):617-26, 1999.
21. KESSLER RC, USTUN TB: The World Mental Health (WMH) Survey Initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *Int J Methods Psychiatr Res*, 13:93-121, 2004.
22. KING RA, SCHWAB-STONE M, FLISHER AJ, GREENWALD S, KRAMER RA et al.: Psychosocial and risk behavior correlates of youth suicide attempts and suicidal ideation. *J Am Acad Child Adolesc Psychiatry*, 40(7):837-46, 2001.

23. LEWINSOHN PM, ROHDE P, SEELEY J: R Psychosocial characteristics of adolescents with a history of suicide attempt. *J Am Acad Child Adolesc Psychiatry*, 32(1):60-8, 1993.
24. LUOMA JB, MARTIN CE, PEARSON JL: Related Contact with mental health and primary care providers before suicide: a review of the evidence. *Am J Psychiatry*, 159(6):909-16, 2002.
25. MEDINA-MORA ME, BORGES G, LARA C, BENJET C, BLANCO J et al.: Prevalence of mental disorders and use of services: Results from the Mexican Nacional Survey of Psychiatric Epidemiology. *Salud Mental*, 26:1-16, 2003.
26. MICHEL K, RUNESON B, VALACHL, WASSERMAN D: Contacts of suicide attempters with GPs prior to the event: a comparison between Stockholm and Bern. *Acta Psychiatr Scand*, 95(2):94, 1997.
27. MONDRAGON L, BORGES G, GUTIERREZ R: La medición de la conducta suicida en México: estimaciones y procedimientos. *Salud Mental*, 24(6):4-15, 2001.
28. PETRONIS KR, SAMUELS JF, MOSCICKI EK, ANTHONY JC: An epidemiologic investigation of potential risk factors for suicide attempts. *Soc Psychiatry Psychiatr Epidemiol*, 25(4):193-9, 1990.
29. PIRKIS J, BURGESS P, DUNT D: Suicidal ideation and suicide attempts among Australian adults. *Crisis*, 21(1):16-25, 2000.
30. PIRKIS JE, BURGESS PM, MEADOWS GN, DUNT DR.: Suicidal ideation and suicide attempts as predictors of mental health service use. *Med J Aust*, 19:175(10):542-5, 2001.
31. PIRKIS J, BURGESS P, JOLLEY D: Suicide attempts by psychiatric patients in acute inpatient, long-stay inpatient and community care. *Soc Psychiatry Psychiatr Epidemiol*, 34(12):634-44, 1999.
32. REINHERZ H, GIACONIA RM, SILVERMAN AB, FRIEDMAN A et al.: Early psychosocial risks for adolescent suicidal ideation and attempts. *J Am Acad Child Adolesc Psychiatry*, 34(5):599-611, 1995.
33. ROBINS LN, WING J, WITTCHEN H-U et al: The Composite International Diagnostic Interview: an epidemiologic instrument suitable for use in conjunction with different diagnostic systems and in different cultures. *Arch Gen Psychiatry*, 45:1069-1077, 1988.
34. SUDAAN: Professional Software for Survey Data Analysis [computer program]. Version 8.0.1. Research Triangle Park, NC: Research Triangle Institute; 2002.
35. SUOMINEN K, HENRIKSSON M, SUOKAS J, ISOMETSA E, OSTAMO A, LONNQVIST J: Mental disorders and comorbidity in attempted suicide. *Acta Psychiatr Scand*, 94(4):234-40, 1996..
36. SUOMINEN KH, ISOMETSA ET, OSTAMO AI, LONNQVIST JK: Health care contacts before and after attempted suicide. *Social Psychiatry Psychiatric Epidemiology* 37(2): 89-94, 2002.
37. WAGNER BM, COLE RE, SCHWARTZMAN P: Comorbidity of symptoms among junior and senior high school suicide attempters. *Suicide Life Threat Behav*, 26(3):300-7, 1996.
38. WEISSMAN MM, BLAND RC, CANINO GJ, GREENWALD S, HWU HG et al.: Prevalence of suicide ideation and suicide attempts in nine countries. *Psychol Med*, 29(1):9-17, 1999.
39. WHO WORLD MENTAL HEALTH SURVEY CONSORTIUM : DEMYTTENAERE K, BRUFFAERTS R, POSADA-VILLA J, GASQUET I, KOVESS V, LEPINE JP et al.: Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *JAMA*. 291(21):2581-90, 2004.
40. WITTCHEN HU: Reliability and validity studies of the WHO-Composite International Diagnostic Interview (CIDI): a critical review. *J Psychiatr Res*, 28(1):57-84. 1994.
41. WOLTER KM: Introduction to Variance Estimation. Springer-Verlag, New York, 1985.
42. YUEN NY, NAHULU LB, HISHINUMA ES: Miyamoto Cultural identification and attempted suicide in Native Hawaiian adolescents. *J Am Acad Child Adolesc Psychiatry*, 39(3):360-7, 2000.