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ORIGINAL ARTICLE

The growth of suicide ideation, plan and attempt among young adults in the Mexico City metropolitan area

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Aims. Low and middle income countries share a heavy burden of suicide with about three in every four suicides occurring in these countries. Mexico has witnessed a growing trend in suicide deaths; if this trend is not simply a reflection of better reporting of suicide on death certificates, then this increase should logically be accompanied by an increasing trend in suicide ideation, plan and attempts, but we lack information on the trends for suicide ideation, plan and attempt for this period. We therefore aim to report changes for suicidal behaviour for the period 2001–2013 in the Mexico City Metropolitan Area.

Method. Using two cross-sectional surveys conducted in Mexico in 2001 and 2013, we report the lifetime and 12-month prevalence of suicide ideation, plan and attempt and changes in treatment for these problems among respondents aged 19–26 living in the Mexico City Metropolitan Area 12 years apart. To estimate the changes in prevalence for each outcome, we used generalised linear models to calculate prevalence ratios (PR; the prevalence rate in the exposed (year 2013) divided by the prevalence rate in the unexposed (year 2001–2002), adjusting for sociodemographic variables.

Results. While increases in the prevalence are noted everywhere, statistical comparisons only found differences for lifetime ideation (PR = 3.1; 95% CI = 1.7–5.8) and a borderline difference for suicide attempt (PR = 2.2; 95% CI = 1.0–4.9). No attempt within the last 12-months was reported in 2001, but the prevalence in 2013 reached 1.5% (18 cases). While PRs for 12-month prevalence were all above the null, none reached statistically significant differences. During this 12-year period, the distribution of mental disorders and the use of services for mental disorders among suicide ideators, planners and attempters did not change in any noticeable way.

Conclusions. The limitations of our data are the small number of participants in the 2001 survey, the low follow-up rate for the survey in 2013 and that while representative from one city it does not represent the whole country. These findings suggest that suicide ideation and attempt may have increased during this 12-year period in the Mexico City metropolitan area, but this increase did not lead to more use of mental health care services. This information, coupled with the long-term trend of increasing suicide death rates in the country, draw a worrisome and neglected scenario for our youth in this region. Urgent measures, following the recent WHO guidelines for suicide prevention, must not be postponed.

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Introduction

The most recent report on suicide from the World Health Organization (WHO) shows that worldwide suicide is an important cause of death and disability (World Health Organization, 2014). Surprisingly, low and middle income countries (L&MIC), once believed to be less affected by suicide, share a heavy burden of suicide with about three in every four suicides occurring in these countries. To make things even worse, the 2014 Report also noted that in L&MIC resources and services to deal with the problem are scarce and sometimes plainly inexistent. Mexico is no exception in this current state of affairs. Data from the WHO report, based on national registry data, shows that in Mexico the number of suicides between the years 2000 and 2012 increased by 10.6% and the suicide death rate increased by 17.1%, while at the international level the suicide death rate decreased by 26% (World Health Organization, 2014). Also, data from the Institute of Health Metrics and Evaluation (IHME) for Mexico (Lozano *et al.* 2013), shows that between 1990 and 2010 suicide increased 1.25 times and rose from the 21st place to the 11th place in rankings for cause of disability adjusted life

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years (DALYs) (Lozano *et al.* 2013). This increase in suicide in the country has been shown to be a long term trend (Borges *et al.* 2010*b*). On the other hand, treatment for mental health disorders, a key risk factor for suicide, in the country is limited (Borges *et al.* 2006).

Recent trends show that adolescents and young adults are at particularly high risk of suicide deaths and suicide attempts, globally (World Health Organization, 2014) and in Mexico (Borges *et al.* 2010*b*), but the lack of treatment is especially alarming among adolescents suffering from suicidal ideation and attempts (Borges *et al.* 2010*a*). Since in the WHO Mental Health Action Plan 2013–2020, WHO Member States have committed themselves to work towards the global target of reducing the suicide rate 10% by 2020, and thus Mexico needs to better understand the dynamics related to the growth of suicide in the country. One key aspect in this trend is the study of possible changes in suicidal ideation and attempts, a key risk factor for suicide (World Health Organization, 2014). An important question therefore is whether there is an increase in suicidal ideation and attempts parallel to the increase in suicide death rate. Because suicide ideation and attempts are not fully reported by any health agency, data on trends of these two problems ideally need at least two comparable cross-sectional surveys some years apart; this is expensive and rarely available. The few studies, all in other countries, on the existence of increasing recent trends in ideation and attempts are not consistent, nor conclusive (Kessler *et al.* 2005; Baca-Garcia *et al.* 2010, 2011; Kim *et al.* 2010; Fleming *et al.* 2014; Miret *et al.* 2014; Rhodes *et al.* 2014*a*, *b*), and while the prevalence of suicide attempts overall did not differ between 1991 and 2001 in the USA (Baca-Garcia *et al.* 2010), the same authors reported an increase among subgroups, such as Puerto Ricans and Cubans, during this period (Baca-Garcia *et al.* 2010).

Because of the lack of data for trends in suicide ideation and behaviour in L&MIC, we take advantage of two population-based cross-sectional surveys conducted in Mexico in 2001 (Medina-Mora *et al.* 2005) and in 2013 (Benjet *et al.* 2016) to report on the prevalence of suicide ideation, plan and attempt, and changes in treatment for these problems, during the period among a group of respondents aged 19–26 years old living in the Mexico City Metropolitan Area about 12 years apart. The suicide death rate in Mexico City, compared with the other 31 states in the country, ranks in the middle, above the national mean suicide death rate (Borges *et al.* 2015), but this place in the rank has been growing within the last 20 years (González-Forteza *et al.* 2002; Feregrino *et al.* 2003; Hernández *et al.* 2004; Borges & García, 2015). In our study, by focusing on a more limited age group at particularly greater risk for suicidal behaviour from a large but more delimited region, we aim to narrow the impact of other variables that may play a role when studying overall changes in the total population from the whole country.

Material and methods

Datasets

This report uses data of surveys conducted before in Mexico. The first is the Mexican National Comorbidity Survey (Medina-Mora *et al.* 2005, 2007) and the second one is the recent follow-up (Benjet *et al.* 2016) of the original Mexican Adolescent Mental Health Survey (Benjet *et al.* 2009). We briefly describe the methodologies of these surveys below.

Mexican National Comorbidity Survey-The Mexican National Comorbidity Survey (M-NCS) is part of the World Health Organization's World Mental Health Survey Initiative (Demyttenaere *et al.* 2004). The survey was based on a stratified, multistage area probability sample of noninstitutionalised persons aged 18–65 years living in urban areas (population 2500+) of Mexico. About 75% of the Mexican population is urban and meets the above definition. Data collection took place from September 2001 through May 2002. The response rate was 76.6% for a total 5782 respondents. The World Mental Health Survey version of the Composite International Diagnostic Interview (Demyttenaere *et al.* 2004) was installed on laptops and administered by lay interviewers. All interviews were conducted at the respondents' home after a careful description of the study goals was provided and informed consent was obtained. All recruitment and consent procedures were approved by the ethics committee of the National Institute of Psychiatry. The data were obtained from a stratified multistage sample and were subsequently weighted to adjust for differential probabilities of selection and non-response. Post-stratification to the total Mexican population according to the 2000 Census in the target age and sex range was also performed (Medina-Mora *et al.* 2005, 2007). For this report, we were only interested in 223 respondents who were 19–26 years old and lived during 2001–2002 in the Mexico City Metropolitan Area, which comprised the 16 municipalities of Mexico City and 16 municipalities located in the neighbour State of Mexico.

Mexican Adolescent Mental Health Survey- This is a stratified multistage area probability survey, designed to be representative of the 1 834 661 adolescents aged 12–17 who were permanent residents of the Mexico City Metropolitan Area at the time of the survey and who were not institutionalised. Participants were administered the computer-assisted adolescent version

of the World Mental Health Composite International Diagnostic Interview by trained lay interviewers in their homes in 2005. A verbal and written explanation of the study was given to both parents and adolescents. Interviews were administered only to those participants for whom a signed informed consent from a parent and/or legal guardian and the assent of the adolescent were obtained. The final sample included 3005 adolescents, with a 71% response rate. The ethics committee of the National Institute of Psychiatry approved the recruitment, consent and field procedures. The data were subsequently weighted to adjust for differential probabilities of selection and nonresponse. Post-stratification to the total Mexico City Metropolitan Area adolescent population according to the year 2000 Census in the target age and sex range was also performed (Benjet *et al.* 2009). Eight years later, 1071 respondents from the Mexican Adolescent Mental Health Survey in 2005 were followed up in another survey conducted in 2013, when the participants were 19–26 years old. A response rate of 62.0% of located and eligible participants was obtained, though this was only 35.6% of the wave I sample. Because of possible attrition bias in the follow-up, χ^2 tests were performed, which tested differences in socio-demographic and mental health characteristics of those participants that were re-interviewed *v.* those that were not, which found no differences in baseline lifetime DSM-IV disorders for wave I *v.* wave II respondents. The variables that showed bias (i.e., sex, being a student, living with both parents and income) were used to calculate weights using the WTADJUST procedures in SUDAAN software to ensure that wave II participants represented the initial wave I sample (Benjet *et al.* 2016).

Variables

As mentioned above, all surveys used the same WMH-CIDI and are fully comparable. For this report we are interested in comparing the prevalence of three outcomes, suicide ideation, suicide plans and suicide attempts (suicidal behaviour), during the 12-year period. Prior reports of lifetime and 12-month prevalence and risk factors for suicidal behaviours in these surveys have been extensively published before (Borges *et al.* 2007, 2008; Nock *et al.* 2012). Respondents were asked about lifetime experiences of suicidal 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?'). Because self-administered surveys have been shown to yield higher rates of reporting of embarrassing behaviours than interviewer-administered surveys (Turner *et al.* 1998), these experiences were listed in a self-administered booklet and referred to by letter (Events 'A', 'B' and 'C') for respondents who were able to read. Those who reported a lifetime ideation, plan or attempt were then asked about the presence of these outcomes in the last 12-month.

DSM-IV mental disorders

The diagnostic assessment included measurement of DSM-IV mood (major depressive disorder, dysthymia, and bipolar disorder), anxiety (panic disorder, agoraphobia without panic disorder, specific phobia, social phobia, generalised anxiety disorder, posttraumatic stress disorder), impulse-control (oppositional-defiant disorder, conduct disorder, and attention deficit/hyperactivity disorder), eating disorders (bulimia and binge disorder) and substance use (alcohol abuse, drug abuse, alcohol abuse with dependence, and drug abuse with dependence) disorders.

Any mental health service use

Information was obtained about ever receiving treatment for emotional, alcohol, or drug problems, the type and context of professionals visited, as well as the use of self-help or support groups and hotlines and school-based programs among those reporting suicidal behaviour (Borges *et al.* 2010*a*). Near the end of each CIDI diagnostic section, respondents were asked whether they ever in their life 'talked to a medical doctor or other professional' about the disorder under investigation. The interviewer clarified that the term 'other professional' was meant to apply broadly to include 'psychologists, counselors, spiritual advisors, herbalists, acupuncturists, and any other healing professionals.'

Sociodemographic factors previously shown to be related to suicidal behaviour (Nock *et al.* 2008), such as sex, age/cohort, years of education (in four categories: 0–6, 7–9, 10–12 and 13+), occupation (paid job, student, homemaker and other), and marital status (married/cohabiting, separated/divorced/widowed and never married), were used to adjust the prevalences reported for suicidal behaviour across the two time periods.

Analyses

First, we compared the distribution of key demographic variables and the prevalence of the outcomes (suicide ideation, plan and attempt) between the M-NCS (2001–2002) and the Mexican Adolescent Mental Health Survey follow-up (2013). Significance tests for cross-tabulations were conducted using design-based Pearson χ^2 tests. Next, to estimate the changes in

prevalence for each outcome, we estimated model-adjusted prevalence ratios (PRs) based on predicted marginals derived from logistic regression models, using SUDAAN's PROC RLOGIST (Bieler *et al.* 2010; Research Triangle Institute, 2012). Thus, PRs (the prevalence rate in the exposed (year 2013) divided by the prevalence rate in the unexposed (year 2001–2002)), were computed after adjusting for sociodemographic variables. Finally, using cross-tabulations, we report the prevalence of psychiatric disorders and any service use for treatment of mental and substance use disorders, among those with each type of suicidal behaviour. All analyses incorporated weights developed for these surveys, as described above. For our GLM models, we estimated standard errors and 95% confidence intervals (CIs) using the Taylor series linearisation method in SUDAAN version 11.0.1 (Research Triangle Institute, 2013) to adjust for the design effects and weighting (Research Triangle Institute, 2012).

Results

Table 1 presents the demographic distribution of the two samples. While similar in sex, age and occupation distributions, the 2013 sample tends to have more years of education up to 10–12 years, while the 2001 sample have a larger proportion of persons with some college-level education. The 2013 sample was more likely to be separated and to have never married.

The top of Table 2 presents the lifetime prevalence of suicide ideation, plan and attempts with *p*-values and PRs for a comparison between year 2001 (reference) and year 2013. The bottom of this table presents the results for 12-month prevalences and comparisons. As apparent from this table, all outcomes, both lifetime and 12-month, increased during this 12-year period. While increases in the prevalence are noted everywhere, statistical comparisons only found differences for lifetime ideation (a 3 fold increase) and a borderline difference for suicide attempt (a 2 fold increase). While PRs for 12-month prevalence were all above the null, none reached statistically significant differences. While no attempt was reported in 2001, the prevalence in 2013 reached 1.5%. Among the 18 persons that reported in year 2013 a suicide attempt, 28% reported it as a 'Cry for help. Did not intend to die', 33% reported it as a 'Tried to kill his/herself. Knew the method was not foolproof', and the remaining 39% reported it as a 'Serious attempt'. A total of 50% reported using a 'razor, knife or other sharp instrument', and about 33% reported that the attempt lead to a medical consultation.

Table 3 presents the prevalence of groups of disorders and use of mental health services among those with suicide ideation, plan and attempt by year of the survey. For example, among attempters in 2001, 100% had a mental disorder while in 2013 this percentage was 85.8%. While 69.7% of attempters in 2001 used any services, this percentage was virtually the same in 2013, 70.1%. Pair-wise tests of all of these comparisons (21 pairs) did not find any differences in these prevalences. During these 12 years, the distribution of mental disorders and the use of services for mental disorders among suicide ideators, planners and attempters did not change in any noticeable way.

Discussion

In this report we focused on a comparison of the lifetime and 12-month prevalence of suicide ideation, plan and attempt among a sample of youths aged 19–26 in two cross-sectional surveys performed in 2001 and in 2013 living in the Mexico City metropolitan region. We found evidence that lifetime suicide ideation and attempt increased during that period; the increase was also seen in 12-month prevalence of these outcomes though it did not reach statistical significance. About 12 years apart, there were no changes in the prevalence of mental disorders among respondents with suicide ideation, plan or attempt and, most importantly, the use of services for mental disorders among those affected remained the same, despite efforts in the country to increase the availability of services for the treatment of mental disorders (Nock *et al.* 2013). With steady increasing rates of death by suicide in the country, the increases in lifetime rates and the stagnation in the 12-month prevalences reported here raises concerns regarding Mexico's possibility of accomplishing the goal of reducing by 10% the suicide rate in the country by 2020 (World Health Organization, 2013). Urgent and coordinated measures, using the available knowledge of risk factors for suicide behaviours (Nock *et al.* 2008; Fresán *et al.* 2015) are thereby needed.

There is no consensus on which factors may contribute to upward or downward population trends of suicide ideation, plan and attempt as the one reported here. A few precedents in the literature exist for comparison of our trends, both from population surveys and from clinical population studies. With regards to population surveys, (Kessler *et al.* 2005) did not find changes in 12-month prevalence of ideation, plan and attempts from 1990–1992 to 2001–2003 in national US samples of those aged 18–54 years old, but found increasing treatment among ideators who attempted suicide. While another comparison of two US national surveys, for the periods 1991–1992 and 2001–2002, found a general stability in the overall lifetime prevalence of suicide attempt of those 18 years and older (Baca-Garcia *et al.* 2010), subgroup analyses among

Table 1. *Sociodemographic characteristics, by year of interview. Mexican National Comorbidity Survey (2001–2002) and Mexican Adolescent Mental Health Survey follow-up (2013)*

	Year					
	2001–2002 ($n = 223$)		2013 ($n = 1071$)			
	n	% (S.E.)	*n*	% (S.E.)	X^2 (df)	*p*-value
Sex					1.19 (1)	0.275
Male	94	44.3 (4.41)	460	49.7 (1.73)		
Female	129	55.7 (4.41)	611	50.3 (1.73)		
Age category (years)					1.43 (1)	0.232
19–21	85	36.6 (4.05)	462	42.9 (2.26)		
22–26	138	63.4 (4.05)	609	57.1 (2.26)		
Education (years)					25.56 (3)	<0.001
0–6	34	12.3 (2.24)	38	4.0 (0.67)		
7–9	60	26.0 (3.42)	358	35.3 (1.97)		
10–12	68	33.6 (4.59)	448	40.4 (1.76)		
13+	61	28.2 (4.13)	227	20.3 (1.31)		
Marital status					8.80 (2)	0.012
Married/cohabiting	105	41.7 (5.04)	359	33.7 (1.56)		
Separated/divorced/widowed	7	2.3 (1.25)	65	6.6 (1.02)		
Never married	111	56.0 (4.96)	647	59.8 (1.43)		
Occupation					7.37 (3)	0.061
Paid job	112	51.5 (5.05)	591	57.5 (1.72)		
Student	39	19.1 (2.41)	224	19.8 (1.51)		
Homemaker	62	25.2 (4.16)	177	15.2 (1.44)		
Other	10	4.2 (1.47)	79	7.5 (0.98)		

S.E., standard error; df, degrees of freedom.
Unweighted *n*'s, weighted percents, design-based SEs.
The Mexico City Metropolitan Area is composed of all 16 'counties' of Mexico City and 16 'counties' of the State of Mexico.

Table 2. *Prevalence and prevalence ratios of lifetime and past-year suicidal ideation, plan and attempt, by year of interview. Mexican National Comorbidity Survey (2001–2002) and Mexican Adolescent Mental Health Survey follow-up (2013)*

	Year						
	2001–2002 ($n = 223$)		2013 ($n = 1071$)				
	n	% (S.E.)	*n*	% (S.E.)	*p*-value*	PR†	95% CI
(a) Lifetime							
Ideation	16	6.0 (1.71)	165	15.9 (1.80)	<0.001	3.1	(1.7–5.8)
Plan	9	3.5 (1.37)	57	5.4 (0.78)	0.203	1.7	(0.7–3.7)
Attempt	8	3.5 (1.41)	72	6.7 (0.85)	0.056	2.2	(1.0–4.9)
(b) Past-year							
Ideation	7	2.5 (1.32)	48	4.0 (0.64)	0.274	1.7	(0.6–5.0)
Plan	3	1.4 (0.85)	18	1.7 (0.42)	0.755	1.3	(0.4–3.8)
Attempt	0	0 (0)	18	1.5 (0.43)	‡	‡	‡

S.E., standard error; PR, prevalence ratio; CI, confidence interval.
Unweighted *n*'s, weighted percents, design-based SEs and CIs.
*p-values from design-based χ^2 tests with one degree of freedom (2001 *v.* 2013 proportion comparison).
†PR adjusted by sex, age (two categories), education category, marital status and occupation with SUDAAN's PROC LOGISTIC.
‡Could not be computed due to zero cell.

Table 3. *Prevalence of lifetime DSM-IV group diagnosis and service use among lifetime suicidal ideation, plan and attempt, by year of interview. Mexican National Comorbidity Survey (2001–2002) and Mexican Adolescent Mental Health Survey follow-up (2013)*

	Year														
	2001–2002						2013								
	Ideation ($n = 16$)		Plan ($n = 9$)		Attempt ($n = 8$)		Ideation ($n = 165$)		Plan ($n = 57$)		Attempt ($n = 72$)		*p*-value*		
DSM-IV diagnosis group	*n*	% (S.E.)	*n*	% (S.E.)	*n*	% (S.E.)	*n*	% (S.E.)	*n*	% (S.E.)	*n*	% (S.E.)	Ideation	Plan	Attempt
Any anxiety disorder†	10	62.1 (15.12)	6	69.4 (18.66)	5	69.7 (16.15)	118	70.2 (3.50)	38	57.2 (6.92)	48	58.8 (6.31)	0.600	0.608	0.567
Any mood disorder	10	66.8 (10.35)	7	80.9 (13.50)	6	85.0 (6.58)	94	53.9 (4.35)	40	64.2 (6.99)	43	58.1 (6.37)	0.304	0.342	0.133
Any disruptive behaviour disorder†	6	33.3 (12.01)	4	44.5 (15.10)	4	49.8 (17.11)	65	39.3 (4.10)	23	35.5 (9.55)	26	33.5 (5.40)	0.663	0.647	0.418
Any eating disorder†	3	21.6 (10.11)	2	31.6 (15.59)	2	32.0 (14.05)	30	17.2 (4.67)	12	20.4 (6.26)	10	14.7 (5.92)	0.647	0.532	0.298
Any substance use disorder	6	37.9 (18.22)	3	43.0 (24.17)	3	42.5 (23.15)	70	41.8 (4.17)	25	42.9 (8.71)	31	39.8 (5.11)	0.844	0.997	0.914
Any disorder†	14	83.2 (11.92)	8	92.0 (8.01)	8	100 (0)	153	91.8 (2.85)	52	85.7 (6.91)	65	85.8 (5.86)	0.483	0.594	0.093
Any service use†	10	59.9 (14.71)	7	80.1 (13.81)	5	69.7 (16.15)	103	59.4 (6.14)	39	70.0 (7.97)	47	70.1 (5.46)	0.972	0.578	0.981

S.E., standard error.

Unweighted *n*'s, weighted percents, design-based SEs.

*p-values from design-based χ^2 tests with one degree of freedom (2001 *v.* 2013 proportion comparison).

†Statistics for these summary measures were computed among the full part II sample, since some DSM-IV diagnosis was assessed only in that subsample (applies only to year 2001).

Hispanics revealed different trends (Baca-Garcia *et al.* 2011); increased lifetime prevalence rates during the period was found among 18–24-year-old Puerto Rican women and Cuban men, and among 45–64-year-old Puerto Rican men. These studies interpret the general stability of 12-month and lifetime suicide attempt rates as a worrisome finding, since treatment for mental disorders and increasing recognition and treatment of suicidal people in the USA were apparent during this period.

Whether the younger are more likely to be affected, as suggested by (Baca-Garcia *et al.* 2011) is also a matter of discussion. In Spain, (Miret *et al.* 2014) reported a stable 10-year trend in the lifetime and 12-month prevalence of suicide ideation, plan and attempts between a survey conducted in 2001–2002 and another survey conducted in 2011–2012, a period of great economic crisis in their country. On the other hand, a panel study with four measurements in South Korea (Kim *et al.* 2010) in 1995, 1998, 2001 and 2005 reported a decrease in the 12-month prevalence of suicide ideation and suicide attempts for the period, but no statistical tests were performed. A comparison of 12 month prevalence of suicide ideation and suicide attempt in two national school surveys in New Zealand in 2007 and 2012 also found no changes in the prevalence, which was also interpreted as a lack of improvement in the situation (Fleming *et al.* 2014).

With regards to clinical population studies, in Canada, an initial downward trend in suicide-related behaviours in girls and boys (12–17 years) seen in emergency departments (EDs) of Ontario from 2002 to 2010 was followed by a subsequent stability and even an increase trend (Rhodes *et al.* 2014*a*) that the authors attributed to the appearance of regulatory warning labels in some antidepressants and a global economic recession (Rhodes *et al.* 2014*b*). An overall decreasing trend for suicide attempts in EDs in England between 2000 and 2007 nevertheless contrasted with stability for the youth subgroup (Bergen *et al.* 2010), while Ireland saw increasing rates of suicide attempts in EDs among males for the period 2007–2008 (Perry *et al.* 2012). The effect of national or local plans for suicide prevention may alter long term trends of suicide, as well as acute financial crisis and short term negative experiences and natural disasters all of which may play a part in these contradictory findings. The reasons for this diversity of findings, where trends are stable, upwards or downwards, are not clear and are beyond the goals of our research. Cross-cultural studies on this topic seem nevertheless necessary.

We could not find studies in L&MIC in this area. Where available, these studies warn us that suicide ideation and attempts may not respond necessarily and immediately after population changes occur in overall mental health, or even wide economic transformations. Subgroup analyses are also necessary, since not all groups seem to be affected in the same manner. In Mexico increasing trends in youth suicide fatalities (World Health Organization, 2014) if not simply a reflection of better reporting of suicide on death certificates, should logically be accompanied by an increasing trend in youth ideation, plan and attempts. While economic crises have been suggested as one explanation for increasing trends in suicidal behaviour (Coope *et al.* 2014), increases in violence exposure (a known risk factor for suicidal behaviour) as experienced in Mexico during these years may be another possible explanation, though our data do not address this question. Another matter of future inquiry could be the spatial distribution of attempts and whether there has been any change in the distribution of attempts across municipalities coupled with changes in health care facilities. Because of limitations in sample size and power in our sample, this is nevertheless beyond our possibilities.

The main limitations of our data are the small number of participants in the 19–26 year old age range in the 2001 survey, the low follow-up rate for the survey in 2013 and the fact that while representative from one city it does not represent the whole country. The original survey performed in 2001 was a nationally representative survey of urban areas and from this we selected those that were interviewed in this age range and in this region of the country. Even when we used the weights from the original survey to obtain representative prevalence estimates, the standard errors are wide and affected the CI for the PRs. On the other hand, while the response rate was low in our second survey, extensive analyses were performed (Benjet *et al.* 2016) and we found no sign that this attrition rate was associated with differential follow-up of more affected individuals that might have biased our results. The fact that one of our outcomes, suicide plan, did not show signs of increase or decrease during the period, suggests that our final sample is not biased for upwards trends. Overall, the small prevalences reported here prevented us from carrying out any subgroup analyses, a matter of relevance as shown above in our review of previous studies. While our sample is representative of a large metropolitan area in Mexico, it does not include other cities and other age groups that may differ in risk factors and trends, including availability of mental health services, during this period. While these limitations suggest caution in the interpretation of these findings, we know of no other study similar to ours in L&MIC. We believe that this information, together with other studies in this topic reviewed above, could still be used by policy makers in the country to formulate policy programs that, finally, address suicide prevention.

Conclusion

Suicide and suicidal behaviour is becoming a growing health problem and concern in Mexico (Jiménez-Tapia & González-Forteza, 2003; Cota & Borges, 2009; Sánchez-Cervantes *et al.* 2015; Chávez-Hernández & Macías-García, 2016). The evidence presented here suggests that suicide ideation and attempt increased during this 12-year period in the Mexico City metropolitan area, but that this increase did not lead to more use of mental health care services. While limited in precision, there is no evidence that this conclusion is biased. This information, coupled with the long term trend of increasing suicide death rates in the country, draw a worrisome and neglected scenario for our youth in this region. Urgent measures following the recent WHO guidelines for suicide prevention and reduction of the burden of suicide (World Health Organization, 2014) are not be postponed.

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Conflicts of interest

None.

Availability of Data and Materials

Data will not be shared. Part of this data is being used by an international consortium that does not allow for sharing all or part of the data; part of this research was funded by a non-profit, non-public, private organisation that does not allow for sharing all or part of the data.

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