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Traumatic life events and posttraumatic stress disorder among Mexican adolescents: results from a survey

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Abstract

Objective. To estimate the prevalence and the association of Traumatic Life Events (LEs) and Posttraumatic Stress Disorder (PTSD) among the Mexico City Metropolitan Area (MCMA) adolescent population. Material and Methods. Adolescents aged 12 to 17 were administered the adolescent version of the World Mental Health Composite International Diagnostic Interview (n=3,005). Data were collected using a stratified, multistage and probability sample. Prevalence, odds ratios and 95% confidence intervals for LEs and PTSD (assessed with DSM-IV criteria) were obtained. Results. The percentage of adolescents reporting at least one traumatic event in their lifetimes was 68.9%, with differences by sex. Prevalence for PTSD were 1.8% (2.4% females and 1.2% males), and sexual-related traumas were the LEs most associated with PTSD \( \text{OR} = 3.9 (\text{CI}_{95}\% = 1.8-8.2) \), adjusted by sex, education and age. Conclusions. Exposure to traumatic life events is not uncommon among Mexico City adolescents. Effort should be made to reduce child and adolescent sexual abuse, a very traumatic event highly associated with PTSD.

Key words: stress disorders; post-traumatic; adolescent; sexual violence; violence; Mexico

Resumen

Objetivo. Estimar la prevalencia y la asociación entre los Eventos Traumáticos (ET) y Trastorno de Estrés Postraumático (TEPT) en la población adolescente del Área Metropolitana de la Ciudad de México (AMCM). Material y métodos. 3,005 adolescentes del AMCM entre 12 y 17 años fueron entrevistados empleando la versión para adolescentes de la Entrevista Diagnóstica Internacional de Salud Mental, en una muestra probabilística, estratificada y multietápica. Resultados. 68.9% de los adolescentes en el AMCM reportaron por lo menos un ET alguna vez en su vida, con diferencias por sexo. La prevalencia de TEPT fue 1.8% (2.4% mujeres y 1.2% hombres), y el abuso sexual se asoció al desarrollo de TEPT \( \text{OR} = 3.9 (\text{CI}_{95}\% = 1.8-8.2) \), independientemente del sexo, educación o edad. Conclusiones. La exposición a ET es común en los adolescentes. Se debe poner énfasis en los esfuerzos que buscan reducir el abuso sexual en la infancia y la adolescencia, ya que se asocia fuertemente al TEPT.

Palabras clave: trastornos por estrés postraumático; adolescente; violencia sexual; violencia; México
Traumatic Life Events (LEs) – such as violence, accidents, sexual abuse and others – are highly prevalent among the general adult Mexican population, with 68% of the population having ever been exposed to at least one lifetime LE. A similar prevalence has been found in studies in the US. Some LEs, like the unexpected death of a loved one, are equally distributed over the lifespan, while others, like sexual assaults or being beaten up by caregivers, are more likely to occur during childhood or adolescence. In Mexico City, older adolescents reported the greatest number of lifetime stressful life events. Accidents and violence (mainly outside the home) are the most important – and preventable – LEs in adolescence from a public health point of view, since they are the main cause of health care use for this population.

LEs have been identified as a risk factor for mental disorders, the majority of which first manifest during childhood, adolescence and early adulthood. Many studies have found an association between LEs and addiction, drug use and abuse, depression, and suicidal behavior. Several studies have documented the association between childhood sexual abuse and subsequent onset of suicidal behavior as well as with 14 mood, anxiety, and substance use disorders among females and five among males. Violence is the most studied LE and is consistently associated with mental disorders.

Of the mental disorders, Posttraumatic Stress Disorder (PTSD) is of particular interest, since it is causally linked (and, therefore, is a direct consequence) of a traumatic event. PTSD is an anxiety disorder that leads to financial burden upon society and individual disability such as greater academic failure and more interpersonal problems.

To our knowledge, PTSD prevalence has been scarcely documented in the national epidemiologic literature, with a lifetime prevalence of 1.5% and 2.6% according to DSM-IV and ICD-10 criteria for PTSD, respectively, among the general adult population. Another study found that 11.5% of the general population that reported at least one LE met criteria for violence-related PTSD. However, neither adolescent PTSD prevalence nor the prevalence of a comprehensive list of LEs has been reported yet among adolescents in Mexico City. The goal of this paper is to report the prevalence of LE and its impact on PTSD among a representative sample of Mexico City Metropolitan Area (MCMA) adolescents. This would be the first representative study to achieve this goal in the MCMA adolescent population.

**Material and Methods**

This study performs a secondary data analysis from the Mexican Adolescent Mental Health Survey (MAMHS), a multistage, probabilistic and stratified household survey. This survey is part of the World Health Organization’s (WHO) World Mental Health Surveys Initiative, and uses a computer-assisted version of the Composite International Diagnostic Interview (CIDI) in order to assess mental disorders according to the definition and criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV).

Written informed consent was obtained from both the adolescent and one parent (or legal guardian), after the interviewer explained the procedures and goals of the study. All participants were given a mental health resources card with the contact information for different institutions, in case they wanted to seek mental health services. The Human Subjects Committee of the National Institute of Psychiatry approved the recruitment, consent and field procedures.

**Study population**

Adolescents aged 12 to 17 who were permanent, non-institutionalized (not living in government institutions) residents in the Mexico City Metropolitan Area (MCMA) were interviewed face-to-face in their homes by trained, non-clinician interviewers, from March through August, 2005. A total of 3,005 subjects completed the interview, with a response rate of 71%. Mean interview length was 2.5 hours. For each Strata, PSUs were census count areas (AGEBs or groups of them), as defined by the Instituto Nacional de Estadística, Geografía e Informática (INEGI) in 2000. Secondary sampling units were city blocks (or groups) selected with probability proportional to size. All households within these city block units with adolescents aged 12 to 17 were selected. One eligible member was randomly selected from each of these households with the Kish method of random numbers. More details on the methodology have been published elsewhere.

**Assessment of LE**

The CIDI’s PTSD section accounts for 23 different lifetime traumatic events (such as rape, violence, serious injuries, domestic violence, serious sickness, etc.), with questions like: “Were you ever involved in a very serious or life-threatening car accident?” For each LE, age of onset and number of times (or duration) was also asked. Symptoms related to the event and symptoms’ duration was asked of the single LE if the participant reported solely one, or the “most upsetting” event if the participant reported more than one LE. After the presentation of this list of events, the respondent was still able to select an “Other/Private Event” category. The “Other/Private Event” category was composed mainly with “Private Event” responses, which allowed the participant to discuss the symptoms.
related to the event without disclosing any details about the specific trauma. Few “Other event” responses were traumas that did not fit in any of the former 21 categories. Due to sample size and similarity between some traumas, a grouping of traumatic events was made for some of the analyses. For a comprehensive list of LEs and their definitions please refer to the appendix.

**Assessment of PTSD**

Lifetime PTSD was assessed with all six DSM-IV criteria:21 a) the person’s response to a traumatic event involved intense fear, helplessness or horror; b) the traumatic event is persistently re-experienced; c) avoidance of stimuli; d) increased arousal; e) symptom duration of at least one month, and f) clinically significant distress or impairment. When people were exposed to more than a single LE, PTSD was assessed only for what the respondent considered the “most upsetting” event.25 The validity and reliability of the CIDI’s PTSD module is documented elsewhere (kappa=0.7525 and kappa=0.62,26 respectively).

**Data analysis**

Data were weighted to adjust for different probabilities of selection and non-response, based on household size. Post-stratification to the total MCMA adolescent population according to the 2000 census in the target age and sex range was also performed.

In order to take into account the survey’s complex design, SUDAAN’s CROSSTABS and RLOGIST procedures27 were used in order to estimate standard errors (SE) and 95% confidence intervals (CI) for proportions and odds ratios (OR), respectively, as well as independence Wald’s chi-square tests. Gender and total prevalence were calculated for each LE (or grouped LEs). Wald’s Chi-square test was conducted to determine female/male differences. Geographic prevalence for Mexico City and the State of Mexico were also performed, Mexico City was divided, according to the Mexican National Institute of Statistics, Geography and Informatics, into three “state coordinations”.28

Survival curves were estimated using SAS software’s LIFETEST procedure,* in order to calculate conditional survival probabilities in one-year periods.

The prevalence of PTSD for each LE was computed and the association between LEs and PTSD was estimated by unconditional logistic regression; two sets of analyses were performed, the first model (model 1) included each group of LE adjusted by age, gender and education; the second model (model 2), consisted of best fitted models including those variables that changed the crude estimator in more than 10%. Respondents with at least one lifetime LE were included in all logistic regressions, since they are the only ones at risk for developing PTSD (n=2,022), and design effects were taken into account for these logistic regressions.

**Results**

Table I shows the socio-demographic characteristics of the sample. Frequencies are unweighted, while percent-
Tras el recuento mencionado, se encontró que cerca del 19% de los adolescentes no asistían a la escuela en el momento de la entrevista, 1,3% estaban casados o divorciados, 1,7% habían tenido un hijo, y alrededor del 10% habían trabajado alguna vez.

Los eventos de vida traumáticos fueron altamente prevalentes, como se muestra en el cuadro II, con alrededor del 68.9% de los adolescentes habiendo reportado al menos un LE de vida. Los LEs más comunes fueron: el fallecimiento repentinamente de un familiar (25.8%), testigos de violencia doméstica y estar involucrados en un accidente serio (19.4% cada uno). Hubo varios cambios de género, con los hombres más propensos a reportar accidentes, enfermedades y testigos o víctimas de violencia en el hogar, mientras que a las mujeres les fue más comunes reportar traumas sexuales, testigos de violencia doméstica, el fallecimiento de un ser querido así como otros eventos privados. También fue común que varios traumas ocurrieran, con el 28.2% de la población reportando dos o tres eventos, y el 13% reportando cuatro o más, con no diferencias en el número de LEs reportados para mujeres y hombres.

Pocos cambios significativos se encontraron a través de los territorios del MCMA (los datos no se mostraron pero estaban disponibles). “Enfermedad de vida amenazante” y ser “atrapado o amenazado con un arma” fueron menos propensos a ser reportados.

<table>
<thead>
<tr>
<th>Table II</th>
<th>PREVALENCE OF TRAUMATIC LIFE EVENTS AND POSTTRAUMATIC STRESS DISORDER (EVER IN LIFETIME) BY GENDER, IN THE MEXICO CITY METROPOLITAN AREA, 2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
</tr>
<tr>
<td><strong>Type of trauma</strong></td>
<td>n</td>
</tr>
<tr>
<td>1 Raped</td>
<td>9</td>
</tr>
<tr>
<td>2 Sexually assaulted</td>
<td>23</td>
</tr>
<tr>
<td>3 Beaten up as a child by caregiver</td>
<td>167</td>
</tr>
<tr>
<td>4 In region of terror</td>
<td>14</td>
</tr>
<tr>
<td>5 Kidnapped</td>
<td>9</td>
</tr>
<tr>
<td>6 Toxic exposure/automobile/life threatening accident</td>
<td>327</td>
</tr>
<tr>
<td>7 Disaster</td>
<td>48</td>
</tr>
<tr>
<td>8 Life threatening illness</td>
<td>112</td>
</tr>
<tr>
<td>9 Beaten up by spouse, romantic partner or someone else</td>
<td>105</td>
</tr>
<tr>
<td>10 Mugged or threatened with a weapon</td>
<td>297</td>
</tr>
<tr>
<td>11 Stalked</td>
<td>64</td>
</tr>
<tr>
<td>12 Unexpected death of a loved one</td>
<td>322</td>
</tr>
<tr>
<td>13 Traumatic event of a loved one</td>
<td>88</td>
</tr>
<tr>
<td>14 Witnessed physical fights at home</td>
<td>234</td>
</tr>
<tr>
<td>15 Witnessed death or dead body or saw someone else seriously hurt</td>
<td>271</td>
</tr>
<tr>
<td>16 Accidentally caused serious injury or death</td>
<td>37</td>
</tr>
<tr>
<td>17 Purposely injured, tortured or killed someone</td>
<td>12</td>
</tr>
<tr>
<td>18 Other/private event</td>
<td>69</td>
</tr>
<tr>
<td><strong>Frequency of trauma</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>485</td>
</tr>
<tr>
<td>Only one</td>
<td>378</td>
</tr>
<tr>
<td>Two or three</td>
<td>398</td>
</tr>
<tr>
<td>Four or more</td>
<td>179</td>
</tr>
</tbody>
</table>

| Any trauma | 955 | 68.7 (0.96) | 1067 | 69.1 (1.10) | 2022 | 68.9 (0.77) | 0.747 |

| Posttraumatic stress disorder | 15 | 1.2 (0.39) | 33 | 2.4 (0.50) | 48 | 1.8 (0.36) | 0.031 |

* Wald's Chi-square. Male/Female contrast.
† Wald's Chi-square, 3 df.
southwest side of Mexico City, and “witnessed death or dead body or saw someone else seriously hurt” were more likely to be reported in the State of Mexico, as well as reports for any trauma.

Survival curves for age of onset of grouped LEs are shown in figure 1. Some LEs appear repeatedly over time, such as accidents, illnesses, death or traumatic event to a loved one, as well as domestic violence (against child or spouses). Some other LEs dramatically appear in early adolescence, such as being a witness or being involved in violence (as a victim or perpetrator).

Interestingly, the “sexual abuse” age of onset and the “Other/Private event” follow a similar survival curve.

Prevalence for PTSD in the MCMA was 1.8% (SE=0.36), and was two times more prevalent in females (2.4%[0.50]) than in males (1.2%[0.39]). As shown in table IV, adolescents reporting (a lifetime) sexual abuse (rape or sexual assault) presented the highest PTSD prevalence (9.7%) and an odds ratio of 3.9 (CI=1.81-8.23). “Other/Private event” was also highly associated with PTSD, with an OR=3.3 (1.94-5.73). As evident from this table, increased prevalence of PTSD was found among those who suffered multiple LEs. ORs were also calculated among the subsample of those reporting at least one event. Compared to those with only one event, those with 2 to 3 events and those with 4 or more events had 3.3 (1.63-6.48) and 6.1 (3.08-12.14) increased odds of PTSD, respectively (p<0.01 trend test).

Given the large amount of multiple events in this sample, we performed a test of whether sexual abuse and “Other/Private event” were associated with PTSD independently of any other event. When controlling for other LEs that changed the OR by 10% (model 2) and adding these LEs to the model, none of the other LEs reached statistical significance except for sexual abuse (OR=3.5, CI=1.54-7.80) and “Other/Private event” (OR=3.0, CI=1.73-5.14).

Discussion

Exposure to traumatic life events is not uncommon among Mexico City adolescents, with 69% having experienced at least one LE and as many as 13% having experienced four or more LEs. The most common LE was the unexpected death of a loved one, followed by...
witnessing domestic violence and being involved in a serious accident. The lifetime prevalence of LEs in this sample of MCMA adolescents is strikingly consistent with the national adult estimate. However, given that adolescents have lived shorter lives, one might expect a lower prevalence of LEs. Three possible reasons might account for this similar instead of lower estimate. First, the prevalence of LEs is likely to be higher in a large metropolitan area than for the overall national population; second, adults might fail to report or remember all of their early traumatic life events and third, this cohort of adolescents may be more exposed to LEs than earlier generations. Additionally the similar prevalence between adults and adolescents may not be that surprising given that many LEs such as physical abuse by caregivers and sexual abuse are concentrated in the childhood and adolescent years.

In this study, it was found that the gender distribution of LEs is consistent with findings from previous research with adults in Mexico\(^1\) and internationally.\(^{29,30}\) For example, females are more likely to report sexual abuse, and males more diverse forms of violence, especially outside the home. Traditional gender roles may help explain these differences such that males spend more time outside the home and in more risk-taking activities, whereas females spend more time inside the home and are more vulnerable to sexual aggression.

While the majority of adolescents have suffered a LE, fortunately most do not further develop PTSD. The percentage of the Mexico City adolescents who reported PTSD was 1.8%, similar to the prevalence estimate for Mexican adults and less than half the prevalence estimate for U.S. adolescents (6.3% and 3.7% for US adolescent females and males, respectively).\(^{13}\) A key question in PTSD research is to determine what factors contribute to whether or not a person exposed to a LE develops PTSD. We examined two such factors: type of LE and number of LEs.

Consistent with the international literature, rape and sexual assault is the traumatic event most likely to result in PTSD.\(^{25}\) Moreover, this association may be even stronger, since the "Other/Private event" category seems to be highly related to the former, as can be appreciated in figure 1, where both survival curves are...
practically the same, as are the adjusted ORs in table III. It is plausible that due to feelings of shame, adolescents did not want to talk about sexual assaults and expressed them as “private events” instead.

One might posit that the twofold female-to-male ratio in PTSD which has been consistently reported in epidemiological studies in Mexico and internationally, as well as in our current study, is due to a greater exposure for females to traumas that are likely to develop into PTSD, that is, sexual trauma. However, some studies have addressed this point and found that the twofold risk of PTSD remains even after the sex distribution for type of trauma is held constant and thus cannot be explained by greater exposure to sexual assault. Rather, Breslau and her colleagues have found that women have a greater risk of developing PTSD than males after experiencing assaultive violence only and hypothesize that assaultive violence may affect women more because aggressors are more likely to be male and thus more physically threatening and potentially injurious to females. The cumulative number of events is also related to the probability of developing PTSD such that a history of several traumas weighs more than a single trauma in the development of PTSD. Those having experienced two or three LEs have more than three times the probability and those having experienced four or more LEs more than six times the probability of PTSD.

Considering this sample was composed only of non-institutionalized adolescents and permanent MCMA residents, it is very likely that the prevalence of LEs—as well as of PTSD—is underestimated, since those who have no permanent residence or live in government institutions (such as correctional institutions or orphanages) may have higher early and/or actual rates of exposure to violent life events. Another source of under-estimation may be due to participants’ unwillingness to disclose information, particularly for emotionally charged or embarrassing events. The inclusion of a “private event”, for which the participants could discuss related symptoms without revealing the content of the event, was implemented to reduce this type of response bias. Since people with PTSD could recall their LE in a different way than people without PTSD, there is a chance of recall bias in this study. However, the structured nature of the CIDI interview, as well as the short time lived by adolescents, could limit this type of bias.

Due to the frequency of traumatic life events in adolescence, their potential to develop into PTSD and the disabling nature of PTSD trauma should be considered a main public health concern. Despite that PTSD has been insufficiently studied. Research suggests that those who experience trauma and suffer from PTSD are not being adequately detected by health services. Increased research in this area is needed in order to improve detection and timely mental health attention.

Acknowledgments

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Appendix

TRAUMATIC EVENTS QUESTIONS OF THE WORLD MENTAL HEALTH ADOLESCENT VERSION
OF THE COMPOSITE INTERNATIONAL DIAGNOSTIC INTERVIEW (WMH-CIDI-A)*

Sexual abuse
Raped
1 The next two questions are about sexual assault. The first is about rape. We define this as someone either having sexual intercourse
with you or penetrating your body with a finger or object when you did not want them to, either by threatening you, by using force or
when you were so small that you didn’t know what was happening. Did this ever happen to you?

Sexually assaulted
2 Other than rape, were you ever sexually assaulted, where someone touched you inappropriately, or when you did not want them to?

Domestic violence
Beaten up by caregiver
3 Were you ever badly beaten up by your parents or the people raising you?
Witnessed physical fights at home
4 Did you ever witness serious physical fights at home, like your father beating up your mother?

Disaster natural or man-made
In region of terror
5 Were you ever in a place where there was a war, revolution, military coup, or where there was ongoing terror of civilians for political,
ethnic, religious or other reasons?

Disaster natural or man-made
6 Were you ever involved in a major natural disaster, like a devastating flood, hurricane, or earthquake?

Disaster
6 Were you ever involved in a major natural disaster, like a devastating flood, hurricane, or earthquake?

Accident or illness
Toxic exposure/ Automobile/ Life threatening accident
7 Were you ever exposed to a poisonous chemical or substance that could cause you serious harm?
8 Were you ever involved in a serious or life-threatening car accident?
9 Were you in any other serious or life- threatening accident?

Life threatening illness
10 Did you ever have a life-threatening illness?

Violence
Beaten up by romantic partner or someone else
11 Were you ever badly beaten up by someone you were dating or with whom you were romantically involved?
12 Were you ever badly beaten up by anyone else?
Mugged or threatened with a weapon
13 Were you ever mugged, held up, or threatened with a weapon?

Stalked
14 Has someone ever stalked you – that is, followed you or kept track of your activities in a way that made you feel you were in serious
danger?

Kidnapped
15 Were you ever kidnapped or held captive?

Death or trauma of a loved one
Unexpected death of a loved one
16 Did someone very close to you ever die unexpectedly; for example, they were killed in an accident, murdered, committed suicide, or
had a fatal heart attack at a young age?

Traumatic event of a loved one
17 Did anyone very close to you ever have a very stressful or life-threatening experience, like being kidnapped, tortured or raped?

Death or trauma of someone else
Witnessed death or dead body or saw someone else seriously hurt
18 Did you ever see someone being badly injured or killed, or unexpectedly see a dead body?

Accidentally caused serious injury or death
19 Did you ever do something that accidentally led to the serious injury or death of another person?

Purposefully injured, tortured or killed someone
20 Did you ever on purpose either seriously injure, torture, or kill another person?

Other/ Private event
21 Were you ever a refugee – that is, did you ever flee from your home to a foreign country or place to escape danger or persecution?
22 Did you ever experience any other extremely upsetting or life-threatening event that I haven’t asked about yet?
23 Sometimes people have experiences they don’t want to talk about in interviews. I won’t ask you to describe anything like this, but,
without telling me what it was, did you ever have an extremely upsetting or life-threatening event that you didn’t tell me about because
you didn’t want to talk about it?

*Traumatic events are not shown in the order presented to participants

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