Risk factors associated with maltreatment syndrome in Mexican children seen at the Emergency Department

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ABSTRACT

Introduction. Child maltreatment is a common cause of hospitalization in developing countries. Children who suffer some type of physical or psychological abuse may develop social adaptation problems. This study analyzed the risk factors associated with child maltreatment syndrome in children admitted to the Emergency Department.

Population and methods. This was a case-control study of children who suffered maltreatment and controls at a 1:1 ratio conducted between January 2015 and December 2016. The most relevant risk factors were analyzed; a *p* value ≤ 0.05 was considered statistically significant.

Results. In total, 148 children who suffered maltreatment and 148 controls were included. Fetal abuse was the most common problem, followed by neglect. In most cases, the abuser was a relative or acquaintance of the child. Being a teenage mother (adjusted odds ratio [aOR]: 3.19; 95 % confidence interval [CI]: 1.49-6.80), a low level of education (aOR: 4.70; 95 % CI: 2.33-9.45), a low income (aOR: 2.02; 95 % CI: 1.16-3.5), illegal drug use (aOR: 15.32; 95 % CI: 6.22-37.7), a child with disability (aOR: 8.58; 95 % CI: 2.76-26.6), and age younger than 2 years (aOR: 2.08; 95% CI: 1.20-3.63) were the highest risk factors for child maltreatment.

Conclusion. Teenage mothers with a low socioeconomic level have the higher risk for abuse from a caregiver. Disability is a risk factor that doubles in the multivariate analysis when associated with teenage mothers.

Key words: child maltreatment, risk factors, children.

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INTRODUCTION

Child maltreatment (CM) is defined as any form of physical or emotional ill-treatment, sexual abuse, negligence or neglect that results in physical or psychological harm and undermines children's dignity and development.[1] CM is followed by a behavior of social isolation, which is then associated with mental health problems, including suicidal ideation or attempt,[2,3] poor academic performance, being a victim of dating or domestic violence,[1] crime,[4-6] alcoholism,[7,8] and illegal drug use.[3,5,9]

One of the main consequences in children who have suffered some type of abuse is that they become parents who maltreat their own children,[2] not only hitting or depriving them of their basic needs, but also continuing the contact with illegal drugs, such as marihuana, cocaine, and amphetamines, which is a global social problem.

Multiple studies have looked for the risk factors associated with CM. One of the most relevant risk factors are caregivers' characteristics, because they usually become the main abuser or fail to look after the children, exposing them to risks. Being a teenage mother is one of the risk factors among caregivers. It has been observed that, since pregnancy, mothers younger than 18 years tend to miss their medical appointments and fail to receive infection prophylaxis during pregnancy, exposing their unborn children to risks even before conception.[10]

The presence of domestic violence in the family not only favors violence

against children but also turns violent actions into a standard behavior.[2] Economic poverty has been studied as a risk factor for maltreatment due to parental frustration towards their children because of their economic situation; however, this has not been clearly established.[11]

Some studies have described drug use in one or both parents as one of the main risk factors for CM, not only because of the social situation of addicts, such as poverty or child neglect, but also as a trigger for drug use at an early age among their children.[2]

Drug production and dependence is a serious problem in Mexico. There is no reliable information about drug distribution and use in the population, and there are scarce data about the prevalence of children who are victims of maltreatment.

The emergency department is the first line of contact where children who suffer CM may be detected and where associated risk and prevention factors may be defined to establish legal and preventive measures aimed at child well-being. The main objective of this study was to analyze and determine the factors associated with child maltreatment syndrome (CMS) in children.

POPULATION AND METHODS
Study design and population

This was a prospective, case-control study that included children aged 0-15 years admitted to the Pediatric Emergency Department of Hospital Civil de Guadalajara "Dr. Juan I. Menchaca" in Guadalajara, Jalisco (Mexico) due to CMS in the period between January 2015 and December 2016. This is a tertiary care hospital that caters for the rural and urban populations in the west of Mexico. The Emergency Department includes two triage rooms for patient assessment and 31 beds to keep them under observation.

The staff includes 12 pediatricians and 24 nurses that see the patients who attended the department. There is also a Multidisciplinary Task Force for the Care of Maltreated Children (Grupo Multidisciplinario para la Atención de Niños Víctimas de malostratos, GMANM) made up of a psychologist, a pediatric toxicologist, a pediatric radiologist, a gynecologist, two social workers, and a legal department. The GMANM assessed all patients admitted to the Emergency Department to make a diagnosis and then provide psychological, social, and legal support to children with CMS.

CMS was defined as any form of physical or emotional ill-treatment, sexual abuse, negligence or neglect in a child that resulted in a damage to the child's health, development or dignity, as per the International Classification of Diseases 9 and 10 (ICD-9 and ICD-10).[1] CMS also included fetal abuse, defined as the absence of antenatal care, physical abuse or drug use during pregnancy.[10] Psychological abuse referred to harming a child's dignity and self-esteem until driving them to suicidal ideation or attempt.

Controls were children younger than 15 years without a history of maltreatment, admitted to the Emergency Department for other reasons, in the same period as study cases. Controls without CMS were assessed by the GMANM to determine that they had not suffered any type of physical or psychological abuse. All children with clinical and radiological data suspicious of CM assessed by the GMANM in whom CMS diagnosis was confirmed were included in the study. Children with suspected CM for whom the GMANM assessment ruled out CMS diagnosis were excluded. The cases whose records did not include a complete assessment by the GMANM were removed. Children with CMS were compared successively to those without a history of CM at a 1:1 ratio.

Demographic data and risk factors

The medical records of children included in this study were independently reviewed by two pediatricians; data were collected using a standardized questionnaire. The following demographic data were analyzed: age, sex, date of birth, gestational age, current weight and birth weight, prior hospitalizations, and medical history. Parents were interviewed to look for potential known risk factors for CMS, including the following: parental age and level of education, weekly household income in Mexican pesos, marital status of the mother, history of child abuse, criminal record, illegal drug use in both parents, current or past caregiver for a disabled person, or attending the School for Parents program, which is sponsored by the Department of Public Education. The program was targeted at the legal guardians of children who attended primary school and included workshops on civic education and social values for a better academic performance of children; parental participation was voluntary.

Statistical analysis

Outcome measures related to the type of

maltreatment and demographic data were described as frequency and proportions. A χ² test and odds ratio (OR) were used for the bivariate analysis; for risk factors, a 95 % confidence interval (CI) was established. It was described as crude OR. A *p* value < 0.05 was considered statistically significant. A logistic regression analysis was done to assess the deviation accounting for the different outcome measures of interest; the backward model was used. It was described as adjusted OR (aOR). A *p* value of < 0.05 was considered significant. ORs were adjusted for the following outcome measures: being a teenage mother, illegal drug use, and primary education for both parents. The IBM SPSS Statistics software, version 21.0.0, was used.

Ethical considerations

An informed consent was obtained from the parents of all children at the time of the clinical examination as part of the hospital routine care and a separate consent was obtained for data inclusion in the study. Additionally, children older than 5 years signed an assent letter in accordance with the General Law on Health Regulation in Terms of Health Research of the United Mexican States. The local Research Council and the Ethics Committee of Hospital Civil de Guadalajara "Dr. Juan I. Menchaca" approved the study protocol as per the most recent version of the Declaration of Helsinki, 2013.

RESULTS
Types of maltreatment

During the study period, 148 children with CMS were seen at the Emergency Department. Of them, 25 % were cases of fetal abuse, followed by child neglect by the parents, who left the child with a relative, like their grandmother, or friends, mostly neighbors *(Table 1)*.

Risk factors associated with children with child maltreatment syndrome

Table 2 describes the sociodemographic characteristics of the study group. Parents' age was divided into three age groups. The level of education was classified as per the type of population seen at the hospital into primary school (complete or incomplete), junior high school, and high school. In our population, no one had obtained a bachelor's degree or postgraduate degree. A risk association was observed with being a teenage mother (age ≤ 19 years), primary education in both parents, and a

weekly income of less than 1500 Mexican pesos, which corresponded to less than 75 dollars. On the contrary, a small association was established with high school education in both parents and a weekly income between 1501 and 2500 Mexican pesos, and once the OR was adjusted for illegal drug use, such protection was lost.

In relation to parents' history, it was observed that being a caregiver for a disabled person before having children, especially a family member (more often, a sibling), and attending the School for Parents program were risk factors with a small association with CM. Once readjusted for being a teenage parent and having completed primary education, outcome measures still showed a small association. On the contrary, illegal drug use was a risk factor for CMS and, once readjusted for the outcome measures mentioned before, the risk remained *(Table 3)*.

Table 4 shows the characteristics of children as risk factors associated with CMS. It was observed that having a central nervous system (CNS) disability, like pediatric cerebral palsy, hydrocephalus or Down syndrome, were risk factors for CMS and the risk doubled in the case of teenage mothers and illegal drug use.

TABLE 1. *Cases of child maltreatment in this study (N: 148)*

Type of maltreatment reported	%	n
Fetal abuse[a]	25	37
Negligence or neglect by the parents	23.8	35
Physical abuse	18.2	27
Abuser		
Father	29.6	8
Mother	29.6	8
Stepparent	37	10
Other relative[b]	3.8	1
Sexual abuse	17.5	26
Abuser		
Grandfather	38.5	10
Stepfather	15.3	4
Other relative[b]	34.6	9
Other non-related person[c]	11.6	3
Psychological abuse by the parents	15.5	23
Total	**100**	**148**

[a] Fetal abuse is the absence of antenatal care and drug use during pregnancy.
[b] Cousins or uncles. [c]Neighbors.

TABLE 2. *Socioeconomic characteristics of the parents of the 296 study children*

Characteristics	Case/control n = 148/148	Crude OR (95 % CI)	Adjusted[a] OR (95 % CI)	p[b]
Maternal age				
Teenage mother (≤ 19 years old)	30/11	3.17 (1.45-7.05)	3.19 (1.49-6.80)	0.003[c]
20-35 years old	83/113	0.40 (0.23-0.64)	1.96 (1.05-3.64)	0.03[c]
≥ 36 years old	35/24	1.46 (0.91-2.33)	1.90 (0.77-4.64)	0.15
Maternal education level				
Primary school (complete or incomplete)	68/31	3.12 (1.87-5.53)	4.70 (2.33-9.45)	0.0001[c]
Junior high school	59/69	0.78 (0.47-1.24)	1.19 (0.74-1.94)	0.46
High school	21/48	0.34 (0.19-0.64)	2.88 (1.57-5.30)	0.001[c]
Paternal age				
Teenage father (≤ 19 years old)	9/3	3.13 (0.76-14.9)	2.86 (0.72-11.28)	0.13
20-35 years old	89/100	0.74 (0.45-1.23)	1.21 (0.73-1.98)	0.44
≥ 36 years old	50/45	1.13 (0.67-1.90)	0.99 (0.59-1.66)	0.97
Paternal education level				
Primary school (complete or incomplete)	66/34	2.70 (1.59-4.60)	2.44 (1.45-4.11)	0.001[c]
Junior high school	58/63	0.87 (0.53-1.42)	0.99 (0.61-1.6)	0.99
High school	24/51	0.37 (0.20-0.66)	2.91 (1.62-5.24)	0.0001[c]
Weekly household income (Mexican pesos)				
≤ $1500	139/92	3.08 (1.78-5.34)	2.02 (1.16-3.5)	0.01[c]
$1501-2500	9/41	0.17 (0.07-0.38)	9.93 (3.93-25.89)	0.0001[c]
≥ $2500	0/15	0.06 (0.00-0.41)	11.17 (1.45-8.81)	0.02[c]

OR: odds ratio; CI: confidence interval.
[a] ORs were adjusted for parental use of illegal drugs.
[b] χ^2 test for adjusted OR, $p < 0.05$.
[c] Fisher's exact test for adjusted OR, $p < 0.05$.

TABLE 3. *History of the parents of the 296 study children*

Characteristic	Case/control n = 148/148	Crude OR (95% CI)	Adjusted[a] OR (95% CI)	p[b]
Maternal history				
Single mother	6/4	1.52 (0.42-5.50)	0.62 (0.17-2.28)	0.47
Married	115/124	0.33 (0.17-0.63)	0.73 (0.39-1.35)	0.31
Past caregiver for a disabled person	10/39	0.20 (0.90-0.42)	0.25 (0.12-0.55)	0.0001[c]
Criminal record[d]	49/21	2.99 (1.63-5.57)	2.89 (1.58-5.27)	0.001[c]
Illegal drug use	81/8	15.6 (6.19-42.22)	15.32 (6.22-37.7)	0.0001[c]
Marihuana	33/3	28.3 (4.01-571)	9.70 (3.28-28.71)	0.0001[c]
Amphetamines	23/3	8.89 (2.46-38.14)	8.53 (2.44-29.78)	0.001[c]
Inhaled drugs (poppers)	10/1	10.43 (1.35-220)	9.75 (1.20-79.21)	0.03[c]
Cocaine	15/1	16.58 (2.26-341)	17.39 (2.22-136)	0.007[c]
History of child abuse	18/28	0.59 (0.31-1.1)	1.40 (0.72-2.75)	0.31
Attending the School for Parents	43/100	0.20 (0.12-0.33)	0.20 (0.12-0.34)	0.0001[c]
Paternal history				
Criminal record[d]	35/14	2.96 (1.45-6.12)	2.96 (1.51-5.78)	0.001[c]
Illegal drug use	135/45	7.55 (4.37-13.08)	6.90 (4.08-11.67)	0.0001[c]
Marihuana	48/14	4.59 (2.30-9.28)	4.16 (2.14-8.07)	0.0001[c]
Amphetamines	55/20	3.78 (2.05-7.03)	3.40 (1.88-6.15)	0.0001[c]
Inhaled drugs (poppers)	12/4	3.18 (0.92-11.99)	3.36 (1.03-10.9)	0.04[c]
Cocaine	20/7	3.15 (1.21-8.50)	3.36 (1.34-8.39)	0.009[c]
History of child abuse	10/15	0.64 (0.27-1.48)	1.24 (0.53-2.93)	0.61

OR: odds ratio; CI: confidence interval
[a] ORs were adjusted for being a teenager and primary education.
[b] χ^2 test for adjusted OR, $p < 0.05$.
[c] Fisher's exact test for adjusted OR, $p < 0.05$. [d] Drug use or possession.

DISCUSSION

Physical abuse is the most common type of maltreatment reported at pediatric emergency departments.[11-15] In this study, the main cause of maltreatment in our community was fetal abuse.

Ramos et al. and Fajardo et al. reported, in studies done in the Mexican population, that a risk factor for fetal abuse was being a teenage mother or being younger than 19 years.[10-16] Putman et al., in California, observed that the younger the mother, the higher the percentage of children with reported maltreatment, with no ethnic or racial differences.[17]

In our country, teenage pregnancy has increased in spite of preventive measures. This is probably the greatest cause of such fetal abuse prevalence. Both in the bibliography and in this study, it has been demonstrated that sexual education for teenagers has failed.

It is the pediatrician's role, as part of the health care provided to adolescents, to participate in strategies aimed at improving sexual education and reducing teenage pregnancy. Such strategies should not only include teenage pregnancy detection and high risk health care, but also multidisciplinary strategies that encompass education, health, and religion so as to reduce the risk for CMS and other social problems, such as violence, associated with teenage parents.

In relation to the abuser, most studies reported that abusers were mostly biological parents.[12-14] However, in our study, physical abuse was mainly conducted by stepparents, whereas sexual abuse was committed by grandfathers or other relatives (cousins or uncles). This study provides

such information to determine risk groups and guide strategies in the setting of prevention services.

The bibliography has reported multiple factors associated with CMS, e.g., being a teenage mother,[10,14,16,17] a low level of education,[14,18] economic poverty,[12,14,19,20] being a single mother[21] or single-parent households,[18] a history of parents with CMS,[4,13,20] alcoholism,[22,23] criminal records,[4,14] the child being 3 years old[24] or having a disability.[14,21,25,26] We looked for these factors in our population and, once readjusted for drug use, even with an improved income, the risk remained.

Epidemiological studies conducted in California, USA, showed that not only drug use but also an environment where drugs, both illegal and legal (i.e., alcohol), are available, sold, and distributed favors the setting for a higher prevalence of CMS in these populations.[19,23] Mexico is prone to such setting due to the large extent of drug trafficking.

This study also analyzed legal drugs, i.e., alcohol and tobacco, but no risk association was observed, so they were not included.

No references were observed in the bibliography in relation to factors with a low association to CMS, like past caregiver for a disabled person or attending the School for Parents. In this study, we included parents' history as a caregiver for a disabled person because the GMANM observed that this outcome measure was a risk factor common to cases of CM in Münchhausen syndrome by proxy. On the contrary, such history in the caregiver of the study subject was a protective factor against CMS

TABLE 4. *History of the 296 study children*

Characteristics	Case/control n = 148/148	Crude OR (95% CI)	Adjusted[a] OR (95% CI)	p^b
Male sex	60/69	0.78 (0.48-1.27)	0.82 (0.49-1.37)	0.46
Age (years old)				
≤ 2	76/81	0.87 (0.54-1.41)	2.08 (1.20-3.63)	0.009[c]
3-5	21/27	0.74 (0.38-1.44)	0.98 (0.50-1.94)	0.97
6-12	37/31	1.26 (0.71-2.24)	0.53 (0.29-1.98)	0.43
≥ 13	14/9	1.61 (0.63-4.20)	0.75 (0.41-1.36)	0.35
History				
Hospitalization at birth	33/19	1.95 (1.01-3.79)	1.84 (0.92-3.64)	0.08
Preterm birth	21/21	1.35 (0.69-2.63)	1.28 (0.63-2.57)	0.48
Having a disability[d]	18/4	4.98 (1.54-17.9)	8.58 (2.76-26.6)	0.0001[c]

OR: odds ratio; CI: confidence interval
[a] ORs were adjusted for teenage mother and illegal drug use. [b] χ^2 test for adjusted OR, $p < 0.05$.
[c] Fisher's exact test for adjusted OR, $p < 0.05$.
[d] Children with pediatric cerebral palsy, hydrocephalus, autism, and Down syndrome.

in general. It is striking that, once these outcome measures are adjusted for being a teenage mother and having a low level of education, the risk remained low. These two factors, on their own, describe family unity or attachment.

In a review by Thornberry et al., it was observed that even if parents had suffered CM, they did not turn into abusers; on the contrary, when the mothers were in a safe and stable relationship, with unity, satisfaction and even religious support, they were less prone to abuse their children.[27]

This study has limitations, for example, it only included children seen at the Emergency Department but left out risk groups, such as children living in the street.

Although the most relevant maternal history mentioned in the bibliography was included, violence against women and intimate partner violence were not included as outcome measures. Although there is a current social shift worldwide in relation to violence against women that has served as the foundation for movements like *Ni una Menos* (Not one woman less) in Argentina, *Ni una Más* (Not one woman more) in Mexico or *Me Too* in the USA, there are no updated statistics about this type of violence available in Mexico. In addition, it is necessary to conduct a standardized, validated survey to measure this type of outcome measures in a systematic manner so that data can be included in further studies.

To conclude, illegal drug use and being a teenage mother are risk factors associated with CMS, whereas family attachment and adherence to education programs are factors with a low association. Knowing such factors is helpful to develop specific prevention programs and recognize children at risk for maltreatment.

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