

# Unintentional ingestion of cleaners and other substances in an immigrant Mexican population: a qualitative study

Katie Crosslin,<sup>1</sup> Ray Tsai<sup>2</sup>

<sup>1</sup>Department of Health Studies, Texas Woman's University, Denton, Texas, USA  
<sup>2</sup>Children's Health, Dallas, Texas, USA

## Correspondence to

Dr Katie Crosslin, Department of Health Studies, Texas Woman's University, PO Box 425499, Denton, TX 76204, USA; [kcrosslin@twu.edu](mailto:kcrosslin@twu.edu)

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## ABSTRACT

Paediatric poisoning is a salient issue worldwide and also affects the USA. In past years, ingestion of household cleaners was the second leading cause of unintentional poisonings in children. All children are at risk for ingestions, although immigrant children may be at greater risk. The purpose of this study was to document child ingestion experiences from toxic household substances via semistructured interviews with immigrant Mexican mothers. Participants were recruited from a paediatric primary care practice in Dallas/Fort Worth, Texas (N=35). Eighteen of 35 respondents (51%) reported that their child, nephew/niece or a friend's child had accidentally ingested a cleaning solution, gasoline or herbal remedy. Of those ingestions, 12 were reportedly from an alternative container, such as a juice box or soda bottle. Improper storage was the primary reason for ingestion. Culturally appropriate home visits and interventions are needed to better prevent ingestion in young children.

## INTRODUCTION

Unintentional poisonings are a salient issue worldwide with over 346 000 deaths reported each year—of which 70 000 occur in children.<sup>1</sup> While 91% of all deaths due to unintentional poisoning take place in low-income and middle-income countries, industrialised countries in Europe and North America have fewer fatal cases of poisoning. However, incidences in these countries put a burden on the healthcare system. The USA has over one million cases of paediatric unintentional poisonings each year and most transpire in the home environment among young children.<sup>2–3</sup> In 2004–2006, ingestion of household cleaners was the second leading cause of unintentional poisonings in children aged <7 years.<sup>4</sup> The mortality rate for such events is generally low; however, over 10 000 children used medical treatment as a result of exposure to household cleaners.<sup>5</sup>

The USA, along with several other countries, is experiencing tremendous population growth due to immigration.<sup>6</sup> Even though all children are at risk for ingestion, immigrant children may be at greater risk.<sup>7</sup> In the USA, children of immigrants are much more likely to be impoverished than children of natives, often due to the influx of parents who are refugees with low levels of education.<sup>8</sup> Poverty is inextricably linked to unintentional injuries, and in one study, 30% of unintentional injury was attributable to low household income.<sup>9</sup> Because immigrants are in a vulnerable position and may not have citizenship, unemployment may be a struggle

along with access to healthcare for their children.<sup>10</sup> While governmental healthcare for low-income families is available in the USA (ie, Medicaid), language barriers and poor health literacy can be barriers in obtaining it, especially in immigrants.<sup>11</sup> Furthermore, caustic substances often have warning labels in English only and immigrants may not be able to read the labels.<sup>12</sup> Poverty, low levels of education and poor health literacy are all factors that influence whether immigrants have the capacity to create a safe home environment for their children.

As of 2012, almost 50% of Hispanic adults living in the USA were foreign-born and did not possess health insurance.<sup>13</sup> As the US population continues to grow by way of immigration, more research is needed to understand how cultural practices may impact home safety, especially ingestion. In a previous study, the authors demonstrated that less acculturated Mexican immigrants were more likely to store household cleaners within the reach of young children, and that the risk for incorrectly storing cleaners increased by 44% with each additional child in the household.<sup>14</sup> A follow-up study is warranted to assess whether paediatric poisoning is a problem among less acculturated Mexicans living in the USA as well as to describe the context that poisonings may occur. In this culture, mothers and grandmothers are often responsible for children and maintaining the home, and for that reason, we sought to include them in this study. The purpose of this research was to document child ingestion experiences from cleaners and other toxic household substances via semistructured interviews with immigrant Mexican mothers and grandmothers.

## METHODS

### Participants

Participants (N=35) were recruited from a paediatric primary care practice in the Dallas/Fort Worth Metroplex where their children received medical care, and the data were collected from 2011 to 2012. While recruiting participants, we shared the overall purpose of the study—to find out their perceptions of home safety and where household cleaners were stored. The study was advertised in the paediatric clinic with an information table and interested participants approached the researchers. Mothers and grandmothers who qualified to participate in the study did so either before or after their appointment in a separate location at the clinic. Semistructured interviews were conducted in Spanish with participants who met specific criteria, such as being a Mexican immigrant mother or

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grandmother and coming to the USA within the last 10 years, having at least one child aged <6 years, and Spanish-speaking only or limited English proficiency. Immigrants who interview in their native tongue are likely to be less acculturated,<sup>15 16</sup> and the researchers used this as a guide for selecting less acculturated participants who communicated mostly in Spanish.

### Procedure

Because we used purposeful sampling, we recruited participants who met the criteria according to the study guidelines. The participants received the informed consent form and were also told that they could stop the interview at any time. All interviews were conducted entirely in Spanish by a native speaker who was a graduate student trained in qualitative methodology. Participants were asked to report any unintentional ingestion from within their social networks, including children, extended family and friends. Because this culture often has an extended network of family and friends, the researchers sought to broaden the definition of family to acknowledge the cultural paradigm. The interviewer documented any details about the ingestion, such as the type of substance involved and how it was stored (ie, original or alternative container). The interviews were audio recorded and transcribed from Spanish to English and carefully reviewed for accuracy by checking the audio recording against the transcriptions. Each interview was approximately 30 min in length. All study participants who qualified to enter the study agreed to participate and were given a \$20 store gift card as an incentive. This study was approved by the university Institutional Review Board.

### Data analysis

The researchers independently read the transcribed interviews to gain familiarity with the data. Frequency counts for ingestions were abstracted from the data by each researcher and

findings were compared. Thematic analysis was used in which keywords/phrases were identified for each interview which led to the development of a codebook and this aided in understanding the context in which the ingestions occurred.

### RESULTS

The average age of participants was 36 years (SD 8.2) and 83.9% were married. Approximately 45% of participants did not finish high school, while 45% possessed a high school diploma. Most participants' children had Medicaid coverage (90%), which is a governmental health programme for low-income families and individuals in the USA (table 1).

Participants were asked about any ingestion that occurred among their family and friends. According to the results, 18 of 35 respondents (51%) reported that their child, family member or a friend's child had accidentally ingested a cleaning solution, gasoline or an herbal remedy for diabetes treatment. Of those ingestions, 12 were reportedly from an alternative container, such as a juice box or soda bottle. When participants were asked whether they currently store cleaners in an alternative container, eight respondents confirmed (23%; table 2). In our study, mothers reported that they often used home remedies to treat ingestions, such as a child drinking milk to detoxify their system. This may be the reality for many immigrant Mexicans if they do not have access to a healthcare provider.

Improper storage was the primary reason why children ingested cleaners and other toxic substances. Several participants noted that cleaners and other substances (eg, gasoline) are sold in 'suelto' (loose format) in Mexico and customers bring their individual containers to buy small quantities. Thus, this form of storage is dangerous to children from the onset. Even after residing in the USA, some participants continue to improperly store substances in alternative containers. One participant stated that she had placed a cleaner in an old water bottle which was

**Table 1** Demographic variables

	N	Per cent		N	Per cent
Age (M=36; SD=8.2), years			Education		
27–35	17	52.48	Less than high school	14	45.2
36–40	7	22.6	High school graduate	14	45.2
41–49	5	16.1	Some college	2	6.5
50–63	2	6.5	College graduate	1	3.2
Missing	4		Missing	4	
Employment			Language		
Yes	21	67.7	Spanish-speaking only	10	28.6
No	10	32.3	Limited English/mostly Spanish	25	71.4
Missing	4				
Relationship status			Relationships affected by ingestion		
Married	26	83.9	Extended family	5	27.8
Separated	1	3.2	Friends	8	44.4
Single	3	9.7	Daughter/son	2	11.1
Widowed	4	3.2	Brother	2	11.1
Missing	1		Self (as a child)	1	5.6
Substances ingested (18 cases)			Insurance type		
Cleaners	9	50	Medicaid	28	90.3
Clorox	5	27.8	CHIP	2	6.5
Gasoline	3	16.7	Private (self-pay)	1	3.2
Herbal remedy for diabetes	1	5.6	Missing	4	

Medicaid in the USA is a governmental healthcare programme for families and individuals with low income and limited resources; CHIP is another governmental programme for people who earn too much money to qualify for Medicaid. Clorox is an American brand that manufactures bleach for household cleaning. CHIP, Children's Health Insurance Program; M, mean.

**Table 2** Selected quotes from mothers who store substances in alternative containers

How do you use alternative containers in storing cleaners and other substances? Explain--	<p>"Buying Clorox by itself can be so expensive. So what I do is I dilute it in water and I place it a different [nozzle/spray] container, but I mean I have them out-of-reach from the kids."</p> <p>"Okay, here you people call it Mr Clean, like for example. They have it like to make it concentrated, so inside a bottle with a spray I put a label outside of it and with a marker I label what it is."</p> <p>"Like, they have something called an anti-greaser an industrial one and well I use it for cleaning the oven and stove. And I place them in a spray bottle, but I put a label on it. Stating what it is for."</p> <p>"Sometimes I will do that with Clorox."</p> <p>"Like for example, I combine the Clorox and Fabuloso. Because I feel the Clorox has such a strong odor on its own. And if you put so much Clorox in one place, it is clean, but you feel the texture, like porous. If I put a little Clorox and the rest of the Fabuloso, then, the aroma is not going to feel as potent."</p> <p>"Like the Mr. Clean I place it a spray-bottle, you know how it doesn't come with a spray-outlet."</p> <p>"Over there [Mexico] it is very common for one to buy their cleaners in recycled containers, and yes as a matter of fact, I know that this does happen. Because actually, once I purchased a poison for ants and they sold it to me in a soda bottle."</p>
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situated in the back seat of her car next to her young daughter. She continued to explain, "My daughter thought it was tea and she drank a little". Five ingestions occurred while house cleaning took place, and the children ingested Clorox (bleach) from the bottle which was left open on the floor. For instance, 'a young girl was eating an apple and she got thirsty and they had the Clorox inside a beverage bottle and she went ahead and drank it...the container was not in a high location'.

In another instance, a participant's niece drank Clorox and she went on to report that "in Mexico when you are washing, you have everything out and [the niece] had the chance of drinking it accidentally". Moreover, Fabuloso was stored inappropriately leading to an unintentional ingestion. The participant stated that "Fabuloso was in a beverage bottle and young boy drank some, but they caught him on time...he was about 4 to 5 years old. But the color definitely was what called his attention since Fabuloso comes in all kinds of bright colors". Some mothers had written a label on the soda bottle expecting their young children to comprehend those instructions. Additional quotes on mothers' perspectives regarding poison prevention are depicted in [table 3](#).

Participants reported that legal accountability in the USA was a strong motivation to provide a safe environment for their children. According to one mother, "Over there [Mexico], it is not so penalized.....there is no mandate to take care of your children...Here, we prevent accidents because we know very well that quickly 'all justice' would be sent out". Additionally, mothers have learnt from television campaigns about home safety, and one participant bought cabinet locks from watching a commercial advertisement.

## DISCUSSION

Storing cleaning solutions or other chemicals in recycled containers, such as glass soda bottles, is a common custom in developing countries<sup>17</sup> and this behaviour continues as immigrants settle in the USA. This is often out of convenience and necessity, since it is less expensive to dilute smaller amounts of cleaners and store them in a spray bottle as noted in [table 2](#). Immigrant mothers require more education on how to safely store cleaners to prevent ingestions, given the improper storage of substances in this study. Brief interventions that are culturally appropriate have improved safety behaviours in immigrant populations,<sup>18</sup> and future interventions should focus on using community health workers to implement safe storage interventions in the home. Because storing cleaners in this manner is a cultural practice deeply rooted from living in Mexico, immigrant mothers may benefit from knowing other Mexican mothers who have assimilated to the US culture in regards to storing cleaners in a more appropriate way. Mothers were positively influenced by the legal system which enforces child safety and well-being, as well as mass education campaigns. Using culturally relevant approaches to assist immigrant Mexican mothers with transitioning to life in the USA may be an effective way to prevent ingestions.

## LIMITATIONS

There were limitations to this study that may affect the generalisability to other populations. We interviewed participants at one clinic only, and in the future, researchers should consider using several clinics for data collection. Because of low education levels, at times it was difficult to understand what the

**Table 3** Less acculturated Mexican mothers' perceptions about poison prevention

Poison prevention—differences between USA and Mexico	<p>"Yes, because in Mexico they sell everything in <i>suelto</i> (loose format) and we take our containers and fill them up. But here I do not do that, it scares me."</p> <p>"Yes, there is a lot more of a risk over there [Mexico]. Yes, it's more dangerous. I don't know if it's the parents that don't have the consciousness [necessary] to be able to take care of their children. Because there have been/are a lot of cases [in Mexico]. Ingesting is a lot more common, I mean really it's because people grab a soda container and they put chemicals into it. It's very common. It's so, so common."</p> <p>"Well, in Mexico, a nephew of mine did drink ... petroleum [stored in a different container]. Yeah, it was a bad situation."</p> <p>"...here [US] they even give you numbers and all...like papers they give you to place on your refrigerator in case of poisonings."</p> <p>[Poison prevention is discussed in Mexico because] "mothers tell their daughters."</p> <p>"Prevention is publicized [in Mexico], people just don't care. Because they might have something else to do or whatever, sometimes people just don't care [or make a priority] the health of children."</p> <p>"It's just a mother's instinct really. We don't need anyone to tell us this."</p> <p>"Well it is like the saying goes: 'It is not until the child falls down in the hole, that the hole is covered.'" Spanish Translation: "No es hasta que el niño se cay en el hoyo, que se tapa el hoyo."</p>
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participants meant in their responses. Also, some phrases in Spanish do not translate easily into English and this may have led to loss of meaning in the translation. Recall bias may have influenced the responses in some of the participants.

## CONCLUSION

Mexican immigrant mothers who are less acculturated need additional intervention to better store household cleaners to prevent child ingestions. Future home interventions should aim to increase knowledge of why safe storage is necessary and also bolster self-efficacy in mothers and grandmothers to become more capable in creating a safe home environment for children. Additionally, efforts to increase health literacy and build capacity in this population may improve safety behaviours.

## What is already known on the subject

- ▶ Ingestion of household cleaners is a leading cause of unintentional poisonings in children.
- ▶ Less acculturated Mexican immigrants are more likely to improperly store household cleaners within the reach of young children.

## What this study adds

- ▶ Mexican immigrant families with low acculturation have significant experience with unintentional ingestion within their social network.
- ▶ Cultural practices, including storing cleaners in smaller, unlabeled bottles may increase the risk of unintentional ingestion among young children.
- ▶ Specific, targeted injury prevention efforts are needed to continue to address ingestion risk in immigrant populations.

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