

# A Qualitative Exploration of Less Acculturated Mexican Mothers' Safety Perceptions of Herbs, Medicines, and Cleaners in the Home

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**Abstract** Childhood poisoning is a leading public health concern in our society. The death rate from unintentional poisonings among children has increased by 80 % from 2000 to 2009. Immigrant children are also at-risk. A qualitative study, consisting of a pile sort, was conducted among immigrant Mexican mothers to determine their safety perceptions of commonly used medicines, herbs, and cleaners. Participants (N = 35) were selected for semi-structured interviews from a pediatric primary care clinic in the Dallas/Fort Worth Metroplex. Some mothers over-estimated their children's ability to discern the dangers of substances, relied heavily on sensory skills of children, and perceived a medicine as safe after successful use in the past. Other mothers were more cognizant of allergic reactions, ingestion, and the need to store substances carefully. Brief interventions that incorporate culturally-appropriate safety messages are needed to assist Mexican mothers in creating a safe home environment.

**Keywords** Mexicans · Home safety · Qualitative · Childhood poisoning · Semi-structured interviews · Pile sorting

## Introduction

Childhood poisoning is a leading public health concern in our society. As prescription drug use increases due to new treatments for cardiovascular disease, depression, pain management, and sleep issues, accidental drug ingestions are also on the rise in children [1]. Furthermore, expired medicines often accumulate in the medicine cabinet increasing the availability of medicines in the home [2–4]. In the United States (US), over 300 children are seen in the Emergency Department (ED) each day due to ingestion of toxic substances [5]. In a national study over an 8-year period, children self-exposed to prescription medicines led to 248,023 hospital visits, 41,847 admissions, and 18,191 serious injuries [3]. Hypoglycemic agents, sedative-hypnotic, and cardiac medicines were associated with the highest hospital admission rate, while opioid analgesics/cough medicine and cardiac drugs were responsible for several pediatric deaths [3].

Moreover, the number of ingestions from cleaning products among children remains high in the US. Young children (ages 1–3) accounted for the vast majority of cases which involved bleach stored in spray bottles [6]. Alarmingly, the death rate from unintentional poisonings among children has increased by 80 % from 2000 to 2009 [7], which can be largely attributed to greater exposure to medicines and cleaners. Because children spend a significant amount of time in the home environment, it is critical for toxic substances to be stored carefully.

While all children may be at risk for ingestion, special attention to prevent poisonings in immigrant children is necessary given the challenges that these families face. For instance, immigrant parents often have less educational attainment, are underemployed without health insurance, and face discrimination and prejudice [8]. The Hispanic

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community, which is the 2nd largest ethnic group in the US [9], often encounters these types of difficulties. This can impact whether or not preventative measures are taken to reduce childhood poisoning. A majority of less acculturated Hispanics are unable to speak and/or read English well, which poses a problem when educating about ingestion issues. In a previous study, the authors found that poison prevention materials written in Spanish were not culturally acceptable and were at too high of a reading level for most immigrants [10]. Also, the researchers identified that less acculturated Hispanics were more likely to incorrectly store medicines and cleaners when young children lived in the household.

In addition to pharmaceutical medicines, this culture often uses herbs for medicinal purposes, and it is necessary to know how Hispanic parents perceive ingestion risk involving herbs. As observed in other populations, 50–90 % of Hispanics often utilize complementary practices to enhance health status, treat colds, and lessen chronic pain [11], while also using pharmaceutical medicines simultaneously [12]. According to one study, only 15 % of Hispanic participants (N = 600) would tell their doctors that they took an herbal supplement, and immigrants were more likely to use herbs than US-born Hispanics [13]. Herbs such as star anise and linden are common place in the Hispanic medicine arsenal, although largely unknown among Western health care providers [14]. Very few physicians who specialized in family medicine, internal medicine, and pediatrics were knowledgeable about herbal treatments [15]. Thus, the safe storage of herbs may not be addressed by conventional practitioners.

Some herbal therapies have established scientific validity [16], yet herbal medicines may have similar risk profiles as conventional pharmaceuticals, imposing the risk of organ failure, seizures, headaches, miscarriage, and hypertension if not used as directed [17]. For instance, ginger may be used to treat migraines and nausea, but if overdosed, can lead to arrhythmias and central nervous system depression [12]. Because herbs are viewed as harmless, some people may not realize the importance of storing them away from the reach of children, increasing the risk for ingestion.

In an effort to reduce childhood poisoning cases in this vulnerable population, more research is warranted to determine what medicines, cleaners, and herbs are kept in the immigrant Hispanic household. The purpose of this study was to utilize community contacts to develop a list of substances that are used among Hispanic immigrants and to better understand how mothers and grandmothers, who are often the caretakers, view the safety profile of commonly used medicines, herbs, and cleaners.

## Methods

### Participants and Procedures

Participants were selected from a pediatric primary care clinic in the Dallas/Fort Worth (DFW) Metroplex where their children received medical care. Given that previous research has identified language skills as a proxy for acculturation [10, 18], the selection of less acculturated mothers and grandmothers was determined by those who spoke Spanish primarily. Additionally, all participants had at least one child who was 6 years of age or younger (all caretakers will be referred to as “mothers”). Participants had emigrated from Mexico within the last 10 years.

The study was advertised outside of the pediatric office, and mothers who qualified to participate in the study did so either before or after their appointment. Semi-structured interviews (N = 35) were conducted in Spanish by a native speaker who was trained in qualitative methodology and who had a similar cultural background. The interviewer transcribed all interviews from Spanish to English and carefully reviewed each transcript for accuracy. Each interview was approximately 60 min in length and was audio recorded. A short demographic questionnaire was administered at the time of the interview. Participants received a \$20 store gift card at the end of the interview as an incentive. This study was approved by the university Institutional Review Board.

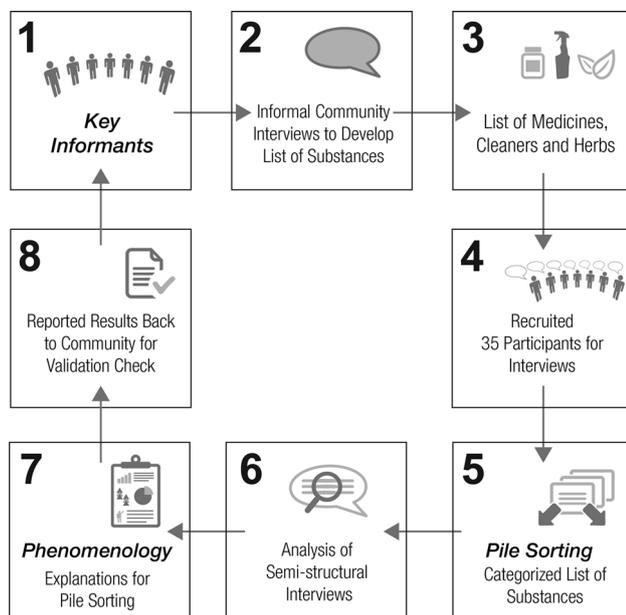
### Study Design

This qualitative study was based on the framework of phenomenology to better understand the lived experiences of a vulnerable group of women as it relates to the safe storage of household substances both here and in Mexico. In this research paradigm, phenomenology draws out the perception and interpretation from participants in order to explain health behaviors. The strength of this approach is that the reasons for certain behaviors can become apparent, which may guide future interventions [19].

It is crucial to know why participants consider substances to be dangerous or not to children and if that influences how the substance is stored in the household. We used a pile sorting methodology which is utilized in various disciplines (e.g., medical anthropology) to provide a concrete process for classification. In a pile sort methodology, researchers ask participants to create categories or “piles” using pre-determined words/phrases and then provide explanations. This classification system is powerful to generate discussion and clarify how participants perceive various health issues, and has been used in the formative development of research findings [20–22].

## Development of Interview Process Through Community Involvement

In order to guide the direction of the pile sort, a community-based approach was employed to gain insight from key informants on the substances that are used in Hispanic households (Fig. 1). The researchers conducted 20 informal interviews with Hispanics who were comparable to study participants in terms of acculturation and language skills. Half of the interviews were drawn from the medical staff who worked at the clinic where the study occurred. The remaining interviews were captured via social networks. One of the researchers was a native Spanish speaker and we interviewed some of her family members who had recently emigrated from Mexico. The informal interviews took place in small groups (3–4 people at a time) and we asked participants about the types of medicine, cleaners, and herbs that were commonly used in their households, in addition to what they have seen in other Hispanic households. After the list of commonly used household substances was developed through informal interviews, each substance was recorded individually on an index card. In total, we created three categories of cards—medicines, herbs, cleaners—and each substance was classified under one category (e.g., Pepto-Bismol was classified as a medicine) (Table 1). Study participants used these cards in a pile sort to demonstrate if they considered the substances to be dangerous or not to their children.



**Fig. 1** Community-based approach to understanding how Hispanic mothers perceive potentially toxic substances

## Pile Sort and Participant Interviews

The pile sort occurred at the beginning of each semi-structured interview and the researchers orally explained to each participant how to categorize the list of substances that were written on cards, and there was no time limit. Two cards were visible on a table which read “Dangerous to children” and “Not dangerous to children.” Participants sorted cards for the medicines in either the dangerous or not dangerous category. They were instructed to only sort the cards that were familiar to them based on personal experiences of using the substance. After the pile sort was complete, the researchers asked the participants to explain their choices for classification. Probes were given to understand specifically why certain medicines were considered dangerous or not. The process was repeated so that participants categorized the cards for herbs and cleaners according to perceived danger.

## Data Analysis

Descriptive statistics were conducted on variables such as age, relationship status, and insurance type in order to characterize the study population. The pile sort activity was analyzed by collecting frequencies for each substance that was classified as either dangerous or not dangerous. The remaining analysis was focused on the themes that emerged from the interviews on the participants’ perceptions of the substances.

The researchers independently read the transcribed data to gain an understanding of the underlying meaning using inductive and deductive methods using content analysis. The transcripts were re-read a second time to increase familiarity with the data. Each transcribed interview was then carefully studied and analyzed for how it aligned with the interview questions. The substances that were categorized in the pile sort were analyzed based on the participants’ perceptions of substances as either dangerous or not dangerous. Key words/phrases were identified for each interview which led to the development of a codebook. The codes were examined for interrelationships and clustered when appropriate. For instance, the phrase “allergic reaction” was identified as a code and classified as a reason for cautiously storing medicines away from children.

## Validation

Because the approach to this study was community-based, the researchers sought to finalize the results by adding member-checking as a way to validate the findings. The researchers contacted two of the key informants who initially contributed to the development of the list of substances to review the study findings and provide feedback.

**Table 1** List of substances commonly used by Hispanic immigrants

Medicines	Purpose	Cleaners	Purpose	Herbs	Purpose
Alcohol with Marijuana	Arthritis—applied topically	Acid Muriatico	Plaque remover for bathroom tiles, bricks	Aloe vera	Leaves from a plant are cut and applied to cuts or burns
Alka-seltzer	Heart burn, reflux	Ajax	Surface cleaning	Arnica	Injuries/sprains; available in herb form and cream
Amoxicillin	Antibiotic	Ariel	Detergent	Basil	Stomach ache
Antacid	Acid reflux	Clorox	Disinfecting, washing	Chamomile	Colic and puffy eyes
Children's Tylenol	Fever reducer	Fabuloso	Floor cleaning	Cinnamon	Bone health
Cough syrup	Cold medicine	Foca	Detergent	Corn starch	Treatment of diaper rash
Desenfriol	Cold medicine	Jabon roma	Detergent	Epazote	Treatment of colic, parasites, stomach ailments
Naproxen	NSAID	Jabon zote	Bar soap	Eucalyptus	Reduce coughing
Pedialyte	Electrolytes	Mr. Clean	Floor cleaning	Garlic	High blood pressure, diabetes, other health issues
Pentrexyl	Antibiotic	Pine Sol	Floor cleaning	Honey	Preventing and treating colds, mixed with lemon
Pepto-Bismol	Diarrhea	Suaviel	Fabric softener	Olive Oil	Constipation or stomach ache
Stomacin-U spray	Acid reflux			Onion	Boiled and cut in half, placed over chest for Asthma
Tempra	Fever reducer			Oregano	Treatment of chronic coughs and elimination of phlegm
Terramicina	Eye infections			Yerbabuena	Indigestion
Vaporub	Chest cream				
Vitacilina (topical)	First-aid cream				
XL-3	Cold medicine				

Active ingredients for proprietary medicines: *Alka-seltzer*—aspirin, citric acid, baking soda; *Children's Tylenol*—acetaminophen; *cough syrup*—may contain any combination of guaifensin, codeine, or pseudoephedrine; *desenfriol*—paracetamol; *Pedialyte*—oral electrolyte solution; *Pentrexyl*—antibiotic that contains Ampicillin; *Pepto-Bismol*—bismuth subsalicylate; *Stomacin-U spray*—cabbage extract, distilled water, cereal alcohol; *Tempra*—acetaminophen; *Terramicina*—oxytetracycline; *Vitacilina*—first-aid cream with neomycin; XL-3—acetaminophen, chlorpheniramine, phenylephrine

Additionally, peer debriefing was employed by including an outside researcher to review findings and ask clarifying questions about the study.

## Results

As displayed in Table 2, all participants were Spanish-speaking only and 90 % possessed Medicaid insurance. Most participants either did not finish high school (45 %) or were high school graduates (45 %). Many participants were married (84 %) and unemployed (67 %). All participants had a child less than 7 years of age in their household, and the average age of children was 3 years old. All of the mothers had other people's children also living in their household.

The list of commonly used medicines, herbs, and cleaners developed through community interviews is displayed in Table 1. When asked about where these items are stored in the household, many of the substances were

stored in the “alacena” (top cupboard), armoire, under the kitchen sink, and in the garage. Additionally, some mothers reported that they stored cleaners in old Coke bottles—a common practice in Mexico instead of purchasing cleaners in bulk.

The pile sort activity for medicines, cleaners, and herbs revealed that many mothers were less concerned about the dangers of these substances among their young children (Table 3). Following the pile sort activity, participants were asked to explain the categories that they created, and the following data indicates the justification for their responses. Additional quotes are depicted in Table 4.

## Medicines

### *Overestimating Child's Ability*

There were specific reasons why the participants did not consider some medicines to be dangerous to children. Some participants relied heavily on their children's ability

**Table 2** Demographic variables

	N	%		N	%
Age (M = 36; SD = 8.2)			Education		
27–35	17	52.48	Less than HS	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			Insurance type		
Yes	21	67.7	Medicaid	28	90.3
No	10	32.3	CHIP	2	6.5
Missing	4		Private	1	3.2
			Missing	4	
Relationship status					
Married	26	83.9			
Separated	1	3.2			
Single	3	9.7			
Widowed	4	3.2			
Missing	1				

*M* mean, *SD* standard deviation, *HS* high school

to correctly discern the safety of substances. Mothers who demonstrated this attitude believed that the child instinctively knew not to play with medicine. There were various reasons why, such as the child was unable to open the bottle, and the child does not like the taste of the medicine. For instance, one mother stated that her “daughter knows that this is only for medicinal purposes and she won’t get into it. It is kept in the refrigerator.” Several mothers thought their children would not like the taste of cough syrup, Pedialyte (oral electrolytes), and first-aid cream and thought that was a large enough deterrent. Many mothers perceived the “natural medicines” that they use to be safe, such as Stomacin-U Spray (acid reflux treatment).

#### *Previous Experiences*

A few participants who successfully used medicines in the past (e.g., Amoxicillin—antibiotic) viewed them more benignly and were less likely to consider them dangerous. For instance, one mother reported that “some medicines are not dangerous because they have been used before without adverse reactions. They are stored in the refrigerator and the lids are tightly closed which children cannot open.”

#### *Allergic Reactions and Large Doses*

There were other participants who viewed medicines with more caution. Some mothers noted that allergic reactions may result and believed that they should properly store these substances. Also, some keen mothers mentioned that children may perceive medicine to be candy so it should be

kept out of their reach. Clearly, some mothers had more education and were apt to follow the recommendations on the labels of medicines. For example, one woman said, “I only use desenfriol [cold medicine] when I have a prescription and I do not leave it within children’s reach.” There were common-sense approaches to injury prevention with one mother stating that “because Vaporub is a cream [ointment to relieve chest congestion], children could touch it and get it in their eyes.” Some mothers recognized that large doses are dangerous, and medicines (e.g., Tylenol and Alka-seltzer) could cause harm if taken in large quantities.

#### **Cleaners**

##### *Ingestion Risk and Experimentation*

Overall, participants viewed cleaners as dangerous for their children. Several mothers stated that their children could swallow a cleaner and that would be dangerous. One mother expressed that “all cleaners are toxic because they could cause harm to the eyes, skin, or they can be ingested.” Mothers stated that kids like to experiment and they could get into cleaners, and one person responded that “all cleaners are dangerous to children under 7 years old because they like to experiment.”

A few participants did not think Fabuloso (all-purpose household cleaner) was dangerous. One mom said that “it wasn’t as bad as Clorox [bleach].” A small group of mothers also thought that Pine Sol (floor cleaner) was not dangerous, while two mothers thought that Ajax (bathroom/kitchen cleaner) was safe.

**Table 3** Results from the pile sort activity

	Dangerous N	Not dangerous N		Dangerous N	Not dangerous N
<i>Medicines</i>			<i>Herbs</i>		
Alcohol con Marijuana	23	0	Aloe vera	9	17
Alka-seltzer (cold/pain reliever)	17	13	Arnica	18	9
Amoxicillin	24	6	Basil	11	12
Cough syrup	12	14	Chamomile	6	22
Desenfriol (cold medicine)	20	10	Cinnamon	8	23
Mejoralito (Children's Tylenol)	14	10	Corn starch	7	21
Naproxen (NSAID)	23	4	Epazote	13	12
Panadol (Adult Tylenol)	20	2	Eucalyptus	16	11
Pentrexyl (antibiotic)	22	3	Garlic	9	19
Pepto Bismal	17	10	Honey	6	25
Sal de Uvas Picot (antacid)	13	13	Onion	5	24
Stomacin-u spray (acid reflux)	22	1	Olive oil	9	21
Suero (pedialyte)	6	24	Oregano	12	15
Tempra (fever)	18	6	Yerbabuena	9	18
Terramicina (topical/eye infections)	19	6			
Vaporub	13	17			
Vitacilina (first-aid cream)	7	18			
XL-3 (cold medicine)	19	3			
<i>Cleaners</i>					
Acido Murriatico	23	0			
Ajax	24	2			
Ariel	23	1			
Clorox	27	1			
Fabuloso	20	5			
Foca	21	2			
Jabon roma	20	4			
Jabon zote	18	6			
Maestro Limpio	21	3			
Pine sol	21	5			
Suativel	24	4			

## Herbs

### *Beneficial for Dietary Reasons and Treatment of Illness*

Most mothers believed herbs are safe for children since they are “natural.” Half of the participants stated that commonly used herbs are eaten on salads or used to prepare foods and for that reason are safe for children as well. One participant said that “Aloe Vera tastes adverse to a child and he/she will not be poisoned” thus relying on taste as a deterrent for children to experiment. Some of the participants mentioned using herbs to treat illnesses, such as stomach aches, skin abrasions, diaper rashes, constipation, and colic. The overall opinion was reflected in the following statement: “If herbs are used for common maladies (cuts or stomach aches), then they can't be that dangerous.”

### *Dangerous Due to Allergic Reactions*

One mother mentioned that large quantities of herbs were dangerous for children, and the concept of allergic reactions was mentioned. Specifically, she reported that her son was allergic to oregano and she believed that the herb inhibited his asthma medication. According to this mother, “some herbs inhibit medicines from working, so they should be used with caution and you should let your doctor know what herbs you want to use.”

## Discussion

This study illuminated how Mexican mothers view the safety profiles of common household substances and medicines and how they may affect their children. Study

**Table 4** Less acculturated Mexican mothers' perceptions about home safety and poison prevention

Perceptions of safety— medicines	“The only thing I think is not dangerous is the Pedialyte because it is like a <i>suero</i> [hydrating liquid, opposite of diuretic]”
	“Well I think because it's a cream/ointment. And the taste is not very pleasing, that's why I think they can't... ingest them”
	“Because I have given to them first to taste a little and then later I give them a bit more. And then if I see that it didn't cause them something bad, then I give them more”
	“...not dangerous [because] they are very common and the child already knows that it is a medicine”
Perceptions of safety— herbs	“The honey [is not dangerous] because it's something sweet”
	“Chamomile— there is no danger, honey from bees no danger either”
	“Aloe vera—not dangerous if it's in plant form”
Perceptions of safety— cleaners	[Herbal teas are] “okay because they are good for you/the body; they are not dangerous”
	[Clorox is stored] “in a cabinet underneath the [bathroom] sink where we wash our hands. And I mean the door to the bathroom is always closed and the baby will not be in there”
	“I put these [cleaners] underneath the sink in the kitchen because I use frequently; that is why I say they are not so dangerous, but they are dangerous if they were to be ingested”
	“I combine the Clorox and Fabuloso...because I feel the Clorox has such a strong odor on its own”
	“Yes, because in Mexico they sell everything in <i>sueldo</i> [loose format] and we take our containers and fill them up. But here I do not do that, it scares me”

results revealed that the perceptions of mothers were dichotomous, with one group perceiving substances casually based on their previous experiences and another category of mothers who were more cognizant of child ingestion. While educational status and health beliefs may explain why some mothers were more cautious than others, it may be helpful to conduct further research on the differences between these two groups in order to train and empower more safety-oriented mothers to teach essential home safety principles and skills.

Additionally, some mothers assessed the safety of substances based on sensory information, relating to whether children liked the taste of medicine or if a cleaner smells pleasant. Many cleaning products are sold in formulations touting “Fresh Scent” which may be attractive to young children. Because bright-colored cleaners may appear to look like juice or Kool-Aid to children, the authors recommend removing coloring and scents to reduce the temptation for children to ingest cleaners.

Furthermore, some mothers over-estimated their children's ability to discern the dangers associated with ingesting a medicine, and heavily relied on their children to discern safety. This finding aligns with other research studies where parents do not provide adequate supervision due to overestimating children's abilities and allowing greater latitude in decision-making among young children [23–26].

Poverty is often a large barrier in the life of immigrants and directly influences living conditions, the type of dwelling that is financially possible, and crowding [26]. In our study, Mexican mothers not only cared for their own children, but also for children of extended family and

friends. One participant noted the challenges of living with several people and not having control over what items are left around the household. According to demographers, the lateral extension of living arrangements is rooted in migration and is a culturally-specific survival strategy [27]. Many mothers also discussed how poverty limited the purchase of cleaners in Mexico and that they often bought small amounts to store in drinking bottles (e.g., Coke bottles). These old patterns influenced by living in Mexico are often continued in the US after immigration and can pose a risk to children. Thus, when designing interventions, it is important to consider the broader social network of friends and family that often influence the home environment. It is also important to address specific behaviors exhibited by immigrants to better connect to the cultural needs and challenges of moving to the US and adopting new safety routines.

In sum, more interventions are needed to educate parents on the importance of home safety and medicine storage. By raising mothers' consciousness to potentially dangerous situations, there is an opportunity to provide recommendations on how to better protect the home environment to reduce ingestions and injuries. For instance, a brief intervention directed to 88 low-income Hispanic parents was successful at improving home safety. Community health workers delivered the program and educated parents on safety issues during a home visit. In a 2-month follow-up survey, parents reported making several positive changes by placing medicines, chemicals, firearms, and insecticides outside of their children's reach [28]. Therefore, by utilizing language-specific programs as well as trusted community workers (e.g., Promotoras), Mexican

mothers may be more likely to respond favorably to new safety regimens for the home environment.

## Limitations

This study presents some limitations which may affect generalizability. While the sampling method was purposive, it is possible that the researchers interviewed participants who originated from certain areas in Mexico and provided views that are not generalizable to all Mexican immigrants. Due to low levels of education, participants at times struggled with communicating their thoughts and this may have affected some responses.

## Conclusions

Mexican immigrants face many challenges when coming to the US. The fact that so many potentially toxic substances are available in the US raises a concern that needs to be addressed when working with immigrants. This study provides insight on how immigrant mothers may perceive commonly used medicines, herbs, and cleaners, as well as where they are likely to store these substances. Future programs to improve home safety include conducting home visits, brief interventions, and community-based classes which emphasize cultural practices and beliefs.

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