

Social, Cultural, and Individual Factors of Latino Residents in the U.S.-México Border as Determinants of Social Disparities Increasing Exposure to Residential Pesticides

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Background

➢ Evidence suggests that exposure to pesticides results in reproductive and developmental problems (Rao, P., 2008). Moreover, 44.8% of known neurotoxic substances to humans fall in the category of pesticides (Grandjean & Landrigan, 2006).

➢ In the U.S.-Mexico border, 8% -10% of residents use illegal pesticides (Saller et al., 2007; Graham et al., 2004) and 21% of households with children unsafely store their pesticide/herbicide products (Roddy et al., 2005).

➢ Hispanic mothers perceive the risk of pesticides according to odor. Pesticides with no smell are perceived as safer (Rao et al., 2006).

➢ Attitudes and beliefs of U.S. border residents vary according to neighborhood SES. A greater proportion of residents in low-income neighborhoods believe they have little control over the risks to their health. El Paso can be a risk-free environment, and that most chemicals cause cancer. Regardless of SES level, over half of participants disagree that the government will do something if there was a serious health problem (Byrd et al., 2001).

➢ Children are of special concern because of their increased physiological susceptibility and typical behavior (Landrigan, 2005; WHO, 2006). Hispanic children confront greater risks because of health disparities and poor physical environments (Flores et al., 2002). The lack of awareness of children's susceptibility and vulnerability to environmental threats by Mexican officials and laws may increase the risks of exposure of Mexican children (Cifuentes et al., 2010).

➢ The public perceives risks under different paradigm than scientists or experts. People examine risks according to a social paradigm (cultural, economic, political contexts) and to the certainty they may occur (Garvin, T., 2001)

➢ Hispanic/Latino populations share cultural and social factors that increase risk (Quandt et al., 2007; Quandt et al., 2006; Arcury et al., 2002) and they believe they lack control of risk of exposure even after pesticide safety education (Arcury et al., 2002).

➢ Compare participants' levels of trust in various sources of information about pesticides.

➢ Extrapolate the socio-cultural factors of U.S.-Mexico border participants to Latino populations in the U.S. that may be subject to disparities of risks of exposure to residential pesticides

Learning Objectives of Poster

➢ Identify social, cultural and individual factors of U.S.-Mexico urban residents that augment the risks of exposure to residential pesticides.

➢ Compare participants' levels of trust in various sources of information about pesticides.

➢ Extrapolate the socio-cultural factors of U.S.-Mexico border participants to Latino populations in the U.S. that may be subject to disparities of risks of exposure to residential pesticides

Research Methods

➢ Part of a big study by Juárez-Carrillo, P. (in preparation) with 252 women living in the U.S.-Mexico border. A resident was eligible if:

Used residential pesticide during summer 2009; Has at least one child <11 years of age; Speaks and reads Spanish; and, ever participated in previous outreach environmental health education.

➢ Random systematic sampling procedure for recruitment (EPA, QA/G-SS, 2002) in 09/2009. On each site, the households screened were located in residential blocks within a 0.5 km. radius. The area was divided into quadrants for equal distribution of participants.



➢ Location: Paso del Norte Region, 6 neighborhoods – 3 neighborhoods on each side of the U.S.-Mexico border.

➢ Analysis included t-tests and chi square to compare means. One-way ANOVA for difference of means of the responses between place of residence according to country (México or U.S.), and correlation analysis (Pearson and Chi square) to examine the relationship between individual characteristics and practices.

➢ Information collected was about residential pesticides in any form (spray, powder, liquid, fog, gel, granules, etc.) to control cockroaches, rats, mice, flies, and ants.

➢ Illegal pesticides examined included Methyl parathion (a.k.a. *pulvo de avión*), Chinese chalk, and mothballs.



Results

Table 1. Individual and housing characteristics of U.S.-México Border participants

Characteristics	Regional (Paso del Norte)	U.S. Participants	México Participants
Age (Sample size)	249	124	125
Mean (SEM; SD)	33.5 (0.296; 9.4)	35.2 (0.793; 8.83)*	31.8 (0.865; 9.68)*
Median	32	34	31
Years of school education (Sample size)	249	126	123
Mean (SEM; SD)	8.3 (0.186; 2.94)	9.6 (0.281; 3.12)**	7.05 (0.189; 2.12)**
Median	9	10	6
Children <11 yrs. of age (Sample size)	252	126	126
Mean (SEM; SD)	2.02 (0.065; 1.029)	2.08 (0.099; 1.107)	1.95 (0.084; 0.945)
Years living in current city? (Sample size)	249	125	126
Mean (SEM; SD)	18.3 (0.762; 12.08)	12.3 (0.861; 9.62)**	24.2 (1.012; 11.35)**
Median	10	10	23
Years living in current house (Sample size)	250	124	126
Mean (SEM; SD)	8.6 (0.532; 8.4)	5.4 (0.494; 5.5)**	11.7 (0.85; 9.54)**
Median	5.5	2	10
Range	1-40	1-29	1-40
Household size (# people) (Sample size)	250	124	126
Mean (SEM; SD)	5.1 (0.109; 1.724)	5.07 (0.146; 1.629)	5.13 (0.162; 0.146)
Median	5	5	5
Housing tenure (Sample size) [%]	250	125	125
Own	64.8	48.0**	81.6**
Rent	31.6	51.2	12.0
Land	3.6	0.8	6.4
Household income per month (Sample size) [US\$]	250	122	122
Mean (SEM; SD)	\$1610 (71.4; 788.64)	\$224 (8.63; 95.39)	\$192
Median		\$1,800	

* Includes Ciudad Juárez, Chihuahua in México, and El Paso, TX, San Elmarco, TX and Sunland Park, NM in the U.S.
** Significant difference between participants in the U.S. and México at p<0.05
*** Significant difference between participants in the U.S. and México at p<0.001

Table 2. Practices of U.S.-México border residents about residential pesticides

Participants' Characteristics	Regional (Paso del Norte)	U.S. Participants	México Participants
Number of pesticide products (in households with at least one product) (Sample size) (Percentage of households with ≥3 product)	155 (61.5%)	96	59
Mean (SEM; SD)	1.55 (0.077; 0.96)	1.7 (0.113; 1.10)**	1.29 (0.073; 0.559)*
Maximum number of products	9	9	4
Uses at least one illegal pesticide product (Sample size) [%]	252	126	126
Yes	43.7%	37.3*	50.0*
Have you ever been notified before pesticides are applied nearby your house or in your neighborhood (Sample size) [%]	252	126	126
Yes	13.1	19.8**	6.3**
No	86.9	80.2	93.7
Do you buy pesticides in the other country? (MX or U.S.) (Sample size) [%]	252	126	126
Yes	31.0	38.9**	23.0**
No	69.0	61.1	77.0
Do you use pesticides with the label in a language you don't understand (e.g. English, Chinese, etc.)? (Sample size) [%]	251	125	126
Yes	35.9	35.2	36.5
No	64.1	64.8	63.5
Does the owner of your home notify you before the application of pesticides? (Sample size) [%]	86	64	22
Yes	62.8	75.0**	27.3**
No	37.2	25.0	72.7

* Includes Ciudad Juárez, Chihuahua in México, and El Paso, TX, San Elmarco, TX and Sunland Park, NM in the U.S.
** Significant difference between participants in the U.S. and México at p<0.05
*** Significant difference between participants in the U.S. and México at p<0.001

Figure 1. Place of birth according to country of residency

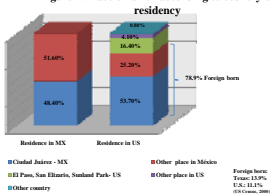


Figure 2. Perception of harmfulness by exposure to small amounts of pesticide in short or long term periods

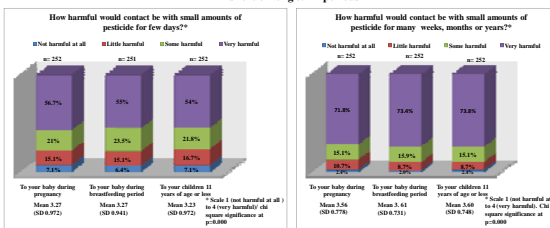


Figure 3. According to the smell, how safe are pesticides if they smell good or bad or have no smell?

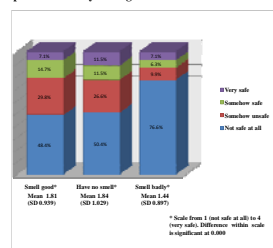


Figure 4. Level of trust on sources of information about pesticides by place of residence (U.S. or México)

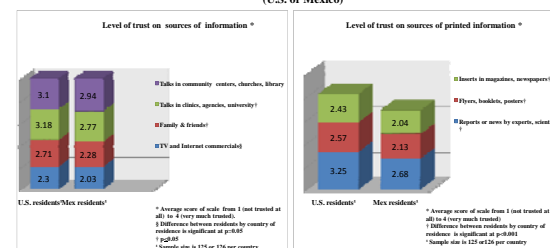


Table 3. Matrix with correlation coefficients between selected individual characteristics, risk practices, and perceptions about residential pesticides*

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Age		-0.266**	-0.209**	-0.148**	0.317**	-0.096	-0.153*	-0.125*
(2) Years of education			-0.203	0.056	-0.302**	0.103	0.082	0.054
(3) Income †				0.073	0.334**	-0.089	0.025	-0.034
(4) Place of birth ‡					-0.040	-0.072	-0.002	0.031
(5) Number of years living in this city						-0.042	-0.057	-0.022
(6) Usage of illegal pesticides							0.317**	0.096
(7) Usage of pesticides with label in a language not understood †								0.083
(8) Perception of safeness of pesticides independently of smell (good, bad) or absence of smell								0.083

* The number in parenthesis in each column is matched with the number in parenthesis before the variable name on each row
† In U.S. dollars (Rate of exchange is rounded to \$13.00 Mexican pesos per dollar)
‡ Place of birth grouped into (1) Ciudad Juárez, (2) El Paso, TX, San Elmarco, TX, and Sunland Park, NM, (3) Other place in México, and (4) Other place in the U.S.
* correlation is significant at 0.05 level (2-tailed)
** correlation is significant at 0.01 level (2-tailed)

Conclusions

➢ Although the results shown here are limited to Hispanic, Spanish-speaking women living in the Paso del Norte Region, results can be extrapolated to women with similar characteristics living in the U.S. More research could help explain behavior of more acculturated Hispanics in urban-semi urban settings.

➢ According to Martínez (1999), Mexican immigrants to the border could be categorized as *settled immigrants* after several years of residence. These immigrants have the ultimate goal of moving farther into the U.S. Living in the border help them absorb as much as possible the U.S. culture to ease their way into the U.S. Living in the border region makes Mexican immigrants maintain a mixed culture to help them function in the diverse social environments found in some places in the U.S. (Martínez, 1999). Having less years of residence and being renters more than homeowners, U.S. participants in this study would share the same goal described by Martínez and some practices and beliefs about pesticides may prevail and mixed with those of the places they settle.

➢ U.S. border cities and counties have greater proportion of Hispanic immigrants with origins from cities and counties in the border than other places in México (Figure 1). Social mobility can be observed in this study for U.S. residents of Mexican origin as compared to their Mexican counterparts. U.S. residents report higher income and years of education and correlated with years of residency.

➢ Usage of illegal pesticides is prevalent in the U.S.-México border (43.7%). However, reported little trust in the information inserted in magazines and newspapers. Illegal pesticides are used by a greater proportion of residents in México (50%) than in the U.S. (37.3%) (Table 2). Use of illegal pesticides is correlated with usage of pesticides with label in another language (Table 3).

➢ Over 36% of U.S. borderlanders are using pesticides with a label in a language they don't understand (English, Chinese, etc.). The number of years living in the U.S. is inversely correlated with the usage of illegal pesticides and with usage of pesticides with label in a language they do not understand.

➢ Border residents of either side have similar number of children and household size. In the other hand, U.S. residents tend to be younger, have more years of education, fewer years of residence in the city and in the house, live more in places rented than owned, and have more pesticides products than their Mexican counterparts (Table 1).

➢ More U.S. Hispanic residents buy pesticide products in México than Mexican residents buy their products in the U.S. The cost of the product and the dollar/peso exchange rate would be the factors explaining this behavior (Table 2).

➢ In general, all participants rated as more harmful the longer exposures to pesticides than to shorter periods of time to their unborn babies, breastfeeding babies, and to their children 11 years of age and younger (all mean differences significant at p<0.001) (Figure 2).

➢ Mothers living on either side of the U.S.-México border share practices such as using illegal pesticides and pesticides with label in a language they do not understand, and purchasing pesticides in the other country.

➢ Hispanic mothers living in either side of the U.S.-México share beliefs, such as the belief that pesticides are safe or not independently of smell (good or bad) or absence of smell and that their unborn babies, breastfed babies, and children <11 years of age are somehow harmed by exposure to pesticides, independently of the length of exposure (short or long term).

➢ Mexican residents place greater trust in information about pesticides given by community centers and churches. U.S. residents, however, place greater trust in information provided by clinics and universities. Participants from either country

➢ Overall, a small proportion of border residents (13.1%) is notified before pesticides are applied near their home or in the neighborhood; most of those are U.S. residents (p<0.000).

➢ The notification to resident by the owner before application of pesticide is significantly predicted by income (F=7.68, p=.007).

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Title: Social, cultural, and individual factors of Latino residents in the U.S.-Mexico border as determinants of social disparities increasing exposure to residential pesticides.

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