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# Increasing Parents Knowledge On Reducing Child Lead Exposure Through Education Provided By Community Health Workers In El Paso, Texas

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# INCREASING PARENTS KNOWLEDGE ON REDUCING CHILD LEAD EXPOSURE THROUGH EDUCATION PROVIDED BY COMMUNITY HEALTH WORKERS IN EL PASO, TEXAS

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## Dedication

For my son, Zachary, and for the Herrera and Gutierrez families.

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by

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## Abstract

**Background and significance**: Childhood lead exposure continues to be a significant public health concern, especially within Hispanic and Latino communities. Exposure to environmental lead is associated with various adverse health outcomes among children. Unfortunately, parents may have limited knowledge on the topic of lead exposure and may be unaware of screening and mitigation options available to their families. Research on culturally competent educational interventions that focus on increasing parents' knowledge on reducing childhood lead exposure is limited, particularly within Hispanic border communities. This study aimed to assess if a brief education session provided by Community Health Workers increased parents' knowledge of reducing childhood lead exposure while also connecting families to needed screening and mitigation services.

**Methods:** For this study, a door-to-door campaign approach was used. Two Community Health Workers (CHWs) went door-to-door, offering parents education on reducing childhood lead exposure and to enroll children in blood lead level screenings. The CHWs were accompanied most days by the team researcher, who helped keep field notes and organize the effort. When a parent or guardian-type family member was at home and agreed to participate, the session required a total of approximately 10 to 15 minutes. It included administering the 12-item knowledge questionnaire before and after the education and a verbal explanation of a brightly colored educational brochure designed especially for this study. The brochure included information on the most common sources of lead exposure in children, possible effects of lead exposure in children, and simple methods for preventing child exposure to lead in the home environment.

**Results:** Due to the pandemic shutdowns, the full sample of subjects planned for this study could not be obtained. The available data were analyzed quantitatively and qualitatively. A total

of 603 homes were approached door-to-door in 7 weeks. Of these approaches, 51 family members answered their doors, and 35 agreed to participate in the brief education session. For these analyses, data from 35 parents were used. Qualitative data in the form of field notes kept during door to door outreach, pertaining to parents responses and attitudes towards the intervention, and reasons for refusal to participate, were also summarized. All materials were available in Spanish and English, and the research workers were fully bi-lingual.

The majority of the participants were female (88.6%, 31/35) and indicated Spanish as their preferred language for receiving educational materials (77%, 27/35). Comparison of pre-and post-education knowledge scores showed a significant knowledge increase following the one-on-one education session offered by Community Health workers (mean diff= -3.086; SD diff= 2.147) (p-value <0.001). Of the 35 participants who received the education session, 23 agreed to enroll their children in blood lead level screenings.

**Conclusions:** While the brief education sessions provided by CHWs on reducing childhood lead exposure effectively increased knowledge among parents, a door-to-door method of outreach was not effective in recruiting a substantial amount of participants for this study, as answering rates were exceedingly low. Future educational interventions should build trust between parents and researchers to increase recruitment in education and screening programs. This can be achieved through multidisciplinary approaches, such as partnering with schools and trusted community centers. This study's findings add to the currently limited research available on brief educational interventions on reducing childhood lead exposure in Hispanic communities.

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# Chapter 1

## Childhood Lead Exposure

For over fifty years, reducing childhood lead exposure in vulnerable communities has been a public health priority. Lead is a toxic environmental metal that accumulates in the body and causes detrimental health effects with no identified "safe" level of exposure (Meyer et al., 2003). Preventative measures to reduce lead in the environment began in 1971 and resulted in the development of several policies and regulations that significantly lowered blood lead levels. In 1973, the Environmental Protection Agency began to regulate the phase-out of lead in gasoline, and the use of lead pipes and lead solder in plumbing was banned in 1986 (Bridbord Kenneth & Hanson David, 2009). By 1988, the Lead Contamination Control Act allowed for the development of grants and resources that would give state and local programs the ability to provide screening and education on lead poisoning. While these regulations and federal standards have aided in decreasing blood lead levels (BLL), low lead levels are still very much present in the environment. Lead poisoning is a severe concern for children, particularly children between the ages of 6 months and five years of age, at an increased risk of ill effects.

The effects of lead exposure are highly detrimental to a child's rapidly developing organ system, and children are far more vulnerable than adults are. Children inhale more significant air per pound volume than adults, resulting in higher rates of lead-contaminated dust and soil inhalation (Royce & Needleman, 1992). Infants and young children also absorb lead within their gastrointestinal tracts at rates 5 to 10 times higher than adults because of their small body size. Frequent hand-to-mouth activity among young children is a significant source of exposure, particularly for toddlers who ambulate on the floor (Royce & Needleman, 1992). Children residing in low-income areas are at a high risk of being exposed to lead through hazards present

in their environments. Many housing units in lower-income neighborhoods have not been screened for lead hazards or mitigated, especially housing built before 1978 (Royce & Needleman, 1992). The Center for Disease Control and Prevention Blood Lead Reference Value currently used to determine case management requirements for children is 5 μg/ dL (Betts, 2012); however, states differ broadly in the level of child blood lead that triggers intervention. In the United States, at least 500,000 children live with blood lead levels above the CDC reference value (Hauptman et al., 2017).

### 1.1 Sources of Childhood Lead Exposure

Between birth and five years, infants and children are developing at rapid rates and often engage in hand to mouth practices, which increase their risk of ingesting/inhaling lead present in their environment (Ko et al., 2007). The most common sources of lead exposure for children are living in homes contaminated with lead-based paint, which deteriorates and contaminates household dust; playing in areas where lead is present in the soil and ingesting the contaminated soil, or playing with toys made of lead or that are painted with lead-based paint (Ko et al., 2007; Royce & Needleman, 1992).

Although in 1978, the Ban on Residential Paint prohibited the use of lead paint in residential areas, there are approximately 23 million homes in which lead-based paint hazards are still present (Jacobs et al., 2002). Deteriorated lead-based paint creates health hazards when the paint chips or flakes and is then ingested by children or inhaled in the form of lead-contaminated dust (Jacobs et al., 2002). Children are exposed to contaminated lead soil by eating the soil or indirectly bringing soil into the home through shoes or clothing (Laidlaw et al., 2016).

Relatively cost-efficient and simple-to-execute options for mitigation of lead are available for sources found inside and outside the home. Painting over areas of deteriorating

lead-based paint with lead encapsulating paint prevents the old paint from contaminating the home environment (Guidotti & Ragain, 2007). When lead-contaminated soil is found outside of the home, the contaminated soil may be covered with physical barriers, mitigated with phosphorous fertilizer, or in cases with high levels of contamination, replaced with clean soil (Guidotti & Ragain, 2007). Before any renovation in older (pre-1978) homes, owners are advised to test the house's interior and exterior surfaces before renovating and properly dispose of waste materials that may be positive for lead (Binns et al., 2007). Parents can reduce child exposure to lead inside the home by wet wiping and wet mopping all surfaces weekly to limit dust collection and by frequent handwashing (Binns et al., 2007). Online resources are also available that allow parents to check if toys and jewelry present in their home have been recalled due to lead contamination.

### 1.2 Negative Health Outcomes Associated with Childhood Lead Exposure

From a life-course perspective, the effects of exposure to environmental lead can be seen as early as infancy and continue to impact those affected well into adulthood, especially concerning neurocognitive function. The neurocognitive impacts of lead exposure are mostly seen among children. Among infants, lead exposure symptoms may manifest as anemia, colic, or general irritability (Bianchi, 2015). Adverse health effects of exposure among children can include hyperactivity, difficulty concentrating, and aggression (Bianchi, 2015).

Various studies have found associations between decreased academic achievement, lower IQ scores, and behavior and attention disorders among children with blood lead levels at or below the CDC's current reference value (Lowry et al., 2016). A study published in 2009 found an association between Attention-Deficit/Hyperactivity Disorder (ADHD) and lead exposure in 25% of ADHD cases among children 8 to 15 years of age using data gathered from the 2001 –

2004 National Health and Nutrition Examination Survey (Froehlich et al., 2009). Additionally, exposure to environmental lead appears to be associated with increased delinquency and violence among some adolescents (Reyes, 2015). Data from 1979 to 1985 were analyzed from the National Longitudinal Surveys of Youth to assess behavior and school performance among 3,833 participants 14-21 years of age (Reyes, 2015). Low levels of lead exposure were associated with increased participation in aggressive, violent, and risky behaviors and impaired school performance among children and adolescents.

Despite knowledge of the many ill effects of early lead exposure, studies have suggested that most US children at the highest risk of lead poisoning are not screened. While requirements for screening for blood lead levels are available for health programs that serve children, many health care providers and program officials do not enforce screening practices (General Accounting Office., 1999). Healthcare providers have listed cost and time constraints and limited certainty of screening requirements for not enforcing screening practices (Bernard, 2003). Lack of consistent screening practices limits the development of reliable prevalence data on elevated blood lead levels among children, minimizing the public's perception of the severity of low-level lead exposure.

A statistical model was used to estimate case ascertainment of Elevated Blood Lead Levels (EBLL) in children aged 12 months to 5 years in the United States between 1999-2010. This model was developed using data collected from the National Health and Nutrition Examination Survey (NHANES) and the CDC's Childhood Lead Poisoning Prevention program. During this period, 1.2 million children were estimated to have had EBLL; however, only half of these cases were reported to the CDC (Roberts et al., 2017). It is estimated that 36% of children who did have EBLL during this period had not been accurately documented (Roberts et al., 2017).

Additionally, while various states appeared to have lower rates of EBLL among children, this rate may be attributed to higher rates of undetected cases rather than lower rates of lead exposure. Roberts et al. (2017) emphasize that even for children that do receive screening for EBLL's, many do not receive follow-up mitigation services for the contaminated environment, resulting in chronic low-level exposure despite detection. Mitigation and further screening are often not initiated unless a child has elevated blood lead levels over a certain period. Healthcare providers can request environmental lead investigation when a child's blood lead levels are 20 µg/dL or higher (*Texas Childhood Lead Poisoning Prevention Program Resources*, 2019). Environmental lead investigation can also be requested when two blood lead level tests collected within 12 weeks of each other are between 10-19 µg/dL (*Texas Childhood Lead Poisoning Prevention Program Resources*, 2019). Since low blood lead levels do not trigger interventions, many children do not receive needed mitigation services.

Studies that produce reliable and accurate prevalence data for lower-level lead exposure are needed to further establish the detrimental health effects of lower lead exposure levels. While recommendations and protocols have been put in place to increase blood lead level testing, more effective collaboration methods between clinicians, public health professionals, and environmental specialists are needed to ensure that both screening and mitigation practices occur. Providing needed education on preventing and reducing childhood lead exposure is the first step in potentially increasing screening and mitigation.

Parents should suspect the presence of lead in their children and homes if risk factors are present. However, many parents are not educated on lead exposure and may have difficulty identifying risk factors due to a lack of knowledge on the topic (Bebek, 2016). Since many lead exposure symptoms are often non-existent or present as common ailments (headaches, stomach

pains, irritability), many parents are unaware their children are being exposed and are unaware of the need for screening and mitigation. This ongoing lack of knowledge on childhood lead exposure and mitigation options suggests a need for educational interventions for primary and secondary prevention.

### 1.3 Educational Interventions to Reduce Childhood Lead Exposure

Limited knowledge and awareness among parents regarding the impact of lead exposure can be a significant barrier to accessing needed screening and mitigation services. Education on increasing knowledge and awareness on lead exposure has been used in several studies as a means of reducing child blood lead levels. In a 1997 retrospective study, outreach workers with the Milwaukee Health Department conducted home visits to educate parents on the sources and consequences of lead exposure and prevention practices (Schultz et al., 1999). The intervention was delivered in the homes of participants, and parents were provided with printed educational materials. Among the sixty-nine children whose parents received an educational intervention, there was a fifteen percent greater decline of blood lead levels than the 72 children whose parents did not receive an educational intervention (Schultz et al., 1999).

Jordan et al. (2003) compared the blood lead levels of 184 children of parents who received an educational intervention with the blood lead levels of 194 children of parents who did not receive the educational intervention (Jordan et al., 2003). The study's purpose was to assess the effectiveness of using intensive educational interventions that are culturally specific and peer-led to reduce childhood lead exposure. A total of 594 mothers were recruited to participate in the Philips Lead Project. Children of the participants of both groups had their BLLs tested and homes inspected for lead. In contrast, only the intervention group received 20 bi-

weekly educational sessions for up to a year. Results indicated that the educational intervention reduced the risk of BLLs > 10 µg/dL among children by 35% (Jordan et al., 2003).

While educational interventions appeared to reduce the risk of lead exposure, several limitations should be considered when evaluating the intervention's effectiveness in reaching those at the highest risk of having elevated blood lead levels. For example, the Jordan study only included children up to three, whereas children up to five are usually considered most at risk, and children up to 12 are also in danger. Including only the youngest children's parents may have excluded an unknown number of families who may have needed the intervention. Additionally, intensive education sessions may not be the most effective practice. Excessive amounts of educational sessions can lead to loss of interest due to time constraints and availability. Interventions that focus on single education sessions may be more beneficial in keeping parents engaged.

A single educational training session provided to parents and employees at the Webb County Head Start Center resulted in improvements in knowledge and behaviors on children's environmental exposures (Trueblood et al., 2016). Knowledge and behavior assessments were provided before and after the training session and one month after the training (Trueblood et al., 2016). The training included information on sources of exposure for several environmental hazards, including lead. The first part of the training focused on discussions of the material with the audience. The second part of the training was conducted in smaller groups with hands-on activities. A total of 114 participants (50 employees and 64 parents) showed increases in knowledge and behavior change (Trueblood et al., 2016). One example of behavior changes was demonstrated by parents being less likely to use folk remedies that may contain lead.

Another example of a brief educational intervention focused on reducing childhood lead exposure is a prospective study that assessed the effectiveness of knowledge gained from using an educational videotape during the child's well-exam doctor's visits. Participants included parents of children between 6 months to 6 years (Kersten et al., 2004). Forty parents were assigned to the control group and did not view the educational video. Thirty-five parents were assigned to the intervention group, where they did view the videotape. Parents were shown a 16-minute narrated tape on lead poisoning prevention by the Pennsylvania Department of Health while waiting for their child's doctor's appointment. The video included information on sources of lead exposure, treatment, and lead poisoning prevention (Kersten et al., 2004). Before the showing of the video, parents were given a survey with 24 items assessing knowledge. The same assessment was given to parents at the end of their visit and again two weeks after the video's initial viewing. Statistically significant improvements in test scores for the intervention group were shown between the pre and post-test assessments. Eighty-three percent of the intervention group reported changes in preventative behaviors than forty percent of the control group (Kersten et al., 2004). Behavior changes reported by participants in the intervention group included increased frequency in handwashing, and the washing of windows, walls, and floors (Kersten et al., 2004). One limitation of brief educational interventions is the inability to determine if parents retain knowledge and behavior changes long term.

While these interventions effectively increased knowledge among parents, education alone is not necessarily sufficient in reducing childhood lead exposure and should be combined with child BLL screening and mitigation options. Educational interventions can be made more effective by increasing parents' awareness of reducing childhood lead exposure and emphasizing screening and mitigation. Therefore, interventions that provide education and connect

community members to screening and mitigation services available are necessary. Additional research and evaluation of educational approaches that reduce childhood lead exposure are also needed.

### 1.4 Examples of Educational Materials Available

The Environmental Protection Agency (EPA) has consistently offered free, high-quality educational materials to the public in several languages, including English, Spanish, Vietnamese, Russian, Arabic, and Somali. The EPA provides a wide variety of educational materials that can be used on social media platforms and modifiable posters, flyers, and an information kit with examples of activities to use during outreach. Examples of different audiences' activities include providing physician's offices with educational materials for their patients and families to increase awareness.

One audience the EPA targets, in particular, is parents. Materials available for parents include infographics, fact sheets, flyers, handbooks, and lead exposure brochures. A booklet by the EPA titled "Protect Your Family from Lead in Your Home" educates its audience on how lead impacts health and what preventative measures are most effective. Additionally, this booklet provides information to homeowners on how and where to access risk assessment services. Several of the materials available emphasize the importance of seeking certified professionals to do this work. Another popular handbook for families developed by the EPA is titled "Fight Lead Poisoning with a Healthy Diet." This handbook provides parents with simple healthy recipes that are high in iron, calcium, and vitamin c, which to some extent, can reduce lead absorption. Educational materials available for children include songs, storytelling, interactive play through puppets, and animated educational videos.

The US Department of Housing and Urban Development (HUD) Healthy Home Initiative addresses housing-related hazards to reduce disease and injuries among children. Grants provided by the Healthy Homes Initiative allow for creating low-cost and effective hazard assessment methods and interventions. These methods include developing and distributing educational materials on home safety topics, carbon monoxide, pesticides, allergens, asthma, radon, mold, and lead. The lead section provides general information on lead exposure and several materials available with more detailed information in brochures and handbooks. The materials available provide detailed information to parents on reducing lead exposure among children, however many of the guides are between 60-80 pages, and parents may find them time-consuming, challenging to comprehend, and perhaps overwhelming.

The Texas Department of Public Health website also provides free educational materials in English and Spanish. Some of the resources available are from the EPA's website, including information on the importance of eating healthy to reduce lead exposure. Flyers are available that focus on weekly cleaning tips to reduce dust, information on where lead is found inside and outside the home, imported items that may contain lead, and how to prevent exposure. While these resources are valuable, many parents remain entirely unaware of lead exposure risks and would not know how to access the appropriate information and resources. Community-based educational campaigns that include door-to-door outreach may serve as a solution for the limited knowledge and awareness surrounding this topic, especially among Hispanic and Latino communities.

In 2006, a qualitative study in North Carolina examined gaps in lead exposure and education and outreach recommendations in a Latino community. Qualitative data were collected through open-ended interviews with the professionals who worked with Latino communities and

focused groups with Latino community members on perceptions of lead poisoning knowledge and recommendations for culturally appropriate effective education and outreach strategies within these communities. The participants consisted of six professionals, including one participant with prior experience in lead poisoning prevention education and four participants with previous experience providing instruction in other topics; the focus groups consisted of sixteen participants who were members of the community (Vallejos et al., 2006).

Approximately eighty percent of participants from the focus groups were unaware of lead exposure sources and had limited knowledge of the health effects of lead exposure and how to acquire blood lead level testing (Vallejos et al., 2006). In the open-ended interviews, professionals acknowledged that when they provided door to door education in their communities, many parents admitted to not knowing a lot about lead. Participants' primary education strategies and outreach recommendations included health fairs, workshops, and sending information home to parents through their children's schools (Vallejos et al., 2006). One professional emphasized the benefit of Latino oriented community health fairs to provide families with information and screening services. The participant cited one event in which 1,000 people approached their information table to receive education, and on-site blood lead level screening for 60 children was provided in one day (Vallejos et al., 2006).

Additionally, for door-to-door outreach to be effective, community members and professionals agreed that educators should not be intimidating and familiarize themselves with the community (Vallejos et al., 2006). Limited research is available on the effectiveness of educational interventions on lead exposure among Hispanic and Latino communities and their responses to the educational interventions. These educational interventions should focus primarily on raising awareness of the severity of childhood lead exposure.

### 1.5 Childhood Lead Exposure in El Paso, Texas

Specific populations are at a higher risk of exposure due to age, occupation, and ethnicity. Studies have indicated that Hispanic people are at a higher risk of being exposed to lead than non-Hispanic populations. Data collected between 1988 – 1994 from the third NHANES study found significant differences in blood lead levels among Hispanic and non-Hispanic children under six. In one study with children between the ages of 1 – 5 years, twenty-eight percent of Mexican American children had elevated blood lead levels compared to only 19% of non-Hispanic white children (Bernard & McGeehin, 2003).

Morales (2005) identified several demographic and socioeconomic factors that predicted elevated blood lead levels among Mexican American children. These included gender, age, home language, generational status, home, and drinking water source. Socioeconomic factors, including family income and education level, were also predictive (Morales et al., 2005). Additional findings of this study indicated that generational status might also influence blood lead levels. First-generation Mexican American children appeared to have higher blood lead levels than third-generation children (Morales et al., 2005). Data from this study also indicated that Mexican American children living in Spanish-only speaking households had higher blood lead levels than children living in English-only speaking homes (Morales et al., 2005). These findings highlight the great need for culturally relevant and appropriate interventions to reduce childhood lead exposure among Mexican American children.

Various cultural practices also have been shown to be associated with the likelihood of lead exposure among Hispanic and Latino community members. One practice, for example, included the use of traditional ceramic lead-glazed cookware (Brown & Longoria, 2010). Consuming Mexican candies contaminated with lead-based ink on the wrappers have also been

associated with increased blood lead levels; also the use of traditional medicinal remedies such as Azarcon and Greta (Brown & Longoria, 2010) with a high lead content poses a significant risk to children (Matte et al., 1994). Another risk factor that has a substantial impact on lead exposure among Hispanic populations is housing. Housing surveys conducted between 1998-2000 found Hispanic families, in particular, were more likely to reside in homes with lead paint hazards present compared to non-Hispanic families (Bernard & McGeehin, 2003).

### 1.6 Lead Exposure in El Paso, Texas

El Paso, Texas, has a long history of contamination in downtown neighborhoods. Since late 1889, an ore smelter operated within 1 mile of the downtown region. In the 1970s, it was discovered that the smelter was emitting vast amounts of lead into the air (Landrigan et al., 1975). The smelter was shut down in 1999; however, the impact of heavy metal exposure on residents' health in both El Paso, Texas, and Juarez, Mexico, was eventually well-documented. A study published in 1975 determined blood lead levels of children living in the area and sources of lead contamination, including soil and dust samples. Fifty-three dust samples were collected from 51 locations, and the average lead content was 22,191 PPM (Landrigan et al., 1975). Four hundred and forty-six surface soil samples were collected from multiple areas surrounding the smelter and were found to have a very high amount of contamination from a lead (Landrigan et al., 1975). Approximately 52.7% of children aged 1-9 years living within 2 kilometers of the smelter were found to have blood lead levels ranging from 40 – 60 micrograms per deciliter of whole blood. Concerning source, blood lead levels were inversely proportional to the smelter location (Landrigan et al., 1975).

Although intervention and prevention efforts have successfully decreased elevated blood lead levels, children currently living in historically contaminated neighborhoods in El Paso are

still at the highest risk for lead exposure. In a sample of 116 children living in the downtown El Paso areas, approximately 27% had an average blood lead level of 4.9 μg/ dL (Sobin et al., 2009). One study compared the blood lead levels of 111 children living in an urban neighborhood in El Paso, Texas, with 111 rural children living in nearby communities. Children between the ages of 5 – 12 years residing in the urban area had significantly higher blood lead levels than children living in rural communities (Alvarez et al., 2018). There is an obvious need for wide-scale screening efforts to identify children who have been exposed to lead and their sources of exposure to prevent further contamination in such areas. Before executing wide-scale screening efforts, the public should be educated on the severity of childhood lead exposure, as well as their children's susceptibility to the toxic effects of lead. Despite the number of children currently known to be exposed, there is a striking lack of public health education on the problem and a general lack of public awareness of its seriousness. Limited awareness and knowledge prevent parents and even health care workers from knowing what to expect and request regarding essential child screening and mitigation. Culturally relevant educational interventions could significantly reduce child lead exposure in the El Paso border region.

### 1.7 Community Health Worker Model

Among vulnerable and underserved populations, various barriers exist that limit their ability to access needed health care and services. Examples of barriers to acesseing services include income status, residence status, age, health status, and language (Chang et al., 2004). These barriers can reduce the likelihood of effective intervention and prevention among the most at-risk populations. One method that has been effective at reaching underserved and vulnerable populations is the community health worker (CHW) model.

Generally speaking, community health workers are voluntary or paid employees who promote health within their respective communities. Community health workers are most effective when they share characteristics similar to the communities they will be serving. They include being familiar with the targeted populations' preferred language, education level, and culturally relevant details about their neighborhoods (US Department of Health and Human Services, 2009). Some of the critical services and resources offered by community health workers include providing culturally competent health education, access to health care, referrals to services, and health advocacy (US Department of Health and Human Services, 2007). The community health worker model allows for the bridging of health information between health professionals and underserved populations. The Community Health Worker model may be beneficial for Hispanic/Latino communities. Among Hispanic/Latino populations, language and cultural factors become significant barriers to accessing health care information and services, mainly due to feelings of mistrust towards medical and government systems (Early et al., 2016). Interventions and services geared towards Hispanic/Latino communities may see improvements in engagement and participation if their priority population is informed through someone they perceive to be trustworthy (Malcarney et al., 2017). Community health workers, often referred to as promotoras de Salud in Hispanic/Latino communities, can be optimal to fill this role.

### 1.8 Effectiveness of the Community Health Worker Model

The community health worker model has effectively addressed significant health concerns within the Hispanic/Latino community. Programs and studies that use CHWs have shown improved health outcomes among their target populations in areas such as diabetes management, maternal and infant health education, and access to screenings and referral services, to name a few.

One study utilized promotoras to increase access to health care among Latinos living in a region of California's San Joaquin Valley. The project took place between November 2007 and May 2009, and the study population consisted of 313 Latinos above the age of 18 living in low-income areas. A baseline survey was administered to participants who measured health care utilization, enrollment of health insurance, and current attitudes and beliefs towards health care access. Two post-test assessments were developed to measure if there was a change in knowledge and attitudes about health insurance enrollment, preventative services, and the use of health care access. The first post-test was provided three months after the initial baseline survey was administered. The second post-test was provided nine months after the initial baseline survey and included questions about the use of health services within the past three months. Outcome measures related to health care access, insurance status, and efficacy showed an overall improvement between the baseline survey first administered and the two post-test assessments (Capitman et al., 2009). The Promotora intervention was identified as effective in increasing the likelihood of accessing health services among the study population.

Community health workers have also proven to be especially useful in educating parents on children's health topics. The community health worker model effectively improved maternal and infant health outcomes among Hispanic women by increasing their folic acid knowledge (Flores et al., 2017). The study took place in four US counties with predominantly Hispanic populations located in Harris County, Texas, Hillsborough County, Florida, Cook county, Illinois, and Mecklenburg County, North Carolina. Study participants included a total of 1,426 Hispanic women over the age of 18 residing in selected counties. Awareness, knowledge, and use of folic acid were first assessed with a pre-test survey. Following this survey, participants were provided with a brief group intervention and offered a three-month supply of multivitamins

by the promotoras. Post-test assessments were then administered four months following the intervention (Flores et al., 2017). Overall increases in vitamin intake, knowledge of the benefits of folic acid and other vitamins were seen following the intervention among participants (Flores et al., 2017). The community health worker model is currently being used to aid in primary, secondary, and tertiary prevention efforts to improve Hispanic and Latino communities' health, especially among populations in the United States-Mexico border region.

One intervention in El Paso, Texas, focused on improving pesticide safety among families by employing local community health workers (promotoras) to conduct home assessments and educate community members. Data collected from three hundred and sixty-seven participants between 2002-2005 showed a significant increase in knowledge and behavior towards reducing exposure to pesticides (Forster-Cox et al., 2007). The intervention consisted of two home visits. During the first home visit, promotoras completed an initial home assessment to determine environmental health/home safety hazards. Additionally, participants were given a pre-test and educational session on home safety and pesticides by promotoras. The second home visit took place approximately two weeks following the initial visit. During the second home visit, promotoras assessed the home again for hazards, and participants were given a post-test to evaluate changes in knowledge and behavior related to pesticide safety. Approximately sixty-two percent of participants began to use protective gear appropriately when handling pesticides by the second home visit (Forster-Cox et al., 2007). Fifty-seven percent of participants also began to safely store pesticides away from children following the first home visit from the promotoras (Forster-Cox et al., 2007). Participants emphasized that promotoras were taking time to listen to community members' concerns and actively improved feelings of trust and engagement with the study, allowing participants to feel more comfortable allowing promotoras in their homes.

While this intervention effectively increases knowledge and behavior changes, the benefits of community health workers addressing environmental health concerns, such as reducing childhood lead exposure, is an area of research that is currently limited. Child lead exposure remains a substantial health concern, especially among Hispanic children residing in El Paso, Texas. Community health workers can deliver effective and culturally competent education on reducing child lead exposure to parents living in high-risk neighborhoods while also connecting individuals to screening and mitigation services.

### 1.9 Qualitative Assessments of Educational Interventions

Research on the qualitative assessment of educational interventions focused on environmental health is needed in the public health field. Qualitative data can evaluate interventions' effectiveness and suggest ways to improve research (Brown, 2003). Professionals who work in lead poisoning prevention programs can provide valuable qualitative information on contributing factors to childhood lead exposure and help develop needed targeted interventions. For example, the perceptions and opinions of sixteen professionals with various roles in lead poisoning prevention roles in Lancaster, Pennsylvania, were recorded through semi-structured interviews between 2017 and 2018 to identify factors contributing to elevated blood lead levels among children residing in their location (Okatch et al., 2019).

Participants acknowledged a limited awareness of lead toxicity and limited environmental health literacy among community members and suggested distributing educational materials at appropriate literacy levels (Okatch et al., 2019). According to participants, housing status played a role in elevated blood lead levels in the community. Families who rented their homes reported not feeling comfortable requesting environmental testing and needed home mitigation from their landlords due to fear of eviction (Okatch et al., 2019). Participants recommended offering

educational sessions to different audiences, such as parents, early learning centers, landlords, and tenants (Okatch et al., 2019). Participants also recommended individualized and simple interventions that do not inconvenience families (Okatch et al., 2019).

Qualitative information provided by parents participating in educational programs is crucial to identifying themes associated with prevention programs' effectiveness. This information can significantly help identify barriers to reducing lead exposure among families. A focus group comprised of seventy-eight participants of the Phillips Neighborhood Lead Poisoning Prevention Project (The Lead Project) identified barriers to and facilitators of adopting behavior changes that prevent lead poisoning (Jordan et al., 2003). The education they received from the intervention focused on household cleaning and hygiene practices, water, nutritional guidelines, and safe home repairs and renovations (Jordan et al., 2003). In the focus groups, participants identified behavior change facilitators to include teaching simple strategies they could easily integrate into their routines and lifestyles, demonstrating concepts when applicable, and presenting techniques for making vegetable consumption appealing to children (Jordan et al., 2007).

The focus group also identified several barriers to behavior change. Some participants stated that some preventative measures took too much effort, such as cleaning more than once a week, and reported having little support from spouses or family members to enforce suggested prevention strategies taught to them. Some participants said that they did not believe their child/children were at risk and did not need to adopt any prevention strategies (Jordan et al., 2007). These focus groups' results can guide the development of more effective educational interventions that do not overwhelm participants while still emphasizing the significant risk

childhood lead exposure poses that would encourage parents to engage in necessary behavior changes.

Another qualitative study explored parental perceptions of blood lead testing barriers and awareness of the severity of lead poisoning among thirty parents with children eligible for Medicaid. Parents appeared to be misinformed on lead exposure and blood lead level screening and were unaware of how to acquire blood lead level screenings for their children (Polivka & Gottesman, 2005). Participants emphasized a need for blood lead level screenings to be easily accessible, such as being integrated into their doctors' wellness visits (Polivka & Gottesman, 2005). Parent's also expressed that easy to read printed materials were their preferred method of learning about lead poisoning and educational videos on the subject (Polivka & Gottesman, 2005).

### 1.10 Goals and Objective

This project's primary goals were to educate parents of children living in El Paso, Texas, on reducing childhood lead exposure and offering to enroll children at high risk for exposure to environmental lead in available screening and mitigation services. This study's primary objective was to increase parental knowledge on reducing childhood lead exposure and mitigation strategies among 75 families in high-risk neighborhoods located in El Paso, Texas, by May 2020. The sample size of 75 families was selected to offer sufficient statistical power; however, due to the COVID-19 pandemic resulting in the cease of data collection efforts, the final sample size was 35.

### 1.11 Study Aims and Hypotheses

*Study Aims:* The first study aim in this project was to test whether a brief one-on-one parent education session delivered to parents through door-to-door outreach increased parents'

knowledge of early childhood lead exposure and how to reduce the risk of lead hazard exposure. This project's second study aim focused on providing a qualitative assessment of the one-on-one parent education session delivered to parents.

*Hypothesis*: Parent knowledge regarding child lead exposure and how to reduce lead hazard risks in the home environment will increase following a single one-on-one education session. As compared to pre-education questionnaire scores, post-education questionnaire scores will be higher.

### 1.12 Theoretical Conceptual Framework: The Health Belief Model

Theoretical models serve as a framework for developing effective interventions (Heale & Noble, 2019). In particular, theoretical models focusing on behavior change are especially useful within the public health field. The Health Belief Model (HBM) has been used for several decades in the public health field to measure and influence health beliefs and behaviors. According to this theoretical framework, an individual's belief in the threat of a health condition or disease, in combination with the individual's belief in a recommended health behavior or behavior change, one can predict if the individual will accept and adopt the behavior (Becker, 1974).

The Health Belief Model's primary constructs include perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy (Skinner et al., 2015). Perceived susceptibility refers to a person's belief in their likelihood of contracting a disease (Zare et al., 2016). Perceived severity refers to the perception of a health condition's seriousness and the impact of the consequences of leaving the condition untreated (Zare et al., 2016). Perceived benefits indicate the believed benefits of participating in health behavior or health behavior change (Zare et al., 2016). Perceived barriers are what the individual perceives as a barrier when participating in health behavior changes, such as the action being time-consuming, costly, or complicated. Self-

efficacy indicates an individual's confidence in their ability to make a health behavior change (Poorolajal et al., 2013). Cues to action refer to a stimulus that prompts a behavior change; this may include experiencing difficulties related to the health condition or gaining knowledge on the topic that influences the individual to act (Poorolajal et al., 2013).

The Health Belief Model was used as a reference framework for the data collection efforts of this study. This study aimed to increase parental knowledge on reducing childhood lead exposure. The primary constructs focused on were perceived susceptibility and severity, cues to action, and self-efficacy. Providing education on sources of lead exposure and pathways of exposure for children can increase parents perceived susceptibility to the issue. The constructs of perceived severity and susceptibility are addressed in this study by educating parents on the severity of exposure and understanding why children are the most vulnerable. Increasing parents' perceived susceptibility and severity of lead poisoning can potentially influence behavior changes to prevent or reduce exposure. Further educating parents on the health effects of lead can result in cues to action that emphasize simple mitigation and prevention strategies. Educating parents on these methods can be the first step in improving self-efficacy to engage in these behavior changes.

# Chapter 2

## Methods and Materials

Community health workers (CHW), also known as Promotoras de Salud in Hispanic communities, effectively educate their respective neighborhoods on various health topics and are the most successful when representing the communities they are serving. For this study, two bilingual community health workers with a minimum of two years' experience were employed to deliver education door to door in identified low-income neighborhoods with a high risk of lead exposure. Community Health Workers were paid to work for approximately 8 – 12 weeks total and were expected to disseminate education to families for a minimum of three days per week. The eight to twelve-week time period was scheduled to be completed within a two to three-month span; however, the emergence of the COVID-19 pandemic lead to a city-wide mandated stay home order which prohibited face-to-face contact between researchers and community members. Data were collected between January 2020 through March 2020.

### 2.1 Sample Population

The city of El Paso, Texas is located on the United States Mexico border and is currently home to an estimated population of 840,758 individuals with 265,724 households (Jordan et al., 2007); 7.5% of this population is under the age of 5 years, and 27.1% of the population is under the age of 18 (*US Census Bureau QuickFacts*, 2018). The average household income in El Paso, Texas is $44,597, with an estimated 20.5% of the population living in poverty; 77% of the population has a high school educational level. Concerning ethnicity, 83% of the population identifies as Hispanic, with 11% identifying as white and 3.9% identifying as African American (*US Census Bureau QuickFacts*, 2018).

A sample of thirty-five parents or guardians of children between 6 months to 15 years of age was recruited to participate in community health workers' educational intervention. Participants were recruited from neighborhoods within a one-mile distance from downtown El Paso.

### 2.2 Study Design

Each family completed the parent education sessions in approximately 30 minutes or less. All materials were made available in both English and Spanish, depending on the participant's language preference. The education provided to parents familiarized them with sources of lead exposure, everyday ways in which children are exposed to environmental lead, and the health effects of lead in children. Participants were also educated on simple, low-cost ways to mitigate lead sources found in the home and methods to prevent or reduce childhood lead exposure. This information was communicated to participants by the promotoras using a 10-page booklet developed by the University of Texas at El Paso Lead Research Team. During this time, the community health workers also informed parents of the opportunity to enroll in blood lead level screening services provided by the University of Texas at El Paso Lead Research Team.

Knowledge gained was the primary measure of the effectiveness of the brief education session provided. Knowledge gained was determined through pre and post-assessments administered to parents containing 12 questions. Parents' knowledge of lead exposure was first evaluated before delivering the educational material and after completing the brief education session provided by promotoras. The questionnaire contained items assessing parent's knowledge of the health impact of lead exposure, sources of lead exposure inside and outside of the home, methods to reduce the risk of lead exposure, and mitigation options for when sources of lead

have been identified. The pre-test and post-test questionnaires were completed in approximately 10 minutes per family.

The educational booklet and knowledge questionnaire were developed by the University of Texas at El Paso Lead Research Team. All materials designed for this study were based on the research team's knowledge of the targeted community and existing academic literature related to reducing childhood lead exposure. The research team has worked extensively in and around the El Paso community over the past several years. The contents of the ten page educational booklet were developed by extracting information from credible government websites that provide details on lead poisoning prevention. These websites included the Center for Disease Control and Prevention (CDC), Environmental Protection Agency (EPA) and the U.S. Department of Housing and Urban Development. Information was also applied from nonprofit organizations such as the Alliance for Healthy Homes. All images used in the educational booklet were extracted from online sources as well. All content within the booklet and knowledge questionnaire were translated to Spanish by members of the research team. The knowledge questionnaire was developed by the research team based on the information provided within the educational booklet. Both materials were written at a third grade reading level. Both the educational booklet and knowledge questionnaire have been utilized by the UTEP Lead Research Team in the past when conducting community outreach and providing home-based environmental health assessments. These materials were culturally appropriate and well-received within the community.

Before initiating home visits, Promotoras completed a 90-minute training session in which they were taught information regarding childhood lead exposure risks and prevention methods. The Graduate Student Project Coordinator (JA) accompanied the community health

workers to the home visits in the designated neighborhoods. While there was no formal measure of fidelity for this study, a research team member was present during a majority of the door-to-door outreach conducted by the Community Health Workers and was able to ensure the materials and approach was being implemented as directed. Data collected from the parent knowledge questionnaires were entered and analyzed by the graduate student project coordinator. The graduate student project coordinator was responsible for developing and disseminating the training session for the Promotoras and monitored the production and dissemination of all educational materials.

Ethnographic research methods were also applied to this study. Ethnographic research provides valuable insight into behaviors and interactions occurring within a group or community through observations or interviews (Reeves et al., 2008). Participant observations in the form of field notes were documented during the course of outreach and while CHWs provided education on reducing childhood lead exposure to parents. Field notes are observational notes made by the researcher that document interactions and describe places and events that took place during the course of a study (Whitehead, 2005).

**2.3 Measures**

Knowledge gained was quantified using a simple 12 item knowledge survey before and after the educational intervention's completion. The knowledge surveys were administered to parents by the community health workers and then collected by the project coordinator upon completion. Several of the twelve items on the knowledge questionnaire were written in a check all that apply format and allowed participants to select between three to four answer choices. These questions assessed knowledge gained by quantifying parents' ability to identify appropriate responses.

These questions included identifying the health effects of lead exposure on children, identifying possible lead exposure sources in the home, and common ways they enter the body. Questions were also asked on how lead enters the house, identifying ways to reduce lead exposure inside and outside the home, and controlling lead contamination. The remaining five items on the knowledge questionnaire were written as true or false questions. These items assessed participants' knowledge of safe renovation practices, how children ingest or inhale lead from their environments, and the effect of lead exposure on the brain. Participants are also asked to identify who is the most vulnerable to lead exposure.

### 2.4 Data Collection

Data was originally to be collected by the Community Health Workers assisted by the Project Coordinator between January 2020 and August 2020; however, due to the COVID-19 pandemic, data collection efforts ceased in March 2020 to ensure the safety of the research team and community members. A total of 35 pre and post-test assessments were completed by parents and guardians of children between 6 months to 15 years of age between January 2020 and March 2020.

#### 2.4.1 Qualitative Data Collection

Qualitative data collected included field notes taken by the Graduate Student Project Coordinator (JA) and house visit records kept by the Community Health Workers. The field notes documented observations made by the Graduate Student Project Coordinator (JA) during the door to door outreach and while witnessing the education session provided by the Community Health Workers. The field notes recorded the dates and times the promotoras and Graduate Student Project Coordinator participated in door-to-door outreach and the Streets targeted for that particular day in targeted neighborhoods.

In addition to field notes, a house visit record was kept by the Community Health Workers. At each home we attempted to deliver education at, the community health workers would document a physical spreadsheet of the home address, if someone did or did not answer the door, or refused to participate or could not join because they had no children. The Community Health Workers documented if the participant answered and agreed to receive the educational intervention or asked us to return later.

### 2.4.2 Quantitative Data Collection

Quantitative data was collected through knowledge questionnaires delivered before and after the educational sessions. The community health workers would first knock on the home door where we were attempting to provide education. When a parent answered the door, they were provided with a brief introduction and summary of the project. If they agreed to participate, they were provided with the pre-test assessment. Once completed, the participant was provided with the educational booklet. The community health workers then delivered the education and offered to enroll participants in blood lead level screening provided by the UTEP Lead Research Team. The participants were then provided with the post-test assessment, and once completed, the education session would end. Both assessments were then collected and securely stored by the Graduate Student Project Coordinator.

## 2.5 Qualitative Data Analysis

A qualitative assessment of the educational intervention provided in this study will provide the field with further information on the description of parent responses and attitudes towards an educational intervention focused on reducing childhood lead exposure. Additional qualitative data recorded and analyzed included examining reasons for refusal to participate in the educational session or failure to follow-up. Qualitative information recorded immediately

following home visits in field notes were summarized and analyzed by the Graduate Student Project Coordinator using the Dedoose application. The House Visit Record forms were entered into an Excel spreadsheet and used to analyze the number of homes to which Community Health Workers attempted to provide education and how many individuals answered, did not respond, participated, or refused to participate.

**2.6 Statistical Analysis**

Descriptive data collected from participants included sex and language preference. Limited descriptive data were collected to ensure participants had the utmost privacy when participating in the educational sessions. To assess if knowledge on reducing child lead exposure has improved among parents, the number of correctly answered items on the pre-and post-education questionnaires were compared with a paired t-test. Responded to items from the pre- and post-education questionnaires were coded as "0" if the answer was incorrect, "1" if the answer was correct "." was used to indicate missing data. Data was considered missing if the participant did not indicate an answer on the questionnaires. Approximately twenty-six participants had no missing data, while four participants failed to answer only one question. Two participants did not answer two of the questions and one participant failed to answer three questions. Two participants did not answer 5 of the items on the questionnaire. During the data collection phase, all data were entered into an Excel database. Descriptive and inferential analysis was conducted through the use of SPSS software.

**2.7 IRB Approval**

The methods used in this study were approved by UTEP IRB (#1309985-7, C. Sobin, PI).

# Chapter 3

## Results

*Please note: The original plan to obtain pre/post data from 75 participants could not be realized because of COVID-19 related restrictions. Data could be collected only between January and March 2020. Qualitative analyses were added to the original plan in order to make maximum use of the available data. The types of qualitative information available were somewhat limited since these types of questions had not been planned initially.*

### 3.1 Quantitative Data Collected from Participants

A total of 35 participants completed the one-on-one education session provided by Community Health Workers between January and March 2020. Pre and post-test knowledge assessments were completed by all participants and quantitatively analyzed for increases in knowledge on reducing childhood lead exposure. Demographic data collected included the sex of participants and language preference. Of the 35 participants, four were male (11.4%), and 31 were female (88.6%). Of the 35 participants, 27 indicated Spanish as their language preference (77%) for receiving educational materials, and 8 participants indicated English as their preferred language (22.9%). Of the 35 participants who received the education session, 23 agreed to have their children participate in blood lead level screenings.

### 3.2 Quantitative Results

To test the hypothesis that pre-test scores (M= 5.51, SD= 2.188) and post-test scores (M= 8.60, SD= 2.354) would increase following a brief one-on-one education session on reducing childhood lead exposure, a paired t-test analysis was conducted. Preliminary univariate analysis of the pre-test scores and post-test scores determined the data's normality (Table 1 and 2).

Among 35 participants, there was a significant difference inincreases in knowledge before participating in a one-on-one education session offered by Community Health workers versus after participating in a one-on-one education session provided by Community Health Workers (mean diff= -3.086; SD diff= 2.147) (p-value <0.001). Table 3 displays the results of the paired t-test analysis.

Table 1. Pre-Test Score Totals

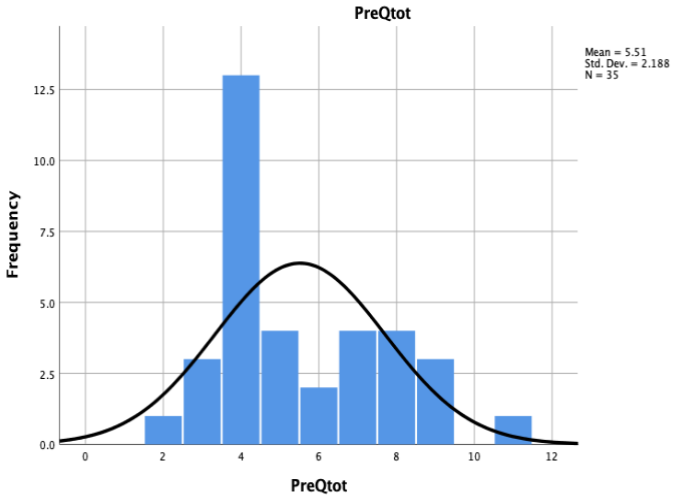


Table 2. Post-Test Score Totals.

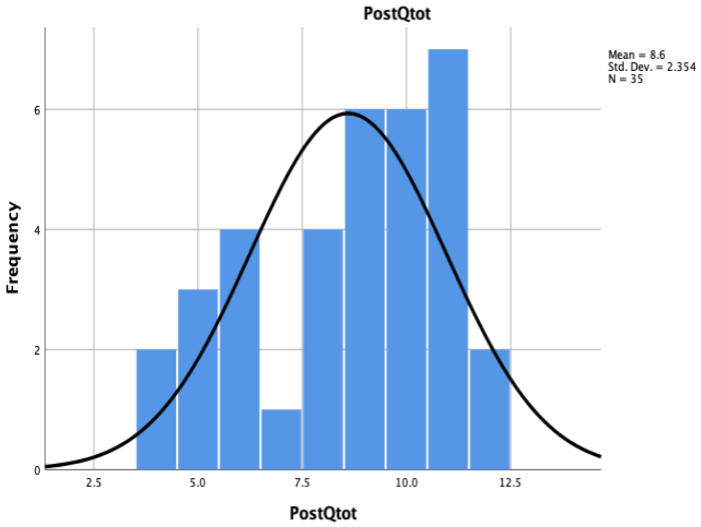

Table 3. Results of t-test Statistics for Pre-Test and Post-Test Score Totals

| Pre-Test and Post-Test Score Totals | | | 95% CI for Mean Difference | | | |
|---|---|---|---|---|---|---|
| M | SD | n | | r | t | df |
| -3.086 | 2.147 | 35 | -3.832, -2.348 | .555* | -8.502* | 34 |

* $p < .000$

### 3.3 Qualitative Data Collected from House Visit Records

Between January and March 2020, Community Health Workers attempted to deliver education to approximately 603 homes in high-risk neighborhoods located in El Paso, Texas. Between January and February, approximately 119 homes were attempted. Between February and March, 410 homes were attempted, and during March, 74 homes were attempted. Of the 603 households attempted, 35 participants (5.8 %) completed the educational sessions, 368 (61%) did not answer, and 156 (25.9%) claimed to have no children and therefore could not participate. Twenty-seven parents (4.5%) that did answer the door when we knocked asked us to come back at a later date; however, when Community Health Workers returned, only one parent answered and completed the education session; the other 26 did not respond. Sixteen parents (2.7%) indicated that they did have children but refused to receive the Community Health Workers' educational session. Overall, 94% of attempted homes did not receive the educational intervention.

Table 4. House-Visit Records Summary

| | |
|---|---|
| Number of homes attempted in total | 603 |
| Number of educational sessions completed | 35 of 603 (5.8%) |
| Number of educational sessions refused | 16 of 603 (2.7%) |
| Number of homes with no answer | 368 of 603 (61%) |

| | |
|---|---|
| Number of homes that reported having no children | 156 of 603 (25.9%) |
| Number of homes who asked us to come back at another time | 27 of 603 (4.5%) |
| Number of education sessions provided vs. not provided | 35 vs. 568 |

### 3.4 Qualitative Data Collected from Observational Field Notes

This project's main goal was to increase parental knowledge on reducing childhood lead exposure following a brief one on one education session provided by Community Health Workers. Observational field notes were recorded by the Graduate Student Project Coordinator while accompanying Community Health Workers as they attempted to deliver education door-to-door to families living in previously identified El Paso neighborhoods. The field notes were recorded on a paper notepad, then transcribed and saved to a word document to be analyzed using Dedoose software. The observational field notes focused on responses to the educational intervention and attitudes towards the education, as well as reasons for refusing to participate or failure to follow-up.

Field note observations also documented the physical characteristics of the neighborhoods where CHWs attempted to deliver education. Most neighborhoods were located within the 79901 to 79905 zip codes. Several neighborhoods consisted mainly of businesses and warehouses with few homes between. It was observed that within neighborhoods with single-family homes, many of the houses displayed obvious risk factors for lead exposure. For example, a majority of houses had deteriorating and peeling paint on the exterior of the home. Other homes had car batteries and waste from renovations in the yard, which can contaminate the

surrounding soil. One home had an old car battery outside near multiple children's toys. Spilled oil could be seen on the sidewalks and in the yards of several homes. These physical descriptions suggest that children living in these neighborhoods are at high risk of being exposed to lead and parents would benefit greatly from receiving education and screening services to reduce lead exposure.

### 3.5 Qualitative Responses and Attitudes Towards Educational Intervention

While the Community Health Workers provided the brief one-on-one educational intervention, the graduate student project coordinator (JA) noted observations on participants' responses and attitudes towards the educational intervention. Field note observations revealed one parent expressed a fear of being "forced" to paint the home if it was found to be contaminated with lead following their agreement to participate in screening and mitigation services offered by the UTEP Lead Research Team.

Another parent who participated seemed very engaged with the presentation and was interested in the study. The participant asked if we were providing education in all El Paso neighborhoods or just targeting that particular area. The parent expressed concern about her children attending a local Elementary school since she had heard from family and friends that the area was highly contaminated. She stated her husband used to work for the recycling plant, so she had some lead exposure knowledge because of his occupation. The mother knew of families in the area that advocated for testing, which allowed the CHW's to introduce the topic of the need for education and screening. She agreed to sign up to be contacted for screening.

During one educational session, a mother agreed to participate and invited us into her home. The education session took approximately 15 minutes to complete, and the participant was very engaged in the presentation. She agreed to sign up her children for the blood lead level

screening. She asked questions about how children are exposed to lead and how their blood lead level results would be shared. The community health workers informed her that the results would be shared through a phone call from a UTEP Lead Research team member, and a physical copy of the results would be sent via mail.

In another educational session, the participant invited us into the home, and the education session lasted approximately 13 minutes. The participant expressed concern to the CHW's that their daughter had trouble focusing during school and was recently diagnosed with Attention-deficit Hyperactivity Disorder (ADHD). The parents noticed a change in their daughter's behavior when they began living in the area. The participant expressed interest in the study and agreed to sign up for the screening.

One mother agreed to participate but asked us to do the education session outside of her home and questioned if any information would be reported to immigration if lead was found in her home or her children's blood lead level screenings. She was also concerned that the program would cost her money. At the end of the session, she had no questions about the education and agreed to sign up for the screening.

During the data collection period, the community health workers and UTEP Lead Research Team provided parents at a local Elementary school in the area with education sessions. They assisted them with signing up for blood lead level screenings for their children. A total of nine parents participated, and all nine participants agreed to sign up for screening services. One parent had a question regarding the availability of home test kits to detect lead, and another parent asked how child blood lead levels would be collected and reported.

### 3.6 Refusal to Participate or Failure to Follow-Up

Throughout the data collection period, when community health workers were going door-to-door for outreach, some individuals answered their door and reported having children but refused to participate in the educational session for various reasons. One parent appeared to distrust the intervention and did not want to participate because she did not believe that we were from the University, even when the community health workers showed their identification badges. The community health workers provided a flyer to the mother to call the office to verify if she was interested in participating at another time. To our knowledge, she did not follow-up.

Another parent refused to participate and said that her child was tested every three months for the environmental lead during their Woman, Infant, and Children (WIC) appointments. Another parent refused to participate in the educational intervention because her child had been tested repeatedly by their pediatrician. Six parents stated they were not interested in participating in the intervention but gave no specific reason. When the community health workers tried to provide them with flyers, they refused.

Based on what was observed during outreach, it is possible that parents refused to participate because they did not have the time to, as some parents stated they would be interested but they had an appointment or errand to complete as the CHWs approached them. It is also possible that parents refused to participate because they were not interested in the education being offered. Some parents may have felt the intervention did not apply to their families.

Several parents who had initially answered the door and seemed interested in participating asked the community health workers to return later. More often than not, when the CHW's returned, the parents did not answer. For example, one parent asked us to come back on 3/2/20 at 1 pm to complete the education session, but there was no answer when we returned. On

one occasion, two parents answered but asked us to come back. When we returned, there was no answer at either home. One parent answered and seemed interested during another day of outreach but asked us to go back in two hours. When we returned, there was no answer.

# Chapter 4

## Discussion

Childhood lead exposure has been associated with a variety of adverse health outcomes (Bianchi, 2015). Children living in historically contaminated neighborhoods are at an exceptionally high risk of being exposed but are often not screened for lead exposure (Roberts et al., 2017). Additionally, there is limited knowledge and awareness on childhood lead exposure and screening resources among parents and caregivers (Trueblood et al., 2016). This research project questioned if a brief education session on reducing childhood lead exposure provided by community health workers would increase parents' knowledge. This research project's primary goals and objectives were to educate parents of children living in El Paso, Texas, on reducing childhood lead exposure while also offering to enroll children in available screening and mitigation services. Two bilingual community health workers were employed to deliver education door to door in identified low-income neighborhoods with a high risk of lead exposure.

### 4.1 Discussion of the Quantitative Assessment of Educational Intervention

The first analysis performed was the paired samples t-test, which indicated a significant increase in knowledge on reducing childhood lead exposure among the 35 parents who participated in the education session provided by Community Health Workers. A majority of the participants were female (88.6%) and preferred to receive their Spanish educational materials (77%). Providing education to parents on reducing childhood lead exposure is vital in improving their ability to identify risk factors present in their environment. This increase in knowledge and awareness can support needed behavior changes. This study suggested that brief educational

interventions can increase parents' knowledge on reducing childhood lead exposure while also providing them with the opportunity to enroll in needed screening and mitigation services.

Previous literature available supported these findings. In one study in a predominately Hispanic population located on the U.S-Mexico border, sixty-four parents showed significant increases in knowledge and behaviors regarding environmental health hazards after participating in a single education session provided by their children's headstart program (Trueblood et al., 2016). Similar to our present study, increases in knowledge were assessed; however, Trueblood did not indicate if families were connected to blood lead level screenings following the educational session provided. Another difference between Trueblood's study and the present study is that participants were assessed for knowledge retained three months following the intervention. Post-test assessments revealed that knowledge and behaviors among parents were improved following the completion of the training; in particular when it came to identifying folk remedies that may contain lead (Trueblood et al., 2016).

Kersten (2004) employed a somewhat similar method in briefly educating parents on reducing childhood lead exposure. However, rather than a face-to-face education approach our study used, the intervention was delivered through a sixteen-minute educational video in their child's pediatrician's office. Pre and post-test assessments collected from the forty parents who viewed the video demonstrated increases in lead poisoning knowledge (Kersten et al., 2004). Following the intervention, parents were contacted to report any behavior changes they implemented since viewing the video. However, it is unclear as to if they were connected to screening and mitigation services. Parents reported that following the intervention they began washing their children's hands more frequently (Kersten et al., 2004). Parents also reported wet wiping and mopping indoor surfaces more often as well (Kersten et al., 2004).

Decades of public health research has revealed that reducing childhood lead exposure requires a multidimensional approach. Increasing parental knowledge on the topic can serve as an initial means of prevention and be explored as a secondary prevention method for families at the highest risk of exposure who need screening and intervention services. Various programs exist that provide education on reducing lead exposure; however, limited information is currently available within these studies that discuss enrolling participants in blood lead level screenings or mitigation services as part of the educational intervention.

Sterling (2004) observed that tailored education, mitigation, and follow-up resulted in a reduction of blood lead levels compared to individuals only participating in conventional health education programs (Sterling et al., 2004). The intervention took place over nine months. In another study, an intervention that included home assessments, environmental education, and referrals demonstrated significant increases in parents' knowledge on environmental home hazards (Mankikar et al., 2016). The intervention consisted of two home visits over two months, and follow-up analysis also revealed that the intervention participants reported improvements in health outcomes among their children with asthma (Mankikar et al., 2016).

In our current study, of the 35 participants who received the education session, 23 agreed to enroll their children in the UTEP Lead Research team's blood lead level screenings. A majority of the participants who did not agree to sign up for blood lead level screenings were grandparents who stated they needed to discuss the screening with their grandchilds parents before agreeing to sign-up. Parents who were engaged with the education being provided and understood the importance of testing their children often expressed a clear interest in the screening services being offered. These results suggest that brief education interventions can serve as a means of connecting parents to needed services.

### 4.2 Discussion of the Qualitative Assessment of Educational Intervention

Field note observations and house visit records recorded while conducting door-to-door outreach revealed several observations regarding parents' responses to the educational sessions and attitudes towards the intervention, and reasons for refusing to participate or follow-up. These observations provided us with the opportunity to conduct a qualitative assessment of the educational intervention provided by Community Health Workers. Field note observations revealed that the education sessions typically took between 10 to 15 minutes to complete, and most of the sessions were delivered at the front door of the home. According to the house visit records, Community Health Workers attempted to deliver education at approximately 603 homes. The number of educational sessions completed was only 5.8%, with 61% of households not answering. While the educational intervention proved to be effective in increasing knowledge on reducing childhood lead exposure among the 35 participants who did complete the education session, these findings question the feasibility of door-to-door outreach as an effective method for this target population.

There are several possible explanations as to why answering rates were so low. The neighborhoods targeted during outreach were within the 79901 and 79905 zip codes. Between 2014 and 2018, the median household income reported for individuals living within the 79901 zip code was $13,893, with 60.8% living below the poverty level (Healthy Paso Del Norte, 2018). During this time, the median household income reported for individuals living within the 79905 zip code was $22,739, with 38.3% of people living below the poverty rate and 34.9% reporting being foreign-born (Healthy Paso Del Norte, 2018). For families living in low-income neighborhoods, parents may need to work longer hours or may even have multiple jobs they must attend to. Many parents may have been working during the times we were conducting our

outreach and so it would be beneficial to conduct outreach at times outside of a typical 9-5 schedule. Weekend or evening outreach may increase answering and completion rates among parents who work during the day or otherwise. Additionally, several streets within these zip codes consisted mainly of businesses rather than single-family homes.

### 4.2.1 Parents Responses to and Attitudes Towards Educational Intervention

The majority of parents who participated in the educational intervention were receptive to the education being delivered and the Community Health Workers providing the intervention. Parents were engaged while the CHW's provided them with the educational materials and reviewed the booklet with them. Each educational session lasted anywhere from 10 to 15 minutes, and most parents did not have questions during or after the presentation.

The most common questions received by the CHW's from parents were on the process of screening their children and how those results would be shared. Regarding the content, parents were mostly concerned about how children may be exposed to lead. This suggests that the education provided was presented in a simple yet effective manner that parents easily understood. Following the education session, some parents could connect to what they had learned and experiences they have had with their children. These parents felt comfortable sharing these insights with the Community Health Workers. For example, one parent shared her concerns about her child's recent ADHD diagnosis and expressed that she began to display symptoms shortly after the family moved into their new home. The parents had not considered the possibility of lead poisoning being a factor of interest. She made this connection following her education and was very interested in having her children and home screened.

While most parents were receptive to the Community Health Workers and the educational session, some parents expressed different concerns and fears of participating in lead

screening and mitigation programs. One interesting response from a parent was the fear of being forced to participate in mitigation should her children have elevated blood lead levels. The CHW's reassured the participant that the options for mitigation would be presented to her but not enforced. Another parent was interested in participating but was hesitant at first until we reassured her the session would be quick and we could complete it at her front door. She later revealed that she was hesitant because of fear of being reported to immigration should lead be found in her home. To increase the likelihood of participation, it may be beneficial to clarify to participants that any information and services being provided will not inquire about residency proof.

These responses provide insight into possible explanations for low participation and answering rates. Parents may be less likely to participate in education and screening if they feel forced. To ease parents' fears and concerns during outreach, it would be beneficial for educational interventions to inform parents early on that the information provided to them would only be for educational purposes. Parents should be assured that they will not be forced to participate in screening or mitigation if they did not feel comfortable. Providing education to parents on reducing childhood lead exposure can be the first step in helping parents make informed decisions regarding screening and mitigation.

Parents also may be less likely to participate if they believe they will face negative ramifications for environmental lead being found in their home, especially if they are renting their homes. A previous study by Okatch (2019) revealed that many parents did not feel comfortable requesting home testing from their landlords due to fear of being evicted (Okatch et al., 2019). Educational interventions should aim to provide valuable information to parents on their rights as home owners and renters regarding testing of their home. Educational

interventions can increase parents' knowledge while also increasing their confidence in advocating for needed home testing.

Another possible solution to reducing feelings of fear and distrust among parents is to use a multidisciplinary approach in which education is provided in a setting parents trust, such as a clinic or a school. The UTEP Lead Research Team is an interdisciplinary team that works with various community partners, including elementary schools within the El Paso Independent School District, to deliver wide-scale blood lead level screenings and dissemination of rapid results to parents that guide case management. By partnering with schools or other community settings, parents can feel more confident in participating in educational interventions being offered, leading to increases in participation.

### 4.2.2 Refusal to Participate and Follow-Up

During outreach, 16 parents refused to participate even though they were eligible. Approximately twenty-seven parents asked us to return at another time; however, only one parent answered and completed the education session when we returned later. Parents provided various reasons for not wanting to participate. One parent did not want to participate because she did not believe we were from the University and wanted more proof. The outreach team had UTEP identification badges, but the parent still did not feel comfortable participating. Another parent insisted that her child's blood lead levels were screened every three months at their WIC appointment; however, WIC screens for low iron levels, not blood lead levels. This parent may have misunderstood what education and services we were offering. Six parents did not provide us with an exact reason why they did not want to participate.

Various factors can influence a parent's decision to participate or not participate in door-to-door educational interventions. Jordan (2007) reported that some parents who participated in a

lead education and prevention program stated they did not feel their families were at risk for lead poisoning and therefore did not need to adopt suggested prevention strategies (Jordan et al., 2007). Limited awareness and knowledge of the severity of childhood lead exposure may account for a lack of interest in parents' participation. Further research is needed that explores the perceived benefits of participating in lead education and prevention programs among Hispanic parents. These findings can guide the development of more effectively tailored education.

### 4.3 Application of the Health Belief Model

The Health Belief Model was used as the theoretical framework for this study. Application of the primary constructs were observed throughout the course of the intervention. In particular, the constructs of perceived susceptibility, perceived severity, and cues to action were addressed. The Health Belief Model suggests that individuals will be hesitant to change their behaviors unless they perceive themselves or their families to be at risk (Skinner et al., 2015). During the intervention, parents were provided with education on how their children can be exposed to lead in their immediate environments. Parents were also made aware of the reasons why younger children are at higher risk of being exposed. This intervention addressed the construct of perceived susceptibility among parents by emphasizing the importance of engaging in the preventative methods suggested in the brief education session so as to reduce the risk of their children being exposed to lead.

In terms of addressing perceived severity, the Community Health Workers emphasized to parents the negative health outcomes associated with childhood lead exposure, as well as the consequences of children who are continuously exposed to lead in their environments. Understanding the significant risks of exposure can influence parents to change their behaviors in order to avoid the consequences of the severity of illness. The construct of self-efficacy was

explored by providing education to parents so that they feel confident in their ability to make informed decisions regarding the health of their children. Cues to action were addressed by educating parents on simple yet effective methods to reduce exposure. Parents who were previously unaware of screening and mitigation for lead exposure now understand the importance of engaging in these actions after being provided with education on the topic and the opportunity to enroll in screening services. This was observed among the 23 participants who agreed to sign up for blood lead level screenings following the educational session.

Certain elements of this model, such as perceived barriers, may be better addressed by providing the education sessions in a trusted community setting, such as a school. Perceived barriers are barriers that an individual identifies that prevent them from engaging in a health behavior change (Deshpande et al., 2009). Barriers may include the amount of effort it takes to engage in behavior changes (Deshpande et al., 2009). Providing the intervention in a trusted setting can help to reduce barriers such as accessibility to education and screening services and assist with the promotion of self-efficacy in addressing these barriers.

### 4.4 Strengths of Research

This brief educational approach was successful in significantly increasing parents knowledge on reducing childhood lead exposure. The success of this approach can be attributed to several factors. In particular, the study was very fortunate to be able to employ two exceptional bilingual community health workers who have had approximately ten years of experience working with families and vulnerable communities in El Paso, Texas. Prior experience in the public health field helped the community health workers to feel confident while communicating with parents and conducting door-to-door outreach.

One community health worker has experience as an outreach educator for subjects such as HIV/STD screening, diabetes management, immunizations and breast cancer. This community health worker has also worked extensively with the Texas Department of State Health Services to provide testing for Tuberculosis and HIV/STD screenings for high risk populations. Another community health worker has had approximately several years of experience working with families of children with intellectual and developmental disabilities. Over the years, this community health worker has assisted with developing events and workshops aimed at educating families and health care workers on caring for individuals with disabilities. She was also the primary facilitator of a support group for parents of children with disabilities and assisted them with accessing needed resources and services. She has worked extensively in the community to provide training and education on reducing stigma surrounding Autism Spectrum Disorder. Both community health workers displayed exceptional communication skills during the course of this project.

**4.5 Limitations of Research**

Several limitations of this research project should be considered. In terms of analyses, the initial goal of recruiting 75 parents to participate in the educational intervention could not be achieved due to the emergence of the COVID-19 pandemic. Stay at home orders required researchers to cease face to face outreach and education efforts, which was the primary method guiding this study. A larger sample size could have potentially provided researchers with further insight into the effectiveness of the intervention. A larger sample size would have been more representative of our priority population, however, considering the low answering rates while going door-to-door, it is not likely the goal of recruiting 75 parents would have been achieved had data collection efforts continued.

Another limitation of the study concerning analyses was the limited collection of demographic data. Seeing as the study primarily assessed increases in knowledge among parents, extensive collection of demographic data, other than the sex of the participant and their language preference, was not initially deemed necessary. However, demographic data such as participant's age, income, and educational levels can help develop a more comprehensive understanding of the population. Associations between increases in knowledge and demographic data can be used to enhance the development of educational interventions.

Several limitations regarding the methods utilized in this study should also be considered. Door-to-door outreach was not the most effective method of outreach for these particular neighborhoods. Word of mouth, promotional flyers distributed at schools or community centers, and additional forms of promoting the program should be put in place before door-to-door outreach attempts. Promotion of the program can help parents to feel more comfortable participating in education and screening and can generate interest within the community on the project.

Another limitation of this study was that there was no formal measure of fidelity implemented within the study. Fidelity refers to the degree to which an intervention is implemented according to the intended design of the study (Breitenstein et al., 2010). The presence of a research team member accompanying the Community Health Workers helped to ensure some level of fidelity in terms of the materials and methods being implemented, however, consistent formal measures can be beneficial in examining outcomes attributed to the intervention and can assist in identifying areas of the intervention to improve (Breitenstein et al., 2010). Future studies implementing brief educational interventions should include quantitative measures of fidelity.

Additionally, since our study focused primarily on knowledge increases among parents immediately following a brief-educational session, further follow-up assessments were not collected from participants. Post-test assessments provided days or weeks following an educational intervention can be beneficial to a study for several reasons. These assessments can demonstrate knowledge retained among participants of the intervention. This can help determine which areas of the intervention effectively increase knowledge and which areas require reinforcement.

### 4.6 Implications of Research and Recommendations for Public Health Practice

The findings of this research project has implications for the public health field, particularly the development of brief educational interventions targeted towards Hispanic families. While brief education sessions were successful in increasing parents' knowledge of reducing childhood lead exposure, the door-to-door outreach method was not effective in reaching enough participants. Additional methods of outreach should be explored to maximize recruitment efforts among Hispanic families. It would be beneficial to promote the program from within a trusted community setting or school where parents feel comfortable participating.

This study also demonstrated that brief educational interventions could connect community members to needed services, such as blood lead level screening. Out of the 35 parents who received education on reducing childhood lead exposure, 23 agreed to sign their children up for blood lead level screenings offered by the UTEP Lead Research Team. Future studies should include providing parents with both education and assistance in enrolling in needed services.

Community Health Workers can assist with bridging the gap between underserved Hispanic communities and needed health education services. Parents who participated in this

research were very receptive to the community health workers providing the education. Our current study employed two bilingual CHW's over seven weeks; however, it would be beneficial to utilize at least four or five CHW's to have flexible outreach schedules, as parents are often unavailable during typical working hours. This research project adds to the currently limited literature available on community health worker-led educational interventions that focus on reducing childhood lead exposure and emphasizes the need for further research in this area of public health.

### 4.7 Conclusion

Exposure to environmental lead continues to have a detrimental effect on the health of Hispanic children (R. W. Brown & Longoria, 2010). Education on the topic of reducing childhood lead exposure can aid in the prevention of lead poisoning among children living in high-risk neighborhoods if parents are knowledgable on proper prevention and mitigation techniques they can apply to their daily lives. This study's findings add to the currently limited research available on Community Health Worker led brief educational interventions on reducing childhood lead exposure in Hispanic communities. Additional studies are needed to examine different effective methods of increasing parents' knowledge on reducing childhood lead exposure to improve brief educational interventions.

### 4.8 Strategic Frameworks

Healthy People 2030's Environmental Health objectives, including 1) EH-04 – Reducing blood lead levels in children aged 1 to 5 years and 2) EH-08 – Reducing exposure to lead were applied in this project (Treser et al., 2017)

### 4.9 MPH Program Foundational Competencies and MPH Program Hispanic and Border Health Concentration Competencies

There were eight MPH program foundational competencies applied to this thesis project. The first competency applied included: Evidence-based Approaches to Public Health. Under this area, the following components were applied; 2) Select quantitative and qualitative data collection methods appropriate for a given public health context; 3) Analyze quantitative and qualitative data using biostatistics, informatics, computer-based programming, and software, as appropriate and 4) Interpret results of data analysis for public health research, policy, or practice. The second competency applied was Public Health and Health Care Systems, and the component addressed was 6) Discuss the means by which structural bias, social inequities, and racism undermine health and create challenges to achieve health equity at the organizational, community and societal levels. The third competency explored included Planning & Management to Promote Health by 8) Applying awareness of cultural values and practices to the design or implementation of public health policies or programs. The fourth MPH program foundational competency applied was Policy in Public Health where we 13) Proposed strategies to identify stakeholders and build coalitions and partnerships for influencing public health outcomes. The fifth competency applied was Leadership where the following components were applied; 16) Apply principles of leadership, governance, and management, which include creating a vision, empowering others, fostering collaboration, and guiding decision making and 17) Apply negotiation and mediation skills to address organizational or community challenges.

The sixth program competency applied was Communication and under this area the following components were applied: 18) Select communication strategies for different audiences and sectors;19) Communicate audience-appropriate public health content, both in writing and through oral presentation and 20) Describe the importance of cultural competence in communicating public health content. The seventh program competency applied was *Inter-*

*professional Practice and* under this area I discussed the means by which we 21) Perform effectively on interprofessional teams. The eighth program and final program competency applied was  Systems Thinking in which the component addressed was 22) Apply systems thinking tools to a public health issue.

Furthermore, I applied five of the MPH program Hispanic and Border Health Concentration competencies to this thesis project including 1) Stating the principles of prevention and control of disease and discuss how these can be modified to accommodate cultural values and practices in Hispanic and border communities; 2)  Developing prevention strategies for the different stages of the major communicable and non-communicable diseases in Hispanic and US/Mexico border communities; and 3) Differentiate quantitative health indicators in major communicable and non-communicable diseases in the US/Mexico border vs. non-border communities.

Additional MPH program Hispanic and Border Health Concentration competencies applied for this project included 4) Identifying, accessing, summarizing, and comparing the content of multiple (at least 5) current initiatives relevant to Hispanic and US/Mexico border health and 5) Distinguish health differences from health disparities on the US/Mexico border, and using the Toolkit for Community Action (National Partnership for Action to End Health Disparities), develop action plans for community prevention and intervention.

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y=&subgrouping=1&card=0&handpicked=0&resultsPerPage=150&showComparisons=1&showOnlySelectedComparisons=&showOnlySelectedComparisons=1&grouping=1&ordering=1&sortcomp=0&sortcompIncludeMissing=

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## Appendix

Parent Knowledge Questionnaire

***UNIVERSITY OF TEXAS AT EL PASO***
***COLLEGE OF HEALTH SCIENCES***
***DEPARTMENT OF PUBLIC HEALTH SCIENCES***
***CHILD LEAD STUDY GROUP***

***Knowledge is Power!***

***What Do You Know About***
***Child Lead Exposure?***

***Test Your Knowledge Now!***

Subject ID: _____

Date: _____

**Pre-Brochure** □
**Post-Brochure 1** □
**Post-Brochure 2** □

1. When children are exposed to lead, it can cause which of the following?

   ***Check all that apply***:
   - □ Learning problems
   - □ Sleep problems
   - □ Poor attention

2. What are some of the *possible sources of lead* in the home?

   ***Check all that apply***:
   - □ Old paint in houses
   - □ Children's jewelry
   - □ Children's toys
   - □ Pencil lead

3. What are some of *the most common ways* for children to get lead in their bodies?

   ***Check all that apply***:
   - □ Breathing lead contaminated air
   - □ From the inside of cars
   - □ "Hand-to-mouth behavior" that puts leaded paint chips, soil or dust in children's mouths

4. What are some of the ways that lead can get from *outside the home to inside the home*?

   ***Check all that apply***:
   - □ On the fur and paws of pets that come in from outside
   - □ From contaminated air that settles in household dust
   - □ From lead contaminated soil brought in from outside on shoes and clothing

5. What are some *simple ways to reduce* lead exposure *inside* the house?

   ***Check all that apply***:
   - □ Wash your child's hands and toys
   - □ Wet dust and wet mop every week
   - □ Take off shoes before entering the house

6. What are some *simple ways to prevent* lead contamination *outside* the house?

   ***Check all that apply***:
   - □ Do not blow torch old painted surfaces
   - □ Do not burn old tires or car batteries
   - □ Pick up loose paint chips and peeling paint with a wet

towel and discard safely

7. Which of the following are *effective ways to control lead* contamination at home?

***Check all that apply:***

□ Paint over old lead paint inside the home with “lead encapsulant” paint
□ Cover lead contaminated soil with turf, mulch, stones or gravel
□ Add phosphate fertilizer to bind lead in soil

| *TRUE or FALSE?* | *CHECK ONE* | |
|---|---|---|
| | **TRUE** | **FALSE** |
| **8. Before renovating your home, all surfaces should be tested for lead-based paint.** | | |
| **9. Lead from the environment can get into children's bodies by ingestion and/or inhalation.** | | |
| **10. In children, lead changes how the brain works.** | | |
| **11. Children 5 years of age and younger are the <u>least</u> vulnerable to lead exposure.** | | |
| **12. There are inexpensive ways to get rid of lead.** | | |

***Thank you!***

## Vita

Jaleen Gabrielle Avila graduated Summa Cum Laude in 2017 from the University of Texas at El Paso with a Bachelors of Science in Health Promotion and a minor in Criminal Justice. While completing the Masters of Public Health program at UTEP, Jaleen had the privilege of serving as a graduate research assistant for two exceptional programs. The first program focused on supporting women recovering from substance use disorders and Jaleen had the primary responsibility of data entry and management, as well as development of educational materials for the program.

Most recently, Jaleen worked as a graduate research assistant for an interdisciplinary Lead research team focusing on methods to reduce childhood lead exposure among families in the El Paso region. Her primary responsibility was to assist Community Health Workers with delivering education to parents on reducing childhood lead exposure through various outreach methods. This educational intervention served as the basis of Jaleen's thesis research project titled "*Increasing Parents Knowledge on Reducing Child Lead Exposure through Education Provided by Community Health Workers in El Paso, Texas.*"

Upon completion of her Master in Public Health degree, Jaleen intends to pursue a career in health education and advocacy serving vulnerable communities within the El Paso border region.

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