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EVALUATING AND INCREASING LEAD POISONING PREVENTION AWARENESS IN
THE REFUGEE POPULATION OF DOUGLAS COUNTY, NE

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Abstract

Background: Lead poisoning is a major public health concern. It accounted for twelve percent of the global burden for intellectual disabilities, and two and a half percent of the global burden for heart disease and stroke, as well as nearly 500,000 deaths in 2015 (World Health Organization, 2018). While everyone is at risk of lead exposure, refugee and immigrant children are at an increased risk because they have increased access and use of products from outside the United States that have been shown to contain lead (Moser, R., and Brownback, S., 2012; and New York State Department of Health, 2015). **Goals and Objectives:** My goal for service learning is to be part of the Douglas County Health Department. The objectives to obtain this goal are to understand the inner workings of the Douglas County Health Department and to understand how the Health Department works in the community. My goal for the capstone project is to impact the refugee populations from Burma and Afghanistan to reduce their risks of lead exposure. The objectives to obtain this goal are to work in the community to do health education sessions, and to disseminate findings. **Methods:** The Health Belief Model is applied throughout this project. A brochure will be created that highlights cultural products, their potential to cause lead poisoning, and dos and don'ts for these products. This brochure will be translated into the culturally appropriate languages. These brochures will be used in addition to the flip book already used by the Douglas County Health Department in the health sessions. Pre- and post-tests will also be given to each participant at each health education session. Data will also be collected from blood lead level tests done by Nebraska Methodist Nursing College. **Impact:** The results of the blood lead level tests will show if there is a correlation between higher blood lead levels and home country. This will tell us the gravity of the problem in Omaha, Nebraska, and help us to know what we need to do in the future. Also, refugee populations are

impacted by the information and self-efficacy that will be taught during the health education session.

Introduction

Placement Site

Placement will be at the Douglas County Health Department within the Childhood Lead Poisoning Prevention Program. The department oversees the health of over a half a million people residing in Douglas County, the eastern part of Nebraska. Its mission is to promote and protect the public's health.

The goal of the health department is to make Douglas County a community where, regardless of place, everyone can grow healthy and succeed. Their primary focus is to prevent and control diseases through vaccination, health education, as well as through communicable disease investigation and prevention. The health department also promotes environmental safety and pursues health equity while taking into consideration the reality of social determinants of health.

Problem Statement

Lead poisoning is a major public health concern globally. In 2015, lead poisoning accounted for twelve percent of the global burden for intellectual disabilities, and 2.5% of the global burden for heart disease and stroke, as well as nearly 500,000 deaths in 2015 (World Health Organization, 2018). Lead is a naturally occurring element that is found in all parts of our environment, including in air, soil, and water. Also, lead has been found in a wide range of products and goods, such as paint, ceramics, cosmetics, pipes, spices, home remedies, jewelry, and batteries. The routes of exposure include ingestion, inhalation, and absorption. Once inside

the body, lead is absorbed and stored in the bones and teeth, and can have large impacts on the health of children and adults. Any amount of lead exposure is very bad for health, but lead poisoning occurs when the blood lead level (BLL) is ≥ 5 mdg/dL.

Literature Review

Lead exposure and Health Consequences

High levels of lead in the body, whether accumulated over a short or long period of time, may cause kidney damage, brain damage, hypertension, anemia, or, at high levels, even seizures or death. (Munene, E., 2013; Moser, R., and Brownback, S., 2012; and World Health Organization, 2018). For children, even with lower doses, lead exposure can cause serious life-long health effects on neurological development and behavior (Munene, E., 2013; Moser, R., and Brownback, S., 2012; and World Health Organization, 2018). Lead inhibits the bodies of growing children from absorbing minerals essential for proper brain and nerve development, as well as proper growth. These behavioral changes can include anti-social behavior or a reduced attention span, delayed learning, and a lower IQ (World Health Organization, 2018).

For adults, lead exposure can have serious impacts on health, such as, kidney, liver, cardiovascular, and brain damage, as well as seizures and deaths (KCMO Health Department, 2013; and World Health Organization, 2018). During pregnancy, lead exposure can impact the developing fetus and can cause stillbirth, low birth weight, premature birth, malformations, or miscarriage (World Health Organization, 2018).

Refugees as a high-risk population for lead poisoning

In the United States, leaded gasoline and lead-based paint was phased out by 1978, leading to a decrease in lead poisoning among children from 78% between 1976 and 1980, to

1.6% between 1996 and 2002 (CDC, 2013c). However, historically, refugees arriving in the United States have had elevated BLLs, likely due to lead-containing gasoline, industrial emissions, some cultural hobbies like ammunition manufacturing, and lead-containing traditional remedies, spices, ceramics, and cosmetics. Also, many resettled refugees living in older housing that contains lead-based paint, and continue to use lead-containing products, and therefore have elevated BLLs even after moving to the United States (CDC, 2013c).

Refugee and immigrant children are at an increased risk of lead poisoning because they have increased access and use of products from outside the United States that have been shown to contain lead, even while living in the United States (Moser, R., and Brownback, S., 2012; and New York State Department of Health, 2015). This increased access is from refugee or immigrant groups bringing back products from their home countries or use products from Asian markets which may contain lead.

Cultural product containing lead

Many cultural products are brought into the United States have been found to contain lead and other harmful minerals like arsenic. According to the Douglas County Health Department Lead Prevention Program, these products include spices, jewelry, and ceramics; however, recently, research has showed that other cosmetic products and digestive aids may also be impacting lead levels in children. In Omaha, Nebraska, some groups of concern are the refugee population from Burma/Myanmar and the refugee population from Afghanistan, because of their access to, and regular use of, Thanakha (cosmetic) and Daw Tway (traditional digestive aid), and Kajal (cosmetic).

Thanakha can be brought from Burma or Thailand, bought online, or bought in local Asian markets. It is created from grinding bark of Thanakha trees and is sold in either paste form or in powder that you mix with water. It is often used by women and children by applying the paste to the face on the cheeks and in designs. Thanakha has many uses including: sunscreen, pore treatment, anti-wrinkle treatment, anti-microbial, acne treatment, and when ingested, fever reducer, headache reducer (Murnene, E., 2013; Moser, R., and Brownback, S., 2012; Levin, D., 2014; Aung, N.N., 2014; KCMO Health Department, 2013; and New York State Department of Health. 2015).

For the Afghan refugee group, Kajal is a product that is typically brought back from countries in Asia, the Middle East, and Africa, or is bought from local vendors from those places. The product goes by many different names, including, but not limited to, Kajal, Kohl, Surma, or Tiro, depending on what group of people are using it, but for the purposes of this proposal, it will be referred to as Kajal (McMichael, J., and Stoff, B., 2018). Kajal can be a powder, gel, water-based, or even bought in rock form, and is used by many parents often on their infants because of the properties it is thought to contain. It is believed to protect the eyes, improve vision and overall eye health, prevent eye diseases, keep their eyes clean and cool, make the eyes attractive, and even ward off evil (McMichael, J., and Stoff, B., 2018; Sprinkle, 2018; Mohta, A., 2010; CDC, 2012; and CDC, 2013b).

Daw Tway is a product that is typically brought in from Burma or Thailand or purchased online. It is either in pellet or powder form and is often given to children and dissolved on their tongue. It is used as a digestive aid (CDC, 2013a).

Lead poisoning from cultural products from Burma

In Indiana in 2013, BLLs among refugee children from Burma were ten times higher than average BLLs for children in Indiana in 2008 (Munene, E., 2013). Another study done, which looked at BLLs in 93 children, 69 of which used Kajal regularly, showed that mean BLLs for users was about 29.6 ug/dL while BLLs for non-user children as around 4.9 ug/dL (Goswami, 2013).

Prevalence of high lead levels in these products has been seen in many places, including Indiana, New York, Minnesota, Kansas City, and even Australia. In 2009 in Indiana, the CDC found elevated BLLs among children from Burma who lived in Fort Wayne. As a result, two studies were done by the CDC in coordination with the Indiana State Department of Public Health, and it was found that this elevated BLL was directly related to Thanakha, and that children who used Thanakha and Daw Tway were more likely to have higher BLLs (CDC, 2009; Pitto, R., 2015; Murnene, E., 2013).

In Kansas City, elevated BLLs found in two small children who were refugees from Burma resulted in research that found these levels were related to contaminated Thanakha (Levin, D., 2014). Resulting in a warning from the Health Department of the risk of Thanakha (KCMO Health Department, 2013). In Minnesota, a cross sectional study was done on the prevalence of elevated BLLs among children from Burma. They found that use of Daw Tway and daily use of Thanakha were both related to these elevated BLLs via linear regression (Ritchy, M.D., et al., 2011).

In New York in 2013, and Sydney Australia in 2014, lab tests of Thanakha that was sold in stores found elevated lead amounts. While there have not been any reports of the product causing elevated BLLs in children from Burma, the results were reported to the FDA, and the

Burmese community was warned of the risk (Murnene, E., 2013; Moser, R., and Brownback, S., 2012; and Levin, D., 2014).

Lead poisoning from cultural products from Afghanistan

Due to reports of high BLLs in children who have used Kajal, multiple research teams are investigating samples of Kajal to determine their lead concentration, and impact on BLLs of children who use it. McMichael, J., and Stoff, B. (2018) did a study using a convenience sample of 10 Kajal products from Afghanistan. They found that 70% of the samples that they tested had lead levels between 35% and 83%. Also, Sprinkle (2018) did a retrospective chart review of patients that were seen in a county hospital using lead exposure questionnaires. It was found that that children who used Kajal had an average BLL three times higher than those who did not use the product.

In New Mexico in 2013, the CDC received a report from Albuquerque on a refugee child who had significantly elevated BLLs. Follow up showed elevated BLL of the child's sibling and mother. Investigation showed the daily use of Kajal by the family. This Kajal was brought back from Afghanistan, and lab analysis showed a high concentration of lead. The report did mention that a secondary source of curry powder that was present in the home (CDC, 2013b).

In Florida in 2012, the CDC received a report about a 6-month old refugee infant from Nigeria, who, in 2011, was found to have elevated BLLs. Through investigation, it was found that the infant had Kajal applied to their eyes multiple times each week. When lab tests were done on the cosmetic that was used, it was found that it consisted of 83% lead. A couple of months after the family stopped applying the cosmetic, the infant's BLL decreased by 5 ug/dL (CDC, 2012).

Refugee populations in Omaha, Nebraska

Nebraska continuously has a high refugee resettlement rate, steadily increasing since 2005. Since 2002, 11,075 refugees from 35 different countries have resettled in Nebraska, and between October 2015 and September 2016, Nebraska welcomed 1,411 refugees into the state. This means that 76 per 100,000 Nebraskans is a resettled refugee, the highest resettlement per capita number in the United States (Omaha World Herald; and Nohr, E., 2016). Refugees from Burma and Afghanistan are welcomed into Nebraska often. In Omaha, in 2015, there were nearly 4,353 refugees from Burma, and nearly 29 refugees from Afghanistan (LFS, 2015).

Knowledge gaps and importance of proposed project

There has been much literature to show the negative impacts of lead exposure on both adults and children. Literature has shown that Thanakha, Daw Tway, and Kajal have had high lead levels in multiple places including: Indiana, New York, Minnesota, Missouri, Sydney Australia, Florida, and New Mexico. While there have not been cases of lead poisoning directly tied to these three products in Omaha, Nebraska, it is important to consider the possibility that access to these products may expose refugees from Burma and Afghanistan to lead. This is an important gap in the literature.

With the large number of refugees in the state, and the importance of lead poisoning prevention, it is extremely important to discuss lead poisoning risks with refugee groups who have known lead risks due to their cosmetic products and traditional medicines, as well as their cultural hobbies, spices, jewelry, and ceramics. The challenge with communicating with the refugee groups include: lack of culture-specific information, lack of information in the

appropriate languages, and need for built trust. All of these limitations will be addressed through this capstone project.

This project is important for the Douglas County Health Department – Childhood Lead Poisoning Prevention Program and the scientific community. For the Childhood Lead Poisoning Prevention Program, this project will add to their materials geared towards immigrants and refugees. It will also give the Childhood Lead Prevention Program and the scientific community information about the refugees and immigrants that are served in Omaha, including the kinds of cultural products that they use, where they are getting them from, and what they know about lead and lead poisoning, as well as how their blood lead levels compare to other groups in Omaha.

Research Methods

The research question for this Capstone is: What is the overall impact of cultural products such as Thanakha, Daw Tway, and Kajal, on the health of children from Burma and Afghanistan living in the Omaha metropolitan area? This question will be answered through two aims: First, to determine how often are cultural products, such as Thanakha, Daw Tway, and Kajal, used by refugees from Burma and Afghanistan living in the Omaha metropolitan area. Second, to assess the potential impact of the use of these products on children's BLL.

The Health Belief Model was used throughout this project to guide the proposed activities to help address each proposed aim for this project. The Health Belief Model was created by Rosenstock, Hochbaum, Kegeles, and Leventhal in 1974 and has six constructs that help practitioners predict health behavior. The constructs are: perceived seriousness of the threat, perceived susceptibility of the threat, perceived benefits, perceived barriers, and cues to action (Jones, et. al, 2014). Through the health education session, information was provided about lead

poisoning, the seriousness of lead poisoning, and how refugees are at a higher risk because of the cultural products they use. This information helped to increase the participant's sense of perceived seriousness and their perceived susceptibility to lead poisoning. Once the seriousness and severity were covered in the health education session, the perceived benefits and perceived barriers were covered by discussing the benefits of using alternative products or acquiring their products differently, as well as how they can deal with potential barriers, such as cost of the products compared with home-made products. Finally, self-efficacy and cues to action were addressed when we discuss strategies for avoiding dangerous products and alternatives to use. We helped identify safe alternatives to these dangerous products, and helped the participants identify where they can get these alternatives, or how to safely make these alternatives.

Providing information on the severity and susceptibility of the problem should lead to behavioral change intentions. In order to measure the effectiveness of our health education session in respect to the Health Belief Model, the post-test asked the participants questions relating to their self-efficacy, and their intentions to adjust their health behavior and use safer products. All of these pieces taken from the Health Belief Model resulted in behavioral intention, and, therefore, safer health behavior.

This project included the creation of a brochure about cultural products, their potential to cause lead poisoning, and dos and don'ts for these products. This brochure was based on the literature review and information from the Douglas County Health Department's Childhood Lead Prevention Program and can be found in Appendix D. There were also health education sessions for refugees. At each health session, information about what lead is, how and why it is dangerous, what products may contain lead, and preventing lead poisoning was given, with an emphasis on spices, cosmetics (Thanakha and Kajal), and home remedies (Daw Tway). There

was a pre- and a post-test given to each participant at each health education session. As well as giving us a measure for how helpful the education session was, the pre-test had a section that gave us information on what products they are using, and where they got the products from. The pre-test and post-test, as well as informed consent, are attached in Appendix A, Appendix B, and Appendix C, respectively. These health education sessions were held mainly at WIC clinics, as well as at some home inspections.

To address our second aim, BLLs among refugee or immigrant children living in the Omaha metropolitan area were compared with BLLs among non-refugee or non-immigrant children. We were not able to test the children during the health education sessions, and only use information gathered from screenings. During screenings, a child's finger is pricked for the Hemoglobin test, but not all of the blood is needed, so the additional blood collected is tested for lead levels. This testing in the Omaha metropolitan area is done by traveling nurses from Methodist Nursing School and the WIC clinics. Methodist Nursing School and WIC clinics collect the BLL information from their testing and send that information to the Douglas County Health Department, where the information was de-identified, and then used for this project. The information was analyzed.

Analysis

Excell was used to analyze the data collected. In order to determine the relationship between BLL and country of origin, results from the deidentified blood tests taken by Methodist Health Systems was collected. The means were compared using an independent T-Test, and the prevalence of each group were compared. We also determined the effectiveness of the health education sessions. To determine the effectiveness, a Paired T-Test of the answers from the confidence-based questions in the pre- and post-tests was done, and a Chi-Squared test was done

for the knowledge-based questions from the pre- and post-tests. Finally, we determined the prevalence of use of Tanakha, Daw Tway, and Kajal by local refugee populations from Burma and Afghanistan. To determine this, answers from the “please tell us about yourself” section of the pre-test given were compared.

According to Lutheran Family Service (2015), there are nearly 4,353 refugees from Burma in the Omaha metropolitan area. For our sample, looked at children under the age of seven, however this exact information for this population is not known. According to the U.S. Census Bureau (2017), about ten percent of Omaha’s population are children under the age of seven, so we will apply this to the population estimation of children under the age of seven who are refugees from Burma. This would make our population 435. In order to have a statistically significant project within 95% confidence level and with a confidence interval of 1.96, we would need 205 refugees from Burma to participate in the BLL screenings. Because there is a small Afghan population in the Omaha metropolitan area, we will hope to reach as many Afghan refugees as possible, but the statistical power for this research will come from the sample from the refugees from Burma.

Potential participants were identified with the assistance of the Douglas County Health Department and Lutheran Family Services. The two organizations work with many refugees from these countries and are able to identify many places where they meet and live. We recruited potential participants by attending home lead inspections and going to the Charles Drew WIC clinic.

Results

The first data that was collected as the Blood Lead Level data that was gathered from all of the WIC clinics in Douglas County, from the Charles Drew clinic, and from Methodist Health

Systems from May 1st through July 19th. Data was collected for 171 refugee and immigrant children, and 3,842 non-refugee and non-immigrant children. This data included screening results, that can go as low as 3.3 ug/dL, and testing results, that go as low as 2.2ug/dL. This data was broken into three levels: less than 3.3, between 3.3 and 4.9, and greater than or equal to 5. Additionally, the average BLL for each population group was calculated, and an independent samples T-Test was done to determine if the averages differed significantly. 63.2% of refugees and immigrants had a BLL of less than 3.3ug/dL, 26.9% had a BLL of between 3.3ug/dL and 4.9ug/dL, and 9.9% had a BLL of 5ug/dL or greater. While, 97.5% of non-refugees and non-immigrants had a BLL of less than 3.3ug/dL, 0.1% had a BLL of between 3.3ug/dL and 4.9ug/dL, and 1.64% had a BLL of 5ug/dL or greater. Additionally, the average BLL of immigrants and refugees was 3.9ug/dL, and the average BLL of non-immigrants and non-refugees was 2.9ug/dL. This resulted in an independent samples t-test with a p of less than 0.0001, meaning the BLLs of immigrants and refugees and non-immigrants and refugees were significantly different.

Throughout July, 16 complete pre- and post-tests were collected, while 33 pre-tests were done, without post-test follow up. Out of those surveyed, 94% were female, 50% were between 25 years old and 34 years old and 38% were between 18 years old and 24 years old, and 44% had less than high school education and 25% had some high school education, while the rest had high school education or above. The surveys and education were aimed at refugees from Burma and Afghanistan. 50% of the participants were from Burma, 25% were from Thailand, 13% were from the USA, 6% were from Nepal, and 6% were from India. However, 75% of the participants spoke languages that are spoken in Burma.

Out of the product usage questions on the 16 surveys, 47% of said that they use cultural spices, 12% use cultural make-up or cosmetics, and 6% use cultural medicines or make home remedies. On the pre-tests, the respondents marked all of the places that they get their cultural products from. The Nine of the respondents said that they got their cultural products from local vendors or stores, like Asian Markets, seven got their cultural products from large stores, like Hy-Vee or Wal-Mart, 4 get their cultural products from family or friends, and 1 said that they order their cultural products online. Of the five participants who use Thanakha, four said that they intend to use or make safe Thanakha and only use Thanakha on children seven years old and older. Additionally, both of the participants who said that they use Kajal said that they intend to shop for safer Kajal, and only use Kajal on children seven years old and older.

Respondents were asked how confident they are they know which cosmetics, medicines, and spices are safe, as well as where to get safe Thanakha, medicines, Kajal, and spices. After the education sessions, respondents were statistically significantly more confident in their ability to know which cosmetics ($p=0.0013$), medicines ($p=0.0032$), and spices ($p=0.0013$) are safe, as well as knowing where to get safe Thanakha ($p=0.0033$), medicines (0.0161), and spices ($p=0.028$). The t-test results are shown in Table 1 below. Respondents were also asked seven true and false questions to assess their base knowledge and to gage the knowledge that they gained from the education. The questions were analyzed using chi-squared tests. For only two of the seven questions, did a statistically significant number of participants correct their answers after education. These questions were “the human body needs a small amount of lead for good nutrition” and “most cases of childhood lead poisoning are caused by drinking water”, both with p-values of 0.041. The chi-squared value and p-value for each question can be seen in Table 2 below.

Table 1. T-test results for 7 confidence questions asked in the pre- and post-tests with confidence p-value of 0.05.

	Safe Cosmetics		Safe Medicines		Safe Spices		Find Thanakha		Find Medicines		Find Kajal		Find Spices	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Avg.	3.12	3.88	3.25	3.94	3.06	4.0	2.4	3.6	2.2	3.8	2.0	2.7	3.5	4.0
Diff.	0.75		0.68		0.94		1.2		1.6		0.67		0.5	
P-Value (p≤0.05)	0.0013		0.0032		0.013		0.032		0.0161		0.5		0.028	

Table 2. Chi-squared results for the True-False knowledge questions asked in the pre- and post-tests with confidence p-value of 0.05.

	Cleaning a home with soap and water decreases the lead in the home	The human body needs a small amount of lead for good nutrition	Children should receive a yearly blood test for lead until age 7	Lead in Soil Cannot Harm children	Most children have symptoms when they have a high blood lead level	Most cases of childhood lead poisoning are caused by drinking water	The lead a pregnant woman taken into her body can be transferred to the fetus
Chi-squared	0	4.167	0	0.25	0.167	4/167	1.33
P-Value (p≤0.05)	1	0.0412	1	0.617	0.683	0.0412	0.248

Discussion

The Blood lead level results show that refugees and immigrants in Douglas County have statistically significant higher blood lead levels than non-refugees and non-immigrants. This shows that it is important to focus on this population in Douglas County, especially considering their high resettlement rate in Omaha. To help reach more of this population, the Childhood Lead Poisoning Prevention Program needs to continue fostering relationships with local organizations, like Lutheran Family Services, and with local clinics, like Charles Drew and OneWorld. These organizations and clinics have many ties to the community and can assist in increasing the program's reach.

The questions about what products participants use and where they get them, will help the program to know what our education needs to be geared towards. We anticipated that most participants would say that they use Thanakha or Kajal, and that they used spices; however, we found that less than half of the participants from Thailand or Burma use Thanakha, both participants from India and Nepal used Kajal, and 47% of our participants use spices. Therefore, I would recommend that education sessions talk about cosmetics, like Thanakha and Kajal, but that it put an emphasis on spices. Additionally, most respondents said that they get their cultural products from local stores, especially Asian Markets. It is especially important that during education they make sure that participants know that they have found spices from Asian markets that have elevated levels of lead, and that it is recommended that they get spices from larger stores, such as Hy-Vee or Walmart.

From the questions that were asked relating to the participant's confidence, we know that our education made a positive difference in the confidence level of the participants. However, the knowledge questions did not show the same. Only two of the seven questions on knowledge

showed that participants may not be gaining the knowledge, that the education is aimed at them gaining.

Limitations

There are several limitations to this study. The largest limitation was the sample size. We aimed to get a sample size population for the blood lead level screenings of 205, however the sample size that we got for this screening was 171. This decreased sample size limits the significance of our analysis comparing blood lead level screenings. Additionally, we were only able to get 16 pre- and post-test from the health education sessions. This limited sample size limits our ability to generalize our results to the whole population.

This decreased sample size may be due to multiple other limitations. One of these was language barriers. Most of the education sessions were done at the WIC clinics where a large number of refugees take their children. The language barrier was a limitation because, while there are translators at the clinic, they were usually back in the rooms with the patients and were only able to help with translation services when they were waiting for their clients to go back. Additionally, these language barriers could have led to confusion about what the questions meant or how to answer them, possibly leading to the results we saw for the knowledge-based questions. Another reason for the limited sample size was likely reach. We had a difficult time reaching groups of refugees from Burma or Afghanistan, which is why most of the sessions were done one-on-one, limiting our reach.

Another limitation is the causation in the study. Due to Methodist Nursing School not being able to attend the health education sessions, they were not able to test the BLLs of the children whose parents were receiving the education and answering the questions. Rather, we

were limited to BLLs from already collected sample. Due to our restrictions, we cannot truly show the causation of the products asked about in the pre- and post-tests and high BLLs. Instead, we can only show that the health education sessions have led to intentions of changing their health behaviors.

Recommendations

Based on the results from the Blood Lead Level screenings, I would recommend that the Childhood Lead Poisoning Prevention Program continues their work with multiple different populations, but also increases the education that is given to the refugee and immigrant populations in Douglas County. This is especially important because of the very high refugee resettlement rate in Nebraska. Additionally, a project like this should be done on all refugee groups, rather than limiting ourselves to just refugees from Burma and Afghanistan. This would give the program more information on what kinds of cultural products are being used by different cultural groups, allowing them to know what to focus their education on.

We learned, from the product usage questions, that refugees from Burma, Thailand, Nepal, and India are using Thanakha and Kajal, respectively, as well as cultural spices. Based on this information, I would recommend that the program give information focusing on the importance of getting safe cosmetics and spices, which can be found at stores like Wal-Mart and Hy0Ve instead of from Asian Markets and other local vendors, as well as not using cultural cosmetics on children under 7 years old.

Another recommendation that I have for the program, is to get all materials (brochures, flipbooks, check-lists, and pre- and post-tests) are translated into as many languages as possible. Although some materials are in languages spoken by immigrants and refugees, there is a need for

additional languages to be available. A lot of the materials were not translated into the languages that we worked with during the project, which was an issue because it left us relying on translators more than was possible, contributing to sample size problems. Translating these materials will help get the information across clearer to refugees and immigrants and would reduce the possibility of having flawed pre- and pos-tests due to participants not understanding the questions.

In addition to the materials in the different languages, it is important to give education that is culturally relevant and understandable. Most refugees who do use potentially dangerous products have used these products since they were a child. It is, not only difficult, but also not ethically right to tell these populations that they cannot use these products at all anymore. Instead, it is important to provide alternatives, or ways that they can use these products more safely. I would recommend that, during education, information on where to get these products safely, such as at large American stores, Wal-Mart, and Hy-Vee. Additionally, I would recommend that instead of telling the refugees and immigrants that they should not use these products on children who are under seven years old.

My final recommendation to the Program is for them to continue fostering their relationships with community organizations and clinics. Many community organizations and clinics have access to refugee and immigrant populations that are difficult for the program to reach on their own. By working with these organizations and clinics, they may have an easier time reaching hard-to-reach populations, increasing their impact on these very important population groups.

Conclusion

Much information was gained throughout this Service Learning and Capstone Experience project. During the Service Learning portion of this project, a brochure highlighting cultural products that are used by multiple refugee and immigrant groups in Douglas County was made for the Childhood Lead Poisoning Prevention Program. This brochure was used, along with other materials that the Program already had, were used to do one-on-one health education sessions with refugees from Burma, Thailand, Nepal, and India.

During the Capstone portion of the project, data was analyzed from, blood lead level screenings done by Methodist Nursing School, and at the WIC clinics, as well as from the pre- and post-tests given during the one-on-one health education sessions. From these analyses, it was found that refugees and immigrants in Douglas County have statistically significant higher blood lead levels compared with non-refugees and non-immigrants in Douglas County. Additionally, it was discovered during the pre-tests, that most cultural products that the refugees that we did the sessions with used come from local small stores, especially Asian Markets. 47% of the refugees use spices that are traditionally from their home country, and 12% use cultural cosmetics.

During each health education session, pre- and post-tests were collected. These tests asked questions about the participants confidence in knowing what products are safe as well as where to get the safe products. They also asked knowledge-based questions to assess the knowledge gained by participants. After education, participants confidence in knowing what cosmetics, medicine, and spices are safe, as well as knowing where to get safe Thanakha, medicines, and spices significantly increased. Additionally, for two of the seven knowledge questions did a significant number of participants change their answers from incorrect to correct.

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Acknowledgements

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Michaela Dei, Refugee Health Liaison with LFS, Additional Committee Member

CLPPP staff and supervisors

Service Learning/Capstone Experience Reflection

Throughout the Service Learning and Capstone experience, I feel as though, while I really got to use the knowledge I gained from my public health education, I also learned a lot about how public health practice works “in the real world”. I learned a lot about how the Douglas County Health Department works both inside the department, and out in the community. After visiting the department, the first time, I assumed that they were mostly working inside, doing paperwork and analysis; however, once I started doing the service learning with them, I learned that what they’re day-to-day looks like is very different from what I expected. I learned that the department goes out into the community very often, doing health education sessions and home lead inspections.

The SL/CE activities were preformed throughout the summer. A lot of the hours were done doing health education sessions in the community, either at lead inspection visits, the WIC clinics, and in apartment complexes where groups would meet. In the beginning of the service learning, I attended health education sessions with my preceptor and watched her give the information in sessions that lasted anywhere from 10 minutes, to an hour. Most of the health

education sessions required an interpreter, and materials that were in different languages, so that the participants could take home the materials and be able to read them in their own languages and understand the information. It is very important for the program to have a good relationship with the community and clinics, in order to be able to disseminate lead poisoning prevention information.

One major challenge that the CLPPP has, is that they recently went through multiple staff cuts. These cuts have really hurt their ability to do all of the health education, events, and home inspections that they need to do in the community. These cuts have not only been a challenge to the program staff and getting everything done well with only 4 staff members, but also for me because I am not qualified to help with everything, but needed direction on what I can help with. But since the staff was so happy, it was hard for them to find time to explain what I could help with. However, these challenges read to my greatest contributions. I think, my greatest contributions to the organization were in helping with in office work, like organizing their files and materials, as well as helping with health education events in the community. Because of my strength of being able to learn quickly, and put that knowledge to use, after attending a few health education events with my preceptor, I felt comfortable enough to be able to go and do some health education myself, which helped the load on the rest of the staff.

A couple of things that have really stuck out to me from my public health education, that have prepared me for my SL/CE were health literacy, and organizations working together. When creating materials about products that contain lead, I knew that there could be an issue with reading level and language. During my public health education, I learned how to check the reading level of materials, and how to change them, if necessary, to make sure that they are at an appropriate reading level. Remembering how to do this and all of these rules was very important

when creating the brochure. Also, throughout my public health education, we learned how important it is for organizations to work together in the community to be successful. This helped me prepare for my SL/CE experience because the organization works with a lot of other community organizations to be successful.

While I was prepared to work with other community organizations, I did not realize how much work collaborating with the other community organizations were, or how often these collaborations were needed. From my experience, it appears almost all the activities that the CLPPP does are with the help of other community organizations. This has changed my view of public health practice, and really helped open my eyes to the extent of community collaboration required. Additionally, my view on public health practice was widened because I didn't realize the wide range that organizations and programs like the CLPPP does. Public health practice in an organization doesn't have to be specialized in one thing, like surveillance. Instead, it can be focused on a problem, like childhood lead poisoning prevention, and do a wide range of public health activities, including surveillance, home lead inspections, lead dust tests, health education sessions, and data analysis.

APPENDIX A – Pre-tests

Date: _____

Children under Age 7 in Household? Y___ N___

Lead is a mineral that come from the earth, and is very harmful to health, especially for children. Many cosmetic products, stomach remedies, and spices that are from countries like Burma and Afghanistan may contain lead. Using these products may result in higher levels of lead in the body and cause harm. Thanakha and Kajal are examples of potential dangerous cosmetics, and Daw Tway is an example of a potentially dangerous stomach remedy. Spices are used in food to give them more flavor, some examples of spices are salt, pepper, turmeric, cumin, and curry powder. Lead has also been found in some of these spices.

1. I feel very confident that I know which cosmetic products are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
2. I feel very confident that I know which stomach remedies products are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
3. I feel very confident that I know which spices are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
4. I feel confident that I know where to get safe Thanakha for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
5. I feel confident that I know where to get safe Daw Tway for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
6. I feel confident that I know where to get safe Kajal for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
7. I feel confident that I know where to get safe spices
1 2 3 4 5
Not confident Somewhat Confident Very confident
8. Cleaning a home with soap and water decreases the lead in the home
 - a. True
 - b. False
9. The human body needs a small amount of lead for good nutrition
 - a. True
 - b. False
10. Children should receive a yearly blood test for lead until age 7
 - a. True
 - b. False
11. Lead in soil cannot harm children
 - a. True

- b. False
- 12. Most children have symptoms when they have a very high blood lead level
 - a. True
 - b. False
- 13. Most cases of childhood lead poisoning are caused by drinking water that contains lead
 - a. True
 - b. False
- 14. The lead a pregnant woman takes into her body can be transferred to the unborn baby
 - a. True
 - b. False

Comments

Please Tell Us About Yourself

Gender: Male Female

Age: 18-24 25-34 35-44 45-54 55-64 65 & Over

Primary Language Spoken in Home: English Karen Karenni Dari Other: _____

Country of Origin _____

Education Level

Some High School High school or GED Some College College Graduate Post-Graduate

PRODUCT USE

Do you use imported products from your home country?

Yes

- Please check which you use
 - Spices
 - Remedies
 - Cosmetics
 - Other

No

Do you use Thanakha? Yes No

Do you use Daw Tway? Yes No

Do you use Surma? Yes No

Where do you get products from your home country?

Local vendors

Bring it myself

Get it from family/friends

Order online

From a large store (like HyVee or Bakers)

Other: _____

APPENDIX B – Post – Test

Date: _____ Children under Age 7 in Household? Y___ N___

- 1. I feel very confident that I know which cosmetic products are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 2. I feel very confident that I know which stomach remedies products are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 3. I feel very confident that I know which spices are safe for me and my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 4. I feel confident that I know where to get safe Thanakha for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 5. I feel confident that I know where to get safe Daw Tway for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 6. I feel confident that I know where to get safe Kajal for my family
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 7. I feel confident that I know where to get safe spices
1 2 3 4 5
Not confident Somewhat Confident Very confident
- 8. Cleaning a home with soap and water decreases the lead in the home
 - a. True
 - b. False
- 9. The human body needs a small amount of lead for good nutrition
 - a. True
 - b. False
- 10. Children should receive a yearly blood test for lead until age 7
 - a. True
 - b. False
- 11. Lead in soil cannot harm children
 - a. True
 - b. False
- 12. Most children have symptoms when they have a very high blood lead level
 - a. True
 - b. False
- 13. Most cases of childhood lead poisoning are caused by drinking water that contains lead
 - a. True

- b. False
- 14. The lead a pregnant woman takes into her body can be transferred to the unborn baby
 - a. True
 - b. False
- 15. I intend to shop for safer alternatives for Thanakha
 - a. True
 - b. False
- 16. I intend to shop for safer alternatives for Daw Tway
 - a. True
 - b. False
- 17. I intend to shop for safer alternatives for Kajal
 - a. True
 - b. False
- 18. If you are currently using Thanakha, Daw Tway, or Kajal, do you intend to stop using them?
 - a. Yes, Thanakha
 - b. No, Thanakha
 - c. Yes, Daw Tway
 - d. No, Daw Tway
 - e. Yes, Kajal
 - f. No, Kajal

Comments:

APPENDIX C – Informed Consent

The University of Nebraska Medical Center
CONSENT TO PARTICIPATE IN RESEARCH STUDY

INVESTIGATOR: Kara Albright

FACULTY ADVISOR: Fabio Almeida, PhD

You are invited to participate in a project entitled CULTURAL PRODUCTS AND CHILDHOOD LEAD LEVELS. The purpose of this study is to inform you about the dangers of lead and to help you keep your family safe from lead poisoning.

Participation in this study involves answering questions about your knowledge about lead and lead poisoning, and will take approximately five minutes prior to the education session and after the education session. Whether or not you participate is entirely voluntary.

There is a minimal risk of breach of confidentiality, as you will not need to put your names on the surveys, and will be able to stay completely anonymous. If you wish to proceed and participate after reading this, please sign below.

You will benefit directly from this study because you will gain information about the dangers of lead poisoning and how to keep you and your family safe from lead poisoning. Additionally, the results will benefit the Douglas County Health Department and help them gain further knowledge about the needs of the community and benefits of this kind of health education session.

Please ask any questions you may have prior to signing this consent form.

Thank you in advance for taking part in this project!

I have read and understood the information.

I have been given the opportunity to ask questions about the project and my participation

I voluntarily agree to participate in the project

I understand I can withdraw at any time without giving reasons and that I will not be penalized for withdrawing nor questioned

The confidentiality procedures have been clearly explained to me

Participant:

Name of Participant

Signature

Date

Researcher:

Name of Researcher

Signature

Date

APPENDIX D – Cultural Products Brochure

DO'S AND DON'TS

OF SAFE PRODUCT USE

DO

- Get your spices and cosmetics from big name stores (like HyVee or Wal-Mart)
- Make sure your Turmeric is bright yellow, not orange or red
- Thoroughly wash any gardened produce before eating or cooking
- Make sure you are not using lead products for hobbies like making stained glass or fishing sinkers
- Use a smooth surfaced or a wood mortar and pestle

DON'T

- Let children put jewelry in their mouth
- Use traditionally highly decorated dishes or terra cotta pots
- Purchase medicines produced outside of the United States
- Put Thanakha on any child under 7 years old

For Available Services and More Information on Lead and Lead Poisoning

The Douglas County Lead Poisoning Prevention Program offers:

- Community outreach on lead poisoning prevention
- Education on how to prevent lead poisoning
- **FREE** lead test for children under 7 years of age
- **FREE** home lead inspection
- **FREE** HEPA vacuum if you home qualify

www.douglascountyhealth.com

Other local agencies:

- **Omaha Healthy Kids Alliance (OHKA)**
(402) 934-9700
- **City of Omaha Lead-Based Paint Hazard Control Program**
(402) 444-510 Ext. 2028
- **Fair Housing Center of Nebraska & Iowa**
(402) 934-6675
- **Lutheran Family Services**
(402) 342-7038

Where is Lead Found?

COMMON PLACES OR ITEMS
WHERE LEAD IS PRESENT



Childhood Lead Poisoning

Prevention Program

1111 S. 41st Street

Omaha, NE 68105

English: (402) 444-7825

Español: (402) 996-3156

CULTURAL PRODUCTS

HOBBIES, JEWELRY, AND CANDY

HOBBIES

- Certain hobbies may increase risk of contact with lead and lead poisoning
- Examples: making stained glass, soldering, or making fishing sinkers

JEWELRY

- Some inexpensive children's jewelry and adult costume jewelry may contain lead
- Make sure the children don't handle or put these in their mouths

CANDY

- Lead has been found in some candies and candy wrappers imported from Mexico
- Be especially weary of candy containing chili powder or tamarind.



CULTURAL PRODUCTS

COSMETICS, HOME REMEDIES, AND SPICES

COSMETICS

- Some cosmetics from other countries may contain high levels of lead
- Examples: Kohl, Thanakha, Sindoor, Pooja Powder or Vibuti, and some imported lipsticks

HOME REMEDIES

- Certain home remedies have lead in them.
- These often are used in East Indian, Indian, Middle Eastern, West Asia, and Hispanic Cultures.
- Examples: Daw Tway, Kohl, Greta and Azarcon, Empacho, Ghasard, Baluti kesaria, Pay-loo-ah, and Babay-san

SPICES

- May contain high levels of lead if brought or sent from other countries or bought at local Asian markets and import grocery stores.
- Examples: Turmeric, curry powder, chili powder, cinnamon, coriander, cumin, and ginger



CULTURAL PRODUCTS

FOOD CONTAINERS

MORTAR & PESTLE

- Ceramic mortar and pestles can have lead in them that will leach into your food.

POTS AND DECORATED PLATES

- Some pots and dishes contain lead
- Examples: traditional glazed terra cotta pots from Mexico or Asian countries, or highly decorated traditional dishes from Asia

CANS

- Food cans from other countries can be sealed with lead solder which can get into the food

