

THE LEVEL OF AWARENESS FARMWORKERS FROM  
STANISLAUS COUNTY HAVE IN REGARDS TO  
PESTICIDE MANAGEMENT

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By  
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CERTIFICATION OF APPROVAL

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## DEDICATION

Le dedico esta tesis a mi familia, ya que con su apoyo me han ayudado a cumplir cada una de mis metas, y sueños profesionales.

Me gustaría dedicarle esta tesis especialmente a mis padres, Aureliano y Maria Guerrero, quienes me dieron la vida, educación y han sabido formarme con buenos sentimientos, hábitos y que gracias a sus valiosos consejos me han ayudado a salir adelante en los momentos más difíciles.

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## ABSTRACT

The purpose of this research was to get an overall understanding of the level of awareness Hispanic farmworkers from Stanislaus County have in regards to pesticides. This qualitative study explored the knowledge 6 Hispanic farmworkers have in regards to pesticide use, its management and the consequences of its use. All participants were of Hispanic origin, worked in farms, and resided in Stanislaus County. Data were collected through conducting in depth interviews with all participants. The findings revealed that farmworkers are aware that pesticides need to be handled with care. It was found in the study that farmworkers protect their families from pesticides by taking off their clothes when they get home, showering immediately, and washing clothes separately. It is recommended that social workers bring their expertise in community organizing to the agricultural advocacy groups who are the experts in their field; thereby, leading their collaboration to stronger efforts in ensuring that appropriate protective training and equipment are being provided to farmworkers by their employers. It would be ideal for social workers to establish community programs like hands on pesticide trainings, and implement informational classes on how to report pesticide exposures. A recommendation for future research would be to conduct a mixed method study with the same population taking in to consideration their demographics, such as, education level, acculturation, and age to see if there is a correlation between those factors and the level of awareness farmworkers have in regards to pesticides.

## CHAPTER I

### INTRODUCTION

#### **Statement of the Problem**

It is not surprising for farmers in California to use pesticides to conserve prominent crops. Unfortunately, exposure to pesticides have been shown to harm workers. Rao, Quandt, Doran, Snively, and Arcury (2007) have identified that pesticide exposure has been linked to immediate and delayed health defects. Although the workers themselves are the ones who are primarily exposed to the pesticides they are not the only ones at risk. As an unintended consequence of exposure during their work, the families of these farmworkers are affected by secondhand exposure to pesticides (Rao et al., 2007).

Farmworkers and their families are exposed to pesticides everyday without knowing what pesticides consist of. According to Flocks, Kelley, Economos, and McCauley (2012), some workers consider fertilizers to be pesticides and many also believe that applications of pesticides occur too close to where workers are located. It is clear that farmworkers do not fully understand the difference between pesticides and fertilizers. Rao et al.'s (2007) study found that participants believed that if a pesticide had a strong odor it meant the pesticide was extremely dangerous. Families of farmworkers stated that farmworkers who worked directly around pesticides were predicted to be at a higher risk of exposure to and of infecting others (Rao et al., 2007). Families confirmed that farmworkers who are not present while pesticides are

used were not at risk of pesticide exposure. In other words, families believe that in order to be affected by pesticide exposure, farmworkers need to be near where pesticides are being used.

Rao et al.'s study concluded that though farmworkers have some knowledge regarding pesticides, it is not enough to keep them safe. Various other studies have examined the knowledge farmworkers have regarding pesticides. A study was conducted in Texas with 89 participants who had managed pesticides for over five years. The results of the study showed that 50% of participants disagreed that inhaling was the most common way of exposure (Martinez, 2004). Even though participants have been using pesticides for five years or more, only 82% agreed that protective clothing was needed when transporting pesticides (Martinez, 2004). According to Flocks et al. (2007), farmworkers lack basic information such as the names and properties of applied chemicals, which is important to know for health care providers to accurately diagnose and treat. Providing farmworkers with accurate information about pesticide exposure will help alleviate uncertainties farmworkers have expressed and at the same time will help them to use pesticides appropriately (Flocks et al., 2007).

Studies have been done to assess the consequences of pesticide exposure on farmworkers, as well. Neurobehavioral assessments were distributed to non-farmworkers and farmworkers in Oregon. Non-farmworkers performed better on the neurobehavioral assessments (Rothlein et al., 2006). In other words, exposure to pesticides affects the neurobehavioral system of farmworkers. In 2001, approximately

seventy percent of the insecticides used in the United States were organophosphorus pesticides (OP), and they work by attacking the nervous system of insects (Payne et al., 2009). In the agricultural industry, OP is used on corn, cotton, canola, alfalfa, produce, and nuts (Payne et al., 2009). According to Quandt et al. (2010), laboratory analysis indicates organophosphorus pesticides are primarily linked to cholinesterase depression. Cholinesterase depression is caused by the irreversible binding of organophosphorus to red blood cell cholinesterase (Quandt et al., 2010).

Research indicates that farmworkers are often not aware of how to protect themselves from pesticides and its consequences even though the consequences of pesticide exposure can be deadly. For example, some side effects of pesticide exposure include poorer neurodevelopment among children [1-5], altered fetal growth, shortened gestational duration, impaired brain development, and increased oxidative stress (Quiros, 2011). The Centers for Disease Control and Prevention (CDC) confirm that about 10,000-20,000 physician-diagnosed pesticide poisonings occur each year among approximately two million U.S. agricultural workers. Since farmworkers are not very well educated, they fail to understand the safety measures needed to handle pesticides, therefore, the consequences are not clear to them either.

According to Quandt et al., one-quarter to two-thirds of farmworkers do not receive training on pesticide management. Among those who receive training, about 70% report they understand what they have learned in the training (Quandt et al., 2010). A study was conducted by the Familia Sana program in North Carolina in which 600 farmworker families participated in six pesticide safety education lessons.

A pre and posttest was administered and the results were increased: pesticide knowledge, perceived dangerousness of pesticides, and safety self-efficacy among participants (Grzywacz et al., 2013). According to Grzywacz et al. (2013), 95% of participants believed the intervention was effective. Unfortunately, not all farmworkers have the opportunity to participate in pesticide safety programs.

Lack of education and awareness contribute to the inappropriate usage of pesticides. Farmworkers are poorly educated and face a greater health risk when there is no training and education on the use of pesticides (Mokhele, 2011). Mokhele (2011) conducted a study in Lesotho to explore the perception and awareness of farmworkers regarding pesticides. Twenty-seven farmworkers participated in the study, and 85% did not have secondary education (Mokhele, 2011). The study found that the lack of education makes it difficult for farmworkers to read and understand the information labels on pesticides. Also, it is difficult for them to understand the health hazards of pesticides and the need for personal safety measures (Mokhele, 2011). According to Flocks, Monaghan, and Albrecht (2007), farmworkers rely on their senses to detect the presence of pesticides, and they believe that exposure is worsened in wet conditions. Farmworkers use their own knowledge to handle pesticides; this dangerous decision may affect farmworkers and their families for the rest of their lives.

### **Statement of Purpose**

The purpose of this study was to examine the knowledge Hispanic farmworkers from Stanislaus County have regarding pesticide management and its

consequences. One of the goals of this study was to describe farmworkers' perceptions of pesticide exposure regarding their consequences and management. In addition, the study explored what farmworkers use to protect themselves from pesticides. Migrant agricultural workers are likely to have high rates of pesticide exposure (Samples et al., 2009). Therefore, it is important to understand the barriers migrant farmworkers face in using pesticides properly.

An exploratory study was conducted using semi-structured open-ended questions to address the purpose of the research. The research questions that guided the research study include:

1. What are the perceptions of Hispanic farmworkers regarding pesticide use and the consequences of pesticide exposure?
2. What do Hispanic farmworkers practice to protect themselves from pesticides? What services or resources do they access, if any?
3. What recommendations do they have for people who manage and are exposed to pesticides?

### **Significance of the Study**

Research has been conducted regarding farmworkers' perceptions of pesticide management, yet there is not enough research conducted in California. This study is important because farmworkers are using pesticides daily without proper safety measures. This study adds valuable information about migrant farmworkers' knowledge of pesticide protection. It is important to understand farmworkers' perceptions of pesticide usage, so that together farmers and Environmental Protection

Agency (EPA) can step in and educate farmworkers. These education and training programs can then be designed to address the gaps in the information that farmworkers need to have but don't.

As a result of this research study, social workers can develop new resources and or advocate for more services for this specific population. For example, workshops could be conducted that will educate farmworkers regarding pesticide usage and provide portfolios with resources related to pesticide usage and exposure. The information collected in this study helps educate farmers and possibly influence policy that will influence migrant farmworkers to work safely. The information provided within this research study is useful for EPA, for they will be able to understand where farmworkers stand regarding pesticide knowledge. Consequently, EPA will be able to follow up with regulations that will enhance farmworkers' pesticide knowledge and effective pesticide management.

## CHAPTER II

### LITERATURE REVIEW

Hispanic farmworkers are exposed to pesticides daily without the proper knowledge and gear to manage pesticides. This chapter reviews the research on the perceptions of Hispanic farmworkers towards the risks and consequences of using pesticides. The chapter will also address what is known about how Hispanic farmworkers protect themselves from pesticides. Finally, the chapter discusses services/resources and useful recommendations to help this population manage pesticides safely.

#### **Perceptions of Pesticide Use among Hispanic Farmworkers**

Farmworkers have a variety of perspectives in regards to pesticide exposure. According to Flocks, Monaghan and Albrecht (2007), farmworkers base their pesticide knowledge on personal perceptions about pesticide exposure, such as means of entry to the body and means of pesticide exposure as well as potential side-effects of pesticide exposure. The lack of education affects how pesticides are managed by farmworkers. Mokhele (2011) states that because of farmworkers' poor education, it is difficult for them to read the labels on pesticides as well as to understand the health hazards they are exposed to.

In the study conducted by Mokhele (2011), 27 farmworkers from nine different farms were interviewed in order to gain knowledge of the perceptions farmworkers from Lesotho, South Africa have in regards to pesticides. Unfortunately,

about 93% of farmworkers interviewed had received no training in the use of pesticides. Approximately half of the farmworkers reported having extension agents, and about 50% of these farmworkers indicated that the skills taught by the extension agents were useful (Mokhele, 2011). Extension agents are individuals who are supposed to educate farmworkers about pesticide management. In this study, Mokhele (2011) indicates that 85% of participants stated that they read the information label and followed the instructions for applying pesticides. However, only 8% of farmworkers were familiar with reading the labels carefully. Farmworkers were asked if they knew someone who had been affected by pesticides, and about 90% of them said they did not.

On the other hand, some farmworkers are aware of how dangerous pesticides may be. According to Mokhele (2011), 44% of the farmworkers interviewed stated that pesticides need to be handled with great care. Also, 26% reported that pesticides were dangerous specifically if one does not use protective clothing and the appropriate care. Few farmworkers reported that pesticides are poisonous and that one should not eat without washing hands after using pesticides (Mokhele, 2011).

A similar study explored the views of 100 farmworkers in Florida regarding pesticide exposure (Flocks et al., 2007). The researchers conducted 16 focus groups with farmworkers to understand their knowledge and perceptions of pesticide use and exposure. Farmworkers, for the most part, reported that they do not have access to information about the pesticides being applied, although, a few farmworkers who were knowledgeable about pesticide names had worked in industries or had been

applicators in the United States or Mexico. Some farmworkers believed that the degree of danger depended on the amount of pesticide used. Farmworkers were able to identify some pesticides according to the health effects experienced after being exposed (Flocks et al., 2007).

In 2009, Snipes et al. used community-based ethnography and public health risk assessment to assess the beliefs of 99 farmworkers from Washington State in regards to pesticide exposure. According to Snipes et al. (2009), five major themes were found. Many farmworkers believed that dried pesticides are a harmless powder, and farmworkers who identified themselves as being allergic to pesticides were more acutely affected by exposure (Snipes et al., 2009). Also, farmworkers reported that those who are perceived as physically weak tend to be severely affected by pesticide exposure. Since most farmworkers are paid by the piece and not by the hours, protective equipment is used inconsistently because they do not want to waste time putting it on. Participants explained that in order to get a good paycheck, farmworkers are likely to forget about protective equipment. The final theme found within this study is that farmworkers believe that hand washing is critical for decontamination after pesticide exposure (Snipes et al., 2009).

Farmworkers in Flocks et al.'s study reported being exposed to pesticides at their jobs when they enter a treated area before the allowable re-entry interval or shortly there after (Flocks et al., 2007). Also, farmworkers stated that working in closed areas like nurseries was more dangerous than working in the fields. Farmworkers also believe that exposure to pesticides may cause a variety of health

problems and it was related to the worksite environment. Some health conditions include headaches, general itching, swollen hands, and allergies. Flocks et al. (2007) found that when worksites are dry, farmworkers reported feeling exposed to pesticide residue, powdered or dry form of pesticides, fine fern hairs, and dirt. In dry worksites, farmworkers state being exposed to pesticide by inhaling it, handling plants coated with dried residue or residue that had become wet again, and cutting long plants that were hung over their heads. In contrast, when worksites are wet, drifting pesticides or residue can stick to and dry on their skin and clothing. Under wet conditions, farmworkers associated many health problems with the worksite environment, such as weak bones, aching backs, knees and hands, pneumonia, and allergies. The most common means of entry for pesticides to enter their bodies are through skin and pores, inhalation, and hand-to-mouth contact. According to Flocks et al., farmworkers use their sense of smell to detect pesticides being recently applied or if a pesticide being applied is strong.

Farmworkers identified additional health issues related to pesticide exposure. Flocks et al's study found that farmworkers believe that pesticides affect their emotional state and may cause long-term health conditions, such as cancer and memory loss (Flocks et al., 2007). It is believed by farmworkers that long-term exposure to pesticides may cause sterility in men, and infertility in women.

Along with the impact pesticide exposure has on the farmworker him or herself, the participants were also aware of children being the most vulnerable to pesticide exposure. It is very common for children of farmworkers to get hives, welts,

rashes, and swelling due to pesticide exposure because of their parents' clothes, and skin (Flocks et al., 2007). When exposed to pesticides, children are believed to have allergies, cancer, and flu-like symptoms. Farmworkers also believe that pesticide exposure may cause mental retardation and developmental delays to children (Flocks et al., 2007). Mokhele (2007) found that farmworkers are aware that children should not touch anything associated with pesticides and they are not allowed to go to the farms where pesticides have been applied.

Mokhele (2007) concluded that farmworkers are aware of the potential harmful effects of pesticides. Even though farmworkers are aware, they do not use safe practices in their application of pesticides. It is clear that farmworkers are unable to practice their pesticide awareness. Farmworkers are not provided with the resources needed to manage pesticides safely. Since a high number of farmworkers interviewed were not educated, Mokhele (2007) indicates that it is a greater threat to farmworkers because they can not read the information labels.

### **Need for Protective Equipment**

The literature does identify some ways in which farmworkers protect themselves based on their limited knowledge of pesticide use and exposure but it is not enough. Mokhele (2007) found that farmworkers bathed and washed their clothes after pesticide application. About half of the farmworkers in the study used protective clothing and equipment. Some examples of protective clothing are long-sleeved shirts and long pants. Farmworkers reported using rubber boots and waterproof hats. Mokhele (2007) also found contradicting information, which showed that

approximately half of the farmworkers never wore rubber gloves when handling pesticides. Another interesting finding is that 93% of farmworkers reported never using goggles to protect their face from pesticides.

Similarly, Farquhar et al. (2008) conducted a study to gain knowledge of farmworkers' occupational health hazards and lack of safety information provided to farmworkers. Six focus groups, with an average of 8 farmworkers per focus group, were conducted with farmworkers. According to farmworkers, there is a lack of potable water. Even though farms are required to provide drinking water, toilets, and hand washing facilities, most of the time they do not (Farquhar et al., 2008). There is a lack of resources that farmworkers are willing to use if provided by farmers. Farquhar et al. (2008) confirm that farmworkers are aware that there is a lack of adequate protective equipment such as masks, gloves, helmets, and coveralls available to them.

Research has been conducted to analyze work health issues related to pesticide exposure. Flocks et al. (2012) conducted a study to gain knowledge about general worker health issues and fetal health problems potentially related to pesticide exposure. The researchers conducted five focus groups with female nursery and fernery workers. The focus groups reported that in order to be protected from pesticide exposure, especially, pregnant women should wear long pants, long-sleeved shirts, plastic gloves, a hat, a mask, long socks, boots, and sometimes safety glasses (Flocks et al., 2012). Participants in the focus groups also shared that even though they wear plastic gloves, the gloves tear exposing the skin underneath (Flocks et al.,

2012). Participants confirmed that protective equipment like gloves and masks have to be replaced. Unfortunately, employers do not replace protective equipment, therefore, farmworkers have to purchase them with their limited resources (Flocks et al., 2012). A participant shared that she must pay for gloves or other equipment needed for work, if she wanted to use them (Farquhar et al., 2008). Farmworkers are aware of the importance of washing or cleaning hands frequently while at work, yet employers do not provide potable water for these purposes.

### **Resources Available to the Farmworker Community**

Even though protective equipment is not available to farmworkers, some resources are available to farmworkers with the purpose of educating them about pesticide management. The Farmworker Pesticide Project (FWPP) is an organization that brings together researchers, farmworker advocates, along with farmworkers and their families to reduce and eliminate farmworker exposure to pesticides (Shepherd, 2009). FWPP provides resources and information to farmworkers and their advocates about pesticides (Shepherd, 2009). Financial, scientific, legal, and educational resources are provided by FWPP to help the farmworker population with pesticide issues (Shepherd, 2009).

Another organization that strives to help farmworkers manage pesticides is the Community Outreach and Education Program (COEP). The goal of COEP is to develop programs to train pesticide handlers and agricultural field workers to identify and treat pesticide illnesses and injuries (Shepherd, 2009). A program initiated by COEP provided workers in migrant health centers with information about pesticides,

pesticide poisoning, pesticide use, and pesticide illness and injury reporting (Shepherd, 2009). COEP reaches out to migrant farmworker families through “consejera” (lay health advisor) and provides them training about pesticides and actual environmental health hazards (Shepherd, 2009).

There are more programs that aim to educate the farmworkers on pesticide management. Preventing Agricultural Chemical Exposure (PACE) in North Carolina is dedicated to developing an educational intervention to reduce farmworker pesticide exposure (Shepherd, 2009). In partnership with the Forest University School of Medicine, 40 English and Spanish PDF files of pesticide safety educational material and seven accompanying lesson plans were created to educate farmworkers about pesticides. Some topics included what is pesticide, pesticide drift, children’s safety, pesticides and pregnancy, how to read pesticide labels and how to avoid exposure (Shepherd, 2009). Handouts, group activities, discussions, videos and demonstrations served as educational tools. The education provided within this project should be of great help for farmworkers managing pesticides.

The Environmental Protection Agency (EPA) strives to protect human health and environment. EPA has an Agricultural Protection Standard (WPS), which is a regulation that aims at reducing the risk of pesticide poisoning and injury among agricultural workers and pesticide handlers (“Current Agricultural”, 2014 ). WPS protects over two million agricultural workers and pesticide handlers who work at over 600,000 agricultural establishments like farms, forests, nurseries and greenhouses. The WPS requires owners and employers on the agricultural

establishments to protect workers and handlers from pesticide exposure. Also, under the WPS, employers are required to train farmworkers about pesticide safety as well to provide mitigations in case exposures occur (Current Agricultural, 2014).

Environmental Justice grants have been awarded by the EPA (Environmental Protection Agency) with the purpose of educating local farm workers from Kansas City about health issues that affect migrant farmworkers. In 2011, a \$25,000 grant was awarded to the Migrant Farmworkers Project in Lafayette County with the purpose of addressing public health issues migrant and seasonal farmworkers face (Environmental Justice, 2011). Farmworkers were trained to educate the community about public health issues that affect migrant and seasonal farm workers (Environmental Justice, 2011). The goal of this project was to increase awareness about safe handling of agricultural chemicals, detection and treatment of lead poisoning.

It is EPA's (2011) goal to ensure equal environmental and health protections for all Americans, regardless of race or socioeconomic status. Organizations collaborate with EPA by providing education and developing solutions to local health and environmental issues. Grants of one million dollars were awarded in the year 2012 to educate, empower and enable communities to understand and address environmental and public issues. EPA is a great source for migrant farmworkers, for pesticide education is always needed.

The literature identifies these above mentioned resources and organizations as being available to the farmworker community to help educate them and increase their

awareness. However, no research seems to have examined whether farmworkers are aware of these resources, whether they access them, and their effectiveness.

### **Policies in Regards to Pesticide Safety**

Several recommendations have been made to address federal and state policies to protect farmworkers from pesticide exposure. It is recommended by the Farmer Justice Organization pesticide use and pesticide poisoning incidents to be reported at a national level (Farmworker Justice, 2013). According to Murphy (2012), state funding should be provided to rural health clinics and other places where farmworkers receive medical care, so that they can get tested for pesticide exposure. Another alternative would be to provide mobile clinics for farmworkers to get tested for pesticide exposure. It is also recommended for the Occupational Health and Safety Act (OSHA) to be amended and include all farmworkers. Currently, OSHA excludes farms that employ few workers from providing basic field sanitation such as toilets, drinking water, and hand-washing facilities in the fields.

The lack of implementation of WPS and OSHA affect farmworkers. Even though farmworkers have received pesticide safety training, they still do not know how they can be exposed to pesticides. WPS and OSHA are not well designed for farmworkers to grasp all of the important information (Whalley et al., 2009). In order for OSHA and WPS to be effective, it is recommended that more inspectors be employed, so that they can examine camps and regulatory compliance. Growers are required by state law to register their camps with the state by themselves, in order for

camps to be inspected. As a result, frequent inspections will take place so that regulations like OSHA and WPS can be effective.

Whalley et al. (2009) also found that sometimes regulations are not followed because growers do not believe their workers are exposed to pesticides. Therefore, there is a need to revise training procedures to educate growers about how their employees are being exposed to pesticides as well as methods they can implement to prevent exposure. According to Whalley et al. (2009), positive and safe work environments increase the practice of safety behaviors. It is more likely that farmworkers who work in safe environments will follow WPS safety recommendations.

### **Recommendations in Regards Safety Work Conditions**

Recommendations have been made to improve the safety working conditions of farmworkers. According to Reeves et al. (2002), it is recommended that the Department of Pesticide Regulation (DPR) get better at collecting, organizing, and making information publicly available so that serious problems resulting in worker pesticide exposure are identified. Another recommendation is for DPR to implement California Medical Association (CMA) recommendations to improve regulatory protection of workers health and safety. CMA represents about 34,000 physicians in California. In the year 2000, CMA supported efforts to reduce farmworker exposure to pesticides by calling on the State to reduce aerial spraying of pesticides, to help reduce pesticide drift, and to stop pesticide applications where workers will have high risks of exposure.

The pesticide Action Network, California Rural Legal Foundation Assistance, and the United Farm Workers of America organizations also recommend to eliminate the use of the most hazardous pesticides, in order to reduce immediate and chronic pesticide poisoning (Reeves et al., 2002). Exposure to pesticide residue is to be reduced. Residue exposure occurs when workers are not warned that a field is unsafe and reentry intervals are too short.

Farmworkers and families should be provided with the information needed to protect themselves from pesticides (Farmworker Justice, 2013). Some ways the information could be provided are by improving safety training, verifying comprehension of the information, and improving hazard information about specific pesticides they are exposed to. In order to ensure the information is accurately attained, Spanish translations on pesticide labels should be required. (Farmworker Justice, 2013). Federal and state agencies should collaborate with farmworker organizations to develop effective educational materials. The information provided should inform workers of the dangers posed by pesticides, understand how to protect themselves and their families.

### **Conclusion**

The literature review previously discussed has served as a guide for this study. This literature review highlights the perceptions farmworkers have in regards to pesticide exposure. Also, it identifies what farmworkers use to protect themselves from pesticides. Resources and recommendations are listed so that farmworkers are educated and take advantage of them. However, qualitative explorations of the

farmworkers' experiences and their recommendations are very limited in the existing literature. Therefore, the purpose of this research was to gain a deeper understanding of farmworkers' perceptions of pesticide use, its consequences and their recommendations for how to better manage pesticide use. Participants in the study were asked to share their individual experiences as farmworkers in Stanislaus County.

CHAPTER III  
METHODOLOGY

**Overview**

The purpose of this study was to explore the level of awareness farmworkers, from Stanislaus County, have regarding the consequences of using pesticides. According to the 2007 Census of Agriculture for Stanislaus County, there are approximately 4,114 farms consisting of 788,954 acres. About 44% of the farmland include crops that most likely require the use of dangerous pesticides (Agriculture Census, 2007). Currently, there is no research on farmworkers in Stanislaus County regarding this issue. To gain an understanding about the level of awareness farmworkers have regarding the consequences of using pesticides three questions were addressed in the study.

1. What are the perceptions of Hispanic farmworkers regarding pesticide use and the consequences of pesticide exposure?
2. What do Hispanic farmworkers practice to protect themselves from pesticides? What services or resources do they access, if any?
3. What recommendations do they have for people who manage and are exposed to pesticides?

**Research Design**

In order to explore Hispanic farmworkers' awareness and perceptions regarding pesticide use, an exploratory design was used. According to Rubin and

Babbie (2011), an exploratory research design is used to gain in-depth understanding of some phenomenon that much is not known about. Since there is no previous research on this topic in Stanislaus County, an exploratory research design helped the researcher to have a better understanding about the issue. Hopefully this research sets the ground for future studies regarding pesticide awareness in Stanislaus County.

This research study used a qualitative design to conduct the study. Qualitative research designs examine the deeper meanings of the human experience (Rubin & Babbie, 2011). This design is best suited for this study as this research will be exploring the experiences, knowledge and awareness of Hispanic farmworkers with regard to pesticide use. Semi-structured interviews were facilitated by the researcher to help address the research questions. The open-ended questions seek to gain a deeper understanding of Hispanic farmworkers' knowledge of pesticide management and exposure.

### **Sampling Plan**

For the purpose of this study, non-probability sampling was used to recruit the participants. Since the researcher did not have access to a list of all Hispanic farmworkers in Stanislaus County, non-probability sampling was the best choice. The criteria that needed to be met in order to be eligible to participate in this study were, a) be of Hispanic origin, b) have worked in farms, and c) reside in Stanislaus County. The type of sampling that was used is snowball sampling. Rubin and Babbie (2011) explain that snowball sampling is the process of recruiting participants where the researcher begins with one known participant and then that participant suggests other

subjects who meet the criteria for the study. Furthermore, snowball sampling is commonly used in research on minority and oppressed populations (Rubin & Babbie, 2011) that are hard to locate. The researcher contacted the United Farm Workers (UFW) to further assist with recruiting participants. The UFW's mission is to provide farmworkers with the inspiration and tools to share in society's bounty (UFW, 2006). In collaboration with the UFW, the farmworkers were notified of this opportunity. A sample size of six farmworkers participated in this study. The researcher selected this sample size taking into consideration time and cost constraints.

### **Instrumentation**

The researcher developed the interview questions with the purpose of obtaining valuable information regarding the migrant farmworkers' experiences with pesticides. The instrument consists of 10 questions that were also translated in Spanish. All questions focused on general pesticide usage, safety knowledge, and health concepts regarding pesticide risk perceptions. The development of the questions was guided by a thorough review of the literature and the researcher's knowledge about this population and their exposure to pesticides.

### **Data Collection**

The researcher was in charge of collecting all data. Semi-structured interviews were conducted by the researcher. Semi-structured open-ended questions were used to allow participants to respond with their unique thoughts and experiences. According to Rubin and Babbie (2008), open-ended questions may lead to opportunities for further exploration and probing. The researcher was flexible and

while maintaining the direction of the interviews to focus on the purpose of the study, at the same time encouraged participants to expand on and explain their responses, as needed. To avoid any distractions, only each participant was in the room with the researcher where the interview took place. The interviews took approximately one hour long. The data collection included audio recording and note taking to capture everything participants say, with their permission.

The semi-structured interviews were conducted in three weeks. It is important to work around the schedule of the participants. Farmworkers work long hours and their job duties are very tiring. Therefore, the researcher was aware of the possibility of the need to conduct the interviews late in the afternoons or on weekends. At the end of the study, the researcher raffled a \$25 gift card from Walmart to thank the participants.

### **Plan for Data Analysis**

Upon completion of the interview, all data were transcribed into narrative form. Neuman's (2003) plan for qualitative data analysis was used by the researcher in order to analyze the data. Under Neuman's plan, data were organized into themes and categories in a five stage process including: sorting and classifying, open coding, axial coding, selective coding, and interpreting and elaborating (Neuman, 2003). The first stage consists of sorting and classifying, where the data were organized around the research questions. Next, during open coding, critical terms, key events, or themes were identified and sorted guided by the literature and the participants' language. During the third stage, axial coding, data were examined again to see if any additional

themes emerged. As Neuman's plan states, the fourth stage is selective coding, where data went through a final review in order to identify cases and quotes that illustrate specific themes. Finally, during the fifth stage; interpretation and elaboration, major themes and categories were compared and contrasted to existing literature resulting in the formation of concepts and working theory. All data were presented in a narrative format.

### **Protection for Human Subjects**

The first step to conduct this study was to request approval from the Institutional Review Board (IRB) at California State University, Stanislaus. After IRB approval, participants were given a consent form in Spanish stating the purpose of the study, and the participants' rights and responsibilities.

Participants in the research study were informed by the researcher about the purpose of the study upon the initial contact. Participants in the study were informed that their participation is voluntary and they can chose to withdraw from the research study at any time without any penalty. The researcher also informed the participants that refusal to participate in the research study will not result in any penalties or loss of benefits. This ensured that participants did not feel coerced into participating in the research study. Upon agreement to participate in this study, the researcher provided informed consent forms, which provided further information explaining the research study as well as the participants' rights. The consent form informed the participants how their identities will be protected and also stated how data would be recorded and used. The researcher explained to all participants that their identities will not be

revealed in the research study at anytime. They also were informed that all findings in the research study would be shared in aggregate and that all information will be protected from inappropriate disclosure under the law.

Participants were informed that once data are obtained, it will be kept in a locked cabinet at all times. The researcher also informed the participants that all tapes will be erased and notes and transcripts shredded after the completion of the study. Since the research concerns migrant farmworkers, some participants may feel vulnerable to be deported to their country. To protect vulnerable participants, all participants were provided with phone numbers of resources that they can access in case they have questions regarding deportation laws. Participants were also provided with names and phone numbers of the researcher and the researcher's advisor if they had further questions or concerns regarding the research study.

## CHAPTER IV

### RESULTS

#### **Introduction**

The purpose of this research study was to gain knowledge about the level of awareness farmworkers have regarding the management and consequences of using pesticides. An interview guide was utilized to engage participants in a discussion about their perceptions regarding pesticide exposure, what they use to protect themselves from pesticides, and what their recommendations are for people who manage pesticides. The research questions that guided this study were:

1. What are the perceptions of Hispanic farmworkers regarding pesticide use and the consequences of pesticide exposure?
2. What do Hispanic farmworkers practice to protect themselves from pesticides? What services or resources do they access, if any?
3. What recommendations do they have for people who manage and are exposed to pesticides?

A series of questions were addressed to six participants from Stanislaus County. All qualitative data were collected via semi-structured interviews. The researcher was accompanied by an assistant, who is a former student of California State University, Stanislaus, during the interviews, which were conducted at the participants' homes. The data collected were transcribed and analyzed for patterns

and themes that emerged. This chapter provides a description of the sample and presents the results of the study.

### **Overview of Sample**

A total of six Hispanic farmworkers from Stanislaus County were interviewed regarding their knowledge about pesticides. All participants met the required qualifications to participate in the study. The requirements were: participants had to be farmworkers, reside in Stanislaus County and be of Hispanic origin. The age of the participants ranged from 22 to 60 years, with the average age being 39. The United Farm Workers organization helped the researcher with the recruitment of the participants. There were a total of four male and two female participants, all from different cities of Stanislaus County.

### **Farmworkers' Knowledge of Pesticides**

The first research question focused on participants' perceptions regarding pesticide use and their consequences. Participants seemed to know about pesticide use, especially in the context of the harm they can cause. All participants agreed that pesticides could be dangerous for their health. Four participants discussed some of the physical health consequences suffered by people who manage pesticides improperly. One participant stated, "Pesticides are harmful in many ways, I believe they can provoke cancer to the people using them." While two participants shared that a consequence of being exposed to pesticides is feeling dizzy. One participant shared, "When pesticides are used improperly they may cause physical harm, like dizziness, itchiness, allergies and in some cases death." Another participant discussed that,

“Pesticides can harm your brain, the smell is intolerable and may also cause loss of appetite.” A participant shared, “When pesticides are very strong, one can lose consciousness.”

Another participant explained the consequences of being exposed to pesticides. He added, “if exposed by these chemicals you feel anxious and dizzy, face gets swollen and your lips get big and numb, it is important to let your supervisor know what is going on as soon as possible.” The participant shared a story, which led him to discuss the consequences of using a pesticide improperly. The participant shared,

the pesticides used for the trees stay inside the stems of the trees, one day I was applying pesticides and I did not use gloves, a stem poke me and I started feeling my hand really heavy and hot, the next day I went back in to work with the same problem and I reported to my supervisor; my supervisor sent me home, and I went to the hospital.

According to participants, pesticide exposure also affects their families and communities. Three participants agreed that pesticides might be harmful to their families and communities. A participant shared, “I am pretty sure pesticides may be harmful to our health, and I am also sure that pesticides cause cancer, it can also be harmful to pregnant women.” Another participant discussed, “Pesticides may cause allergies... it may cause our children to have allergies and to be more vulnerable to other diseases.” While another participant stated, “I believe that pesticides may cause mental health problems to children.” One of the participants stated that pesticides are

not only dangerous for farmworkers' families but to the whole community. The participant shared, "I have always heard that pesticides are dangerous not only for our families but to the communities nearby the fields... pesticides damages your brain, the odor is intolerable. It makes you loose your hunger."

When asked how they know about the consequences of pesticide exposure, a common theme related to the media, particularly, television emerged. Two of the participants in this study stated that they have heard via television that pesticides are dangerous and that babies are sometimes born deformed or sick due to pesticide exposure. One participant shared, "I have seen commercials on television regarding the consequences of pesticides... for example one commercial was about pesticide affecting pregnant women." Other two participants shared that pesticides might cause cancer. Another participant stated, " I have seen commercials that talk about how pesticides may cause cancer or other diseases."

Furthermore, half the participants in the study discussed their knowledge about different pesticides. According to three participants, there are different types of pesticides that need different levels of protection. For example, one participant explained, "there is a type of pesticide that requires for you to be inside a tractor and wear protective gear like plastic boots, gloves, overalls, and a mask." On the other hand, one of the participants stated, "There are some pesticides that you do not have to use a mask, but even though it is not required to use a mask, I use it all the time." While another participant talked about a specific pesticide called Rwanda, and that it

has to be sprayed when the wind is 10 miles per hour or less so that the pesticide does not spread to farmworkers.

Several participants talked about the application process of pesticides. A participant talked about the duration of each pesticide in the crop. The participant shared, “There is a pesticide that is used for the lettuce, and is used to kill plague, its duration is 12 hours.” The participant explained that during those 12 hours, nobody was allowed to go in to the crop. These three participants were the only ones in the study who were aware of different types of pesticides.

Two participants shared how far away pesticides are usually sprayed from where farmworkers are working at the same time. The application of pesticides depends on how strong the pesticide is. One participant stated,

a helicopter usually sprays pesticides about an acre away from where we are working... what we are told is that it is not dangerous that it is sprayed at a very close distance to the ground, therefore it is not that dangerous for us.

Another participant shared a similar story,

the helicopter is usually spraying pesticides really close to us, about an acre away... we are told that it is not dangerous because pesticides are being sprayed at a close distance to the ground. I think it might be dangerous for us.

### **Experiences Regarding Pesticide Use**

When asked about their experiences with pesticide use, only two out of six participants confirmed they have managed pesticides in the past. One of the participants stated, “we usually use pesticides once a year ... we usually wear overalls,

a mask, depending on the indications of the pesticide instructions.” The other participant shared that pesticide or as he called it “chemicals” are sprayed weekly for 90 days until the plant starts to grow.

Participants who have not managed pesticides agree that the person who is spraying them is usually wearing protective equipment. Even though participants do not use pesticides, they are aware of how pesticides should be managed. One of the participants shared, “I do not use pesticides, but I do know that the people who use pesticides need to wear an uniform.” Another participant stated, “The overalls, masks, gloves, and plastic boots should worn when using pesticides.” A participant shared, “If I would use pesticides, eyes, use gloves I would cover my mouth, use safety precautions, it is important to have your eyes and mouth covered.”

### **How Farmworkers Protect Their Families and Themselves From Pesticides**

The second research question focused on what participants practice to protect themselves from pesticides. All participants discussed the importance of wearing the protective equipment necessary to apply pesticides. According to participants, it is important to protect themselves from pesticides so that they do not suffer the consequences of using them improperly. For example, a participant stated, “When spraying pesticides we need to use the protective equipment necessary... plastic glasses, plastic boots, mask, and overalls.” Participants stated that it is extremely important to wear protective gear when managing pesticides. One participant discussed that, “It is very important to use safety precautions when applying pesticides.” Another participant shared, “The special protective equipment consists of

gloves, mask, plastic boots, and overalls... and should be worn so that farmworkers are not exposed to pesticides.” “In order to see what protective gear is needed for each pesticide, it is important to read the labels carefully,” a participant stated. All six participants were aware of protecting themselves when using pesticides.

Another common theme discussed was that some equipment, including glasses, overalls, and gloves, need to be used only once. Unfortunately, one of the participants shared that sometimes supervisors do not provide farmworkers with protective equipment as needed. Furthermore, it is common for supervisors to encourage workers to use protective equipment more than once, when it is recommended for that protective gear to be used only once for safety reasons. A participant shared, “I have witnessed my supervisor telling people who manage pesticides to use the protective glasses a second time.”

All participants shared what they do to protect their families from pesticides. Five participants discussed the importance of showering when getting home from work. One participant shared, “Before going to my house I wash my hands with soap... when I get home I take off my clothes and put it in a pile of work clothes and then I shower to not expose my family to any kind of chemicals.” Two participants also shared that they would not let their kids hug them or be near them when they get home to avoid any pesticide exposure. A participant shared, “When getting home, I do not touch any of my children, I wait until I take off my work clothes.” One participant stated, “If families have little kids in the home, it is important to shower and clean yourself before touching them.” Overall, almost all participants discussed

the importance of taking a shower when getting home to protect their families from pesticide exposure.

Another common theme found was that farmworkers wash their clothes in a particular manner. Four participants shared that it is very important to wash clothes separately. For example, the work clothes are washed together and put together in a different place while the non-work clothes are washed together and separated from the clothes used for work. A participant shared, “When I take off my clothes and I put it in a different pile from the everyday clothes my family and I wear, and then I shower so that my family and I are not exposed to pesticides.” All participants confirmed that they take off their clothes immediately when they get home. One participant stated, “I take off my clothes before getting to my car, and I put my clothes on different piles when washing clothes.” Another participant shared the following, “I get home, I take off my clothes and I put it separately away from my daughter’s clothes.” Participants emphasized the importance of changing in to other clothes immediately when getting home.

### **Trainings Received For Pesticide Management**

Interestingly, participants are aware of the importance of protecting themselves from pesticides, but half of them have not received any pesticide training from their employer. Two participants discussed that they have never used pesticides and that is why they have not received any pesticide training. One participant shared, “I have not received pesticide training, but we have meetings where they tell us what can happen when pesticides are sprayed if we go into a field without our supervisor’s

permission.” Another participant who has not received training shared, “My boss puts a video that tells us what can happen if we work close by where pesticides are being sprayed.” The participant also stated that it is a little bit of information but it is okay for her and a couple of other co-workers who do not manage pesticides.

On the other hand, three participants shared that they have received pesticide trainings. All three participants stated that their trainings consisted of videos following up with discussions from a representative of their employer. One participant stated, “Every year before the season starts we have a meeting, they [employer] show us videos and at the end someone that knows about pesticides talks about the videos.” Participants shared that at the time of watching the videos they do understand them, yet it is too much information to grasp at once. It was also discussed that the videos were in Spanish. The participants discussed how long the videos are. Two participants shared that the video is shown to him and his co-workers twice a year and they last approximately an hour and a half. While another participant discussed,

the videos are usually 3 hours long... shown once a year at the beginning of the season... I think 3 hours is enough for me since I have been working in the fields for a long time, but maybe for new people the pesticide training should be longer.

### **Participants Who Have Received Pesticide Training Described What the Trainings Consist of.**

According to the participants, pesticide trainings consist of videos that inform them of what chemicals are being used and sprayed depending on the plant, how to use protective equipment, and explain the information on pesticide labels. One participant went in to details as to what the videos of pesticide training entail,

they show the different labels that pesticides have and what protective equipment we need to use for each pesticide... they cover what we need to do in case pesticides get in to our eyes or we are exposed to it.

Another participant shared, “The trainings are usually three hours long, and after the video is done, someone who knows about pesticides comes and goes over the video.”

Two participants discussed that sometimes the trainings are provided by people who are not experts on pesticide management. For example, one participant stated, “sometimes our supervisors gave us pesticide trainings and they are not experts on pesticide management... I think a qualified person should give us pesticide trainings.” It was discussed by another participant that it is important for the pesticide trainings to be facilitated by a person who manages pesticides. The participant explained, “A certified person who is an expert on pesticides should be giving us pesticide trainings so that they can answer any questions we have.” The same participant shared, “The trainings are useful, but they should be offered frequently, like every three months.” Both participants shared that it would be better for an expert who manages pesticides to facilitate pesticide trainings. Experts would have a better

understanding, and would be better able to answer any questions farmworkers might have during the trainings.

### **How Farmworkers Should Be Educated About Pesticides**

Several recommendations in regards to the education farmworkers receive about pesticides were made. One recommendation was about modifying the length of the pesticide trainings farmworkers receive from their employers. All participants stated that the pesticide training videos are helpful, but they should be longer and offered constantly. A participant explained, “Pesticide trainings should be longer than three hours and offered constantly, maybe every three months or so.” Participants believe that if trainings are offered often they will serve as a reminder of how to manage pesticides.

One participant stated, “It is important to pay attention to the pesticide trainings...they should be offered frequently to prevent accidents.” Another suggestion in regards to pesticide education is to have an expert on pesticides facilitate the trainings. It was discussed that pesticide trainings should be specifically about the pesticides that will be used. A participant shared, “We should have pesticide trainings focused on the pesticides we use and are exposed to...I think pesticide trainings will be more useful if we focus on that.” On the other hand, a participant suggested to have a hands-on training, participant shared, “I would suggest hand-on trainings over videos...I am more of a hands-on person.” The participant explained that it would be helpful for him to see someone applying pesticides and at the same time for that person to explain what he is doing and why he

is doing that. A different way of educating farmworkers about pesticides according to a participant is to provide a book about pesticides to farmworkers. The participant shared,

you go to school right? and you go to class but you also have a book to read just in case you need to go back and review what you have learned, I think it should be the same with us, we should have a book just in case we need to refresh our minds.

### **Recommendations for Farmworkers Who Manage and are Exposed to Pesticides**

The last research question addressed the recommendations participants have for farmworkers who manage pesticides. All participants shared that it is important for farmworkers who manage pesticides to wear the adequate protective equipment. One participant discussed, “the person using pesticides should wear a mask, gloves and proper protective equipment.” An example of how to use pesticides safely was given by a participant. The participant shared,

first, the person needs to read the labels of the pesticides to know what kind of protection you need; after, the person needs to read the instructions as to how to mix the pesticides... the hose can not touch the pesticides because sometimes people drink from it... after using the gallons of chemicals the person needs to wash them 3 times and put the gallons away in a safe place locked.

Two participants discussed that farmworkers who manage pesticides should first look at the labels of the pesticides before spraying them to the crops. A participant

discussed, “You have to be very cautious when using pesticides... you have to look at the pesticide labels to see how dangerous they are and to know what precautions you need to take.”

According to one of the participants, farmworkers should be careful when managing pesticides and they should also take their time to put on the protective equipment because sometimes farmworkers want to get done faster, therefore, they forget about the protective equipment. For example, a participant shared, “sometimes people who spray the pesticides do not wear the masks because they feel like uncomfortable with them on, but they should keep them on the whole time.” Another participant stated, “Farmworkers who manage pesticides should be very careful when using them and protect themselves as much as possible...they need to use the proper protective equipment.” Another participant shared,

I would recommend for farmworkers to use gloves at all times... a long time ago a tree branch poke me and I started feeling my hand really heavy and hot. I went home and showered, the next day I worked for 3 hours and I told my supervisor what had happened to me, so he sent me home and he reported it to the office. I was 5 days at the hospital, and the doctor said that the tree branch had venom. Ever since then I use gloves to work.

One participant recommended for farmworkers paying attention to the warning signs that identify when it is safe to enter the field that has been sprayed with pesticides.

The participant stated,

one time I entered a field that had only 2 hours left for us to be safe to enter, right away my hand felt itchy and I had to go to the hospital right away and they gave me medicine. It is important for farmworkers to pay attention to the signs that state when it is safe to go into a field.

Based on their life experiences, all participants recommended for pesticides to be used safely and for protective gear and equipment to be worn and used appropriately.

### **Summary**

Overall, farmworkers are knowledgeable about pesticides, they know how to protect themselves and their families, and have made valid recommendations as to how to manage pesticides. It was found that all participants were aware of the importance of using protective equipment when managing pesticides. Participants agreed that pesticides are dangerous for their health. Also, the practices to protect their families from pesticide exposure were discussed, and consisted of taking a shower when getting home, not hugging their children or letting them come close till they changed their clothes, and washing their work clothes separately. Most participants who manage pesticides have received pesticide trainings consisting of videos and a person discussing the information on videos. Many of the participants believed that pesticide trainings should be longer, offered more frequently, and be facilitated by an expert on the topic or someone who manages pesticides themselves. Another recommendation was for farmworkers to use protective equipment safely when managing pesticides.

## CHAPTER V

### DISCUSSION

The purpose of this research was to obtain a better understanding of the knowledge farmworkers from Stanislaus County have in regards to pesticides. The intent of this research was to provide participants with an opportunity to discuss their knowledge about pesticide use and the consequences of pesticide exposure. Additionally, this study also provided an opportunity for participants to share their recommendations with other farmworkers as to how to manage pesticides. This chapter presents a summary of the major findings while comparing the major findings of this study to the findings in the literature. In addition, this chapter discusses implications for social work practice and policy, as well as recommendations for future research.

#### **Major Findings**

This study indicated that farmworkers agree that pesticides need to be handled with care. The farmworkers explained that it is important to use protective equipment to avoid pesticide exposure. All participants described the protective equipment as including plastic gloves and boots, mask and, overalls. According to Mokhele (2011), about half of farmworkers interviewed agreed that pesticides need to be handled with care. Mokhele identified that some protective equipment farmworkers use are long-sleeve shirts, long pants, rubber boots and waterproof hats. Overall, it seems that farmworkers, who participated in this study, are aware of the protective gear they need to use when managing pesticides.

According to participants of this study, pesticide exposure may cause various health issues and symptoms. It was discussed that pesticide exposure may cause cancer, dizziness, itchiness, allergies and, in some cases, death. Other side effects of pesticide exposure,

identified by the participants, were mental retardation among children, pregnancy issues with women, and swollen body or body parts. This finding is supported by Flocks et al.'s (2007) study that found that farmworkers believe that pesticides affect their emotional state and may cause long-term health conditions like cancer and memory loss. It is also believed by farmworkers that long-term exposure to pesticides may cause sterility in men, and infertility in women. When children are exposed to pesticides, they are believed to have allergies, cancer and flu-like symptoms (Flocks et al., 2007). Participants of Stanislaus County are aware of the possible side effects of pesticide exposure. The researcher got access to the sample of participants through the United Farm Workers (UFW) organization and they play an active role in advocating for farmworkers' rights and empowering the farmworkers. It is likely that the efforts of the UFW are helping with educating farmworkers about the consequences of pesticide exposure.

It was found in the study that farmworkers protect their families from pesticides through taking specific precautions after returning home from work. All participants discussed the importance of taking a shower after work and taking off their work clothes immediately as well. Participants in this study shared that in order to protect their families from pesticides they changed their work clothes right after getting home and put their work clothes in a different pile than the everyday wear clothes. Participants also shared that they do not even hug their family members when wearing work clothes. They highlighted that their clothes are washed separately from their other family members. This finding correlates with Mokhele's (2011) findings that showed that farmworkers bathed and washed their clothes after pesticide application. A couple of the farmworkers who were directly involved in the use of

pesticides also mentioned watching videos on the topic. It is likely that through these educational efforts and talking to each other, they are a little more informed. General literature concludes that farmworkers are not well informed on how to protect their families and themselves from pesticide exposure.

One major finding of this study was that three out of the six participants indicated that they have received some kind of pesticide training. All participants who received pesticide trainings confirmed that people who have some knowledge about pesticides conducted the trainings. Yet, two participants indicated that certified experts on pesticide management should conduct trainings. Participants from Stanislaus County are likely to receive trainings, yet it is not enough, according to the participants in this study. This finding is contradicted by Mokhele's (2011) study, which found that about 93% of the farmworkers interviewed had received no training in the use of pesticides. In Mokhele's study, only 50% of farmworkers reported having extensions agents, who are individuals who are supposed to educate farmworkers about pesticide management. In comparison to Mokhele's study, farmworkers from Stanislaus County seem to be more likely to have received trainings. All participants were UFW members, which makes the researcher believe that they are more likely to receive pesticide trainings.

This study also found that the employers provide farmworkers with limited resources against pesticide exposure protection. It was discussed by farmworkers that employers do not provide protective equipment as needed. For example, gloves, overalls and glasses are only supposed to be used once. It is common for supervisors

to encourage farmworkers to use protective equipment more than once. Similarly, Farquhar et al. (2008) found that farmworkers are aware of the lack of protective equipment like masks, gloves, helmets, and coveralls available to them. According to a study conducted by Farquhar et al., there is a lack of resources that are needed for protection against pesticides and farmworkers would be willing to use if provided by farmers. Farmworkers seem to be educated on what protective gear they need in order to manage pesticides safely. It seems that even though there are laws and policies that require employers to protect employees against pesticide exposure, they are doing the bare minimum. It makes the researcher wonder whether there is effective monitoring of the requirement to implement these safe guards.

In this study, participants shared several recommendations for other farmworkers who manage pesticides and for the employers to make working conditions safer for the farmworkers. Participants shared that pesticide trainings needed to be offered more often, about every 3 months, and for longer durations, for about more than three hours each to allow enough time for the information to be addressed and processed. According to participants, trainings should only be focused on the pesticides they will be using. Literature suggests that farmworkers should be provided with the information needed to protect themselves from pesticides (Farmworker Justice, 2013). Furthermore, Farmworker Justice points out that safety trainings should be improved, by verifying comprehension of the information, and improving hazard information about specific pesticides they are exposed to. It was recommended by Farmworker Justice for pesticide labels to be translated to Spanish.

This study and Farmworker justice found that effective educational materials should be developed so that farmworkers understand how to protect themselves and their families. It seems that farmworkers know what they need, and how the information needs to be presented to them; therefore, employers and professionals working with them would benefit from collaborating with farmworkers and together create learning materials to better educate farmworkers about pesticide exposure.

### **Implications for Social Work Practice**

There are several implications for the social work profession based on this study. First of all, the findings of this research will provide social work professionals with a better understanding of what farmworkers do to work safely in the fields. It also explains what is lacking and what farmworkers need for their working conditions to be safe. The farmworker population highlighted that there is a need for pesticide trainings to be offered constantly by experts on pesticide management. It would be ideal for social workers to establish community programs like hands on pesticide trainings, and implement informational classes on how to report pesticide exposures. Farmworkers know and understand pesticide use, consequences of its exposure and are the experts with regard to their hands on experiences with it; therefore, it is vital that social workers collaborate with them and engage them as partners in the development and implementation of these trainings. Consequently, farmworkers will have support from their community and will be aware of the importance of continuing to use pesticides safely and how to report pesticide exposures.

Additionally, this study highlights the need for social workers to collaborate with other agencies that advocate for the agricultural community. Social workers bring their expertise in community organizing and advocacy and the agricultural advocacy groups are the experts in their field; therefore, their collaboration would lead to stronger efforts in ensuring that appropriate protective equipment is being provided to farmworkers by their employers. It could lead to stronger policies around monitoring of farm owners and their effective implementation of these safety measures.

Organizations like Farmworker Justice, UFW would benefit from this study by analyzing their practices to protect and educate farmworkers about pesticides. The organizations mentioned above educate and bring awareness about environmental issues that may affect the farmworker population. It is recommended for organizations to make sure that employers are following policies so that farmworkers are well protected. A participant shared that sometimes employers do not provide potable water and equipment to protect themselves from pesticides. If existing policies are implemented and monitored, there is a higher chance that farmworkers will be protected from pesticides.

Furthermore, policies in regards to pesticide trainings provided to farmworkers need to be re-evaluated. The importance of having pesticide trainings frequently was discussed by several participants in the study. Policies should be implemented so that pesticide trainings are longer and offered constantly.

### **Limitations of the Study**

Like any other study, this study has some limitations. First of all, the sample size was small due to time constraints. The researcher intended to interview at least eight participants. Although the purpose of the study was explained to potential participants along with scheduled times to meet, as per their convenience, some did not answer their phone to confirm the interview time. A total of two participants were female, which provides a limited discussion of the knowledge female farmworkers have in regards to pesticides. Another limitation was that, even though the goal of the researcher was to interview participants from different populations of Stanislaus County, all participants lived in the same town.

### **Recommendation for Future Research**

The findings of this study showed that farmworkers do have some knowledge about pesticides, their use, consequences of their use and how to protect themselves and their families against pesticide exposure. Ideally, a participatory action research that engages the farmworkers and their families as co-researchers could help frame the needs and discussion around pesticide use in a way that has never been done before. Also, it could lead to action that is data based and driven by the experts with first hand knowledge and experience with pesticide use, exposure, and protection.

This researcher also suggests for future researchers who intend on doing qualitative studies to build rapport with potential participants before interviewing. It seems like the more the researcher becomes familiar with the community and

establishes rapport, the more comfortable participants might feel to engage in an interview with the researcher and share more detailed information.

Also, it would be ideal to have a larger sample size composed of women and men. A larger sample size will definitely provide the researcher with plenty of data to dissect. An equal representation of gender will give both genders an equal opportunity to voice their knowledge. Also, this researcher accessed participants through the UFW, which could have led to a more aware and informed sample. Recruiting farmworkers who are not part of or aware of community-based advocacy or farm worker organizations, might present a different picture of farmworkers' knowledge about pesticide use and its consequences.

An additional recommendation for future research would be to conduct a mixed method study with the same population taking in to consideration their demographics, such as, education level, acculturation, and age to see if there is a correlation between those factors and the level of awareness farmworkers have in regards to pesticides. This researcher focused on Hispanic farmworkers. Therefore, it is also recommended for future researchers to conduct a qualitative study involving other races and compare it to this research study.

## REFERENCES

## REFERENCES

- Census of Agriculture. (2007). County Profile. Retrieved September 20, 2014, from [http://www.agcensus.usda.gov/Publications/2007/Online\\_Highlights/County\\_Profiles/California/cp06099.pdf](http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/California/cp06099.pdf)
- Centers for Disease and Control Prevention. (2013). Pesticide illness and injury surveillance. Retrieved January 27, 2015, from <http://www.cdc.gov/niosh/topics/pesticides/>
- Farmworker Justice. (2013). Exposed and ignored: How pesticides are endangering our nation's farmworkers. Washington, DC.
- Farquhar, S., Samples, J., Ventura, S., Davis, S., Abernathy, M., McCauley, L., & ... Shadbeh, N. (2008). Promoting the occupational health of indigenous farmworkers. *Journal of Immigrant & Minority Health*, 10(3), 269-280.
- Flocks, J., Kelley, M., Economos, J., & McCauley, L. (2012). Female farmworkers' perceptions of pesticide exposure and pregnancy health. *Journal of Immigrant & Minority Health*, 14(4), 626-632. doi:10.1007/s10903-011-9554-6.
- Flocks, J., Monaghan, P., & Albrecht, S. (2007). Florida farmworkers' perceptions and lay knowledge of occupational pesticides. *Journal of Community Health*, 32(3), 181-194.
- Grzywacz, J. G., Arcury, T. A., Talton, J. W., D'agostino Jr, R. B., Trejo, G., Mirabelli, M. C., & Quandt, S. A. (2013). "Causes" of Pesticide Safety

- Behavior Change in Latino Farmworker Families. *American Journal of Health Behavior*, 37(4), 449-457. doi:10.5993/AJHB.37.4.3.
- Hoppin, J. A., Adgate, J. L., Eberhart, M., Nishioka, M., & Ryan, P. (2006). Environmental exposure assessment of pesticides in farmworker homes. *Environmental Health Perspectives*, 114(6), 929-935.
- Martinez, R., Gratton, T., Coggin, C., René, A., & Waller, W. (2004). A study of pesticide safety and health perceptions among pesticide applicators in Tarrant County, Texas. *Journal of Environmental Health*, 66(6), 34-37.
- Mokhele, T. M. (2011). Potential health effects of pesticide use on farmworkers in Lesotho. *South African Journal of Science*, 107(7-8), 27-33.
- Murphy-Greene, M. C. (2002). The occupational, safety, and health of Florida farm workers: Environmental justice in the fields. *Journal of Health & Human Services Administration*, 25(3), 281-314.
- Neuman, W. L. (2003). *Social work research methods: Qualitative and quantitative approaches*. Boston: Allyn and Bacon.
- Payne –Sturges, D., Cohen, J., Castorina, R., Axelrad, D. A., & Woodruff, T. J. (2009). Evaluating cumulative organophosphorus pesticide body burden of children: A national case study. *Environmental Science & Technology*, 43(20), 7924-7930.
- Quandt, S. A., Doran, A. M., Snively, B. M., & Arcury, T. A. (2007). Pesticides in the homes of farmworkers: Latino mothers' perceptions of risk to their children's health. *Health Education & Behavior*, 34(2), 335-353.

- Quandt, S., Chen, H., Grzywacz, J., Vallejos, Q., Galvan, L., & Arcury, T. (2010).  
Cholinesterase depression and its association with pesticide exposure across  
the agricultural season among Latino farmworkers in North Carolina.  
*Environmental Health Perspectives*, 118(5), 635-639.  
doi:10.1289/ehp.0901492.
- Quirós-Alcalá, L., Bradman, A., Nishioka, M., Harnly, M. E., Hubbard, A., McKone,  
T. E., & ... Eskenazi, B. (2011). Pesticides in house dust from urban and  
farmworker households in California: an observational measurement study.  
*Environmental Health: A Global Access Science Source*, 10(1), 19-33. 19-  
33. doi:10.1186/1476-069X-10-19.
- Rao, P., Quandt, S.A., Doran, A. M., Snively, B. M., & Arcury, T.A. (2007).  
Pesticides in the homes of farmworkers: Latino mother's perceptions of risk  
to their children's health. *Health Education & Behavior*, 34(2), 335-353.
- Rothlein, J., Rohlman, D., Lasarev, M., Phillips, J., Muniz, J., & McCauley, L.  
(2006). Organophosphate pesticide exposure and neurobehavioral  
performance in agricultural and nonagricultural Hispanic workers.  
*Environmental Health Perspectives*, 114(5), 691-696.
- Reeves M., Pesticide Action Network; Katten A., California Legal Rural Assistance;  
Guzman M., United Farm Workers of America. (2002). Fields of poison  
2002: California farmworkers and pesticides. California.
- Rubin A., & Babbie E. (2011). *Research methods for social work*. Belmont, CA:  
BooksBrooks/Cole Cengage learning.

- Samples, J., Bergstad, E., Ventura, S., Sanchez, V., Farquhar, S., & Shadbeh, N. (2009). Pesticide exposure and occupational safety training of indigenous farmworkers in Oregon. *American Journal of Public Health, 99*S581-4. doi:10.2105/AJPH.2009.166520.
- Shepherd, J. (2009). Pesticide safety training programs and curricula. *Migrant Health Newsline, 26*(4), 4-5.
- Snipes, S., Thompson, B., O'Connor, K., Shell-Duncan, B., King, D., Herrera, A., & Navarro, B. (2009). Pesticides protect the fruit, but not the people": using community-based ethnography to understand farmworker pesticide-exposure risks. *American Journal of Public Health, 99*S616-21. doi:10.2105/AJPH.2008.148973
- Washburn, B. (2011, December/January). (United states, Environmental Protection Agency). Retrieved March 27, 2015, from <http://yosemite.epa.gov/opa/admpress.nsf/1e5ab1124055f3b28525781f0042ed40/04c25f89ad3862418525796b0063d35d!OpenDocument>
- Whalley, L., Grzywacz, J., Quandt, S., Vallejos, Q., Walkup, M., Chen, H., & ... Arcury, T. (2009). Migrant farmworker field and camp safety and sanitation in eastern North Carolina. *Journal of Agromedicine, 14*(4), 421-436.
- Worker Safety and Training | Pesticides | US EPA. (n.d.). Retrieved March 24, 2015, from <http://www.epa.gov/pesticides/health/worker.htm>

## APPENDICES

APPENDIX A  
INTERVIEW GUIDE: ENGLISH VERSION

- 1. What are the perceptions of Hispanic farmworkers regarding pesticide use and the consequences of pesticide exposure?**
  - A. What do you know about pesticide use?
  - B. Do you use pesticides in your work? How often?
  - C. Do you think pesticides are harmful to you? Your family? Please explain..
  
- 2. What do Hispanic farmworkers practice to protect themselves from pesticides? What services or resources do they access, if any?**
  - A. What do you do to protect yourself when you use pesticides?
  - B. What do you do to protect your family?
  - C. Have you received any trainings on how to use pesticides? If yes, please tell me about them. If not, then how did you know how to use them?
  - D. What is the first thing you do when you get home from work?
  
- 3. What recommendations do they have for people who manage and are exposed to pesticides?**
  - A. What recommendations do you have for other farmworkers who use pesticides daily?

- B. Provide an example of how you think pesticides should be handled?
- C. What is the best way to educate farmworkers about pesticides?

## APPENDIX B

## INTERVIEW GUIDE: SPANISH VERSION

**1. Cual es el punto de vista de los trabajadores Hispanos agricolas sobre el uso de pesticidas y sus consecuencias?**

- A. Que es lo que sabe sobre el uso de pesticidas?
- B. Usted usa pesticidas en su trabajo? Con que frecuencia?
- C. Piensa usted que los pesticidas son peligrosos para su familia y/o usted? Por favor .

**2. Como se protegen los trabajadores agricolas Hispanos cuando usan pesticidas? Que servicios o recursos estan disponibles?**

- A. Que hace usted para protegerse de los pesticidas cuando los esta usando?
- B. Que hace para proteger a su familia?
- C. Usted ah recibido algun entrenamiento sobre como usar pesticidas?  
Si ah recibido entrenamiento, por favor hable sobre eso. Si no ah recibido entrenamiento, entonces como aprendio a usar pesticidas?
- D. Que es lo primero que hace usted cuando llega a casa de trabajar?

**3. Que le recomienda a la gente que usa y esta expuesta a pesticidas?**

- A. Que les recomienda a los trabajadores agricolas que usan pesticidas diariamente?

B. Nombre un ejemplo sobre como se deben manejar los pesticidas?

C. Cual es la mejor manera de educar a los trabajadores agricolas sobre pesticidas?

## APPENDIX C

## ENGLISH INFORMED CONSENT

I, Maria I. Guerrero, am a Masters student in the Master of Social Work Program at California State University, Stanislaus and am doing a research study for my Master's thesis. You are being requested to participate in this study with the purpose of learning about your perception of pesticide management as a farm worker in the United States. If you decide to volunteer you will be asked a series of questions with the purpose of encouraging you to discuss your experiences as thoroughly as you find fit for the interview. Interviews are expected to be between one to two hours in length.

You and others may benefit by utilizing your life experiences as a way to better serve the farm worker population. The information collected will be protected from all inappropriate disclosure under the law. I will tape the interview with your permission and take notes to accurately capture your responses. All data collected will be maintained for one year after the completion of the study when all notes and transcripts will be shredded and tapes will be erased. When I report the findings of the study I will not mention any identifying information, such as your names or connect your name to your response.

There is no cost to you beyond the time and effort required to complete the procedure described above. Your participation is voluntary. If you decide not to participate in this study or choose to withdraw at any time there will be no penalty. You can also choose to not answer any question you do not want to answer. If you agree to participate, please indicate by signing below. If you have any questions about this study please contact me, Maria I. Guerrero at 831-235-9542, my Thesis Chair, Dr. Shradha Tibrewal, at 209- 667-3951. If you have any questions about your rights as a human participant, please contact Campus Compliance at (209) 667-3006 or email IRBAdmin@csustan.edu. Thank you for considering to participate in this study. Your time and input is appreciated.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Name: \_\_\_\_\_

## APPENDIX D

## INFORME DE CONSENTIMIENTO (SPANISH INFORMED CONSENT)

Usted ha sido invitado/a a participar en un estudio con el propósito de aprender acerca de su percepción sobre el uso de pesticidas. Su participación será voluntaria, y se le harán una serie de preguntas con el propósito de motivarlo a expresar su punto de vista acerca del uso de los pesticidas. La entrevista tardara un promedio de 1-2 horas. Si usted esta de acuerdo con este consentimiento, me gustaría grabar la entrevista para que yo pueda captar adecuadamente lo que comparte conmigo.

Usted y otros podrán beneficiarse de esta investigación porque sus puntos de vista proveerán información a los administradores de recursos públicos de su comunidad, así ellos podrán seguir abogando y creando programas para educar a los trabajadores del campo sobre pesticidas. Toda la información recolectada será protegida por ley de cualquier uso inapropiado. Después de haber completado la investigación la información recaudada será almacenada por un ano, y al termino de este será destruida. Cuando yo reporte los resultados de la investigación no haré mención de la información que pueda identificarle a usted, como nombres o respuestas que se puedan conectar con su nombre.

No hay costo alguno al participar en el estudio, solamente se requiere su tiempo, esfuerzo y voluntad para proceder con la investigación. Su participación es sumamente voluntaria. Si usted decide no participar o retirarse en cualquier momento no habrá ninguna multa. Usted también tiene la opción de no contestar algunas preguntas si así lo desea. Si usted esta de acuerdo en participar por favor indíquelo firmando abajo. Si usted tiene alguna pregunta sobre la investigación por favor de contactar a Maria I. Guerrero al 831-235-9542 o a mi patrocinadora, Shradha Tibrewel al 209- 667-3951. Si tiene alguna preocupación sobre el proceso de este estudio por favor de llamar a Campus Compliance al (209) 667-3006. Gracias por considerar su participación en esta investigación. De ante mano le agradecemos el compartir su tiempo e información.

Firma: \_\_\_\_\_

Fecha: \_\_\_\_\_

Nombre: \_\_\_\_\_