

Impacts of Pesticides on the Health of Agricultural Workers

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Pesticide exposure has many negative health impacts on agricultural workers. Pesticides that are used for killing pests who damage crops affect not only those pest organisms but also the agricultural workers who apply the pesticides. There are various ways in which workers can be exposed to pesticides. Agricultural workers have frequent direct exposure to pesticides and work with the highest concentrations of the chemicals very often. Therefore, they are at the highest risk of becoming poisoned and affected by them. Despite this, there are various precautions the workers can take to reduce the harmful exposure and its effects.

Pesticide Exposure

Pesticides are used extensively in the United States, surpassing more than 1.2 billion pounds per year (Samples et al., 2009). According to Salvatore et al. (2008), approximately three million farmworkers are at risk of pesticide exposure during work. That is just for the United States, but agricultural workers are being affected worldwide. The effects and risks can vary depending on how frequent the pesticides are used, the amount that is used, the safety precautions being taken, and the amount of toxicity the pesticide has (Ye et al., 2013).

There are various routes the chemical can enter your body. Workers can be exposed to the toxic chemicals through direct skin contact, ingestion, inhalation, or absorbing it through the eyes (Alavanja & Hoppin, 2004). The chemicals of the pesticide entering through the skin is usually the most common form of exposure and not only can you be exposed dermally, but also from contact with clothing or tools that have pesticide residue on them (Ye et al., 2013).

Cieskielski et al. (1994), stated that people often would report the exposure they had after they already had symptoms that affected their health.

Many farmworkers have false beliefs about pesticide exposure. Quandt et al. (2006) stated a few themes of common beliefs among agricultural workers, for example, you must be able to use your senses to detect a present pesticide, pesticide exposure only occurs if a pesticide is wet, and not all people can be harmed by pesticide exposure. Another common belief is that the workers have no control over their health being impacted by pesticides (Vaughan, 1993). Some of these false beliefs bring more harm to the workers because they often act according to their beliefs. These false beliefs correlate with a lower likelihood of using protective gear and protective equipment (Vaughan, 1993). The perceptions farmworkers have on pesticide exposure play a large role in determining how they are affected by pesticides.

Health Effects

Pesticide exposure leads to various health problems, both short term and long-term and can also cause death. Thousands of agricultural workers die every year from pesticide poisoning. A few of the health problems that can be caused by pesticides are respiratory issues and numerous forms of cancer (Alavanja & Hoppin, 2004). During pesticide application, many things can go wrong that are very harmful for the workers' health. Pesticide spills, splashes, and leakages, which can all be very hazardous, are all possible, as well as the possibility of the protection equipment being defective (Ye et al., 2013). Safe working methods and conditions are critical for minimized pesticide exposure.

All the studies mentioned unanimously state that pesticides are very detrimental to human health. The pesticides agricultural workers apply are made up of chemicals that are very toxic and hazardous (Ye et al., 2013). Some symptoms occur almost immediately, while others occur

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minutes, days, or even several years later. The mild short-term effects can include headaches, vomiting, excessive sweating, dizziness, nausea, salivation (Alavanja & Hoppin, 2004). If it becomes more severe, muscle weakness and twitches can occur, as well as changes in heart rate, respiratory failure and possibly a coma (Alavanja & Hoppin, 2004). According to Alavanja & Hoppin (2004), each year, about 25 million agricultural workers all over the world experience pesticide poisoning. Alavanja & Hoppin (2004), mentioned a case where effects were still seen over ten years after the poisoning occurred, therefore, the damage can be long lasting.

Mild poisoning can lead to long term health impacts which include several different types of cancer as well as neurologic, reproductive, and respiratory issues (Arcury et al., 2002). Pesticides are a huge factor in numerous cases of cancer with agricultural workers. A few of the many forms of cancer mentioned that exposure to pesticides can lead to are non-Hodgkin's lymphoma, kidney, breast, liver, brain, lung, prostate, pancreatic, ovarian, etc. (Alavanja & Hoppin, 2004). According to Parent, Désy, & Siemiatycki (2009), farmers exposed to pesticides have a risk more than double an unexposed farmer would have for prostate cancer. There are many diseases, cancers, and other health effects related to pesticide exposure in agricultural settings.

Safety of Applying Pesticides

Although pesticides are very harmful, many studies agree that there are a few precautions that can be taken to reduce the extent of exposure. For example, studies (Alavanja et al., 1999; Quandt et al., 2006; Salvatore et al., 2008) all agree that washing your hands often, wearing personal protective equipment, clean clothing, and gloves, are all ways to lessen the extent of exposure. Alavanja et al. (1999) mentioned that high pesticide exposure events are more

common when clothing is not changed or washed soon after working with the pesticides. Farmworkers are not very educated on how they can reduce their exposure to pesticides, especially in undeveloped countries, but if they were, their health would not be as negatively affected. According to Arcury et al. (2002), many farmworkers are unaware of the long-term impacts of pesticide exposure and are more focused on how they will be impacted short-term. Although there are standards and regulations workers are required to abide by in terms of safety, they are often violated (Ciesielski et al., 1994). Education is one solution to reduce pesticide impacts, although, it does not always result in action, whereas many other solutions do such as the government putting a tax on agricultural farms that use pesticides and subsidizing those that do not. Despite this, it is very important that agricultural workers using pesticides are educated on the possible health effects from pesticide exposure and know how to minimize that exposure.

Due to the extent of negative health effects pesticide exposure has on agricultural workers, the U.S. Environmental Protection Agency's Worker Protection Standard has been created (Arcury et al., 2002). The worker protection standard is a federally mandated program that protects agricultural workers and is designed to prevent poisoning and unhealthy effects from pesticides (Salvatore et al., 2008). This standard protects agricultural workers from pesticides in numerous ways. It includes requirements for using protective equipment, restricts times agricultural workers can enter pesticide-treated areas and requires safety training (Salvatore et al., 2008). Despite these federal and state regulations, Ciesielski et al. (1994), added that they are sometimes infringed upon. Stronger enforcement of safety behaviors and managing pesticides are extremely important for decreasing pesticide related health problems (Ye et al., 2013). Focusing on health and safety when dealing with pesticides is essential.

Migrant Agricultural Workers

Many agricultural workers in the United States are migrant. According to Arcury et al. (2002), most farmworkers in the United States are immigrants and throughout the past ten years, the population of farmworkers has had increasing Latino and Mexican workers. Many farmworkers who are indigenous to Mexico and Guatemala are susceptible to the health effects from pesticides because it is difficult to provide them with health and safety training due to their poor knowledge and standardized writing (Samples et al., 2009). In health care, there are many language and cultural barriers. There were several indigenous workers who reported that their doctor did not speak their language and also that there was no interpreter for them (Samples et al. 2009). Ethnicity and socioeconomic status also play a key role in pesticide exposure. Vaughan (1993) states that people of ethnic minority and low-income are frequently more exposed to chemical hazards. Although the salary for agricultural workers is below the poverty level, it is usually their families' main source of income and they often are not knowledgeable of other employment opportunities for them (Vaughan, 1993). Migrant agricultural workers' lack of awareness of the negative effects of pesticides leads to many negative consequences.

Prevention of Pesticide Exposure

There are different methods for reducing agricultural workers' exposure to pesticides such as more safety training and better education to increase workers knowledge on pesticides and their risks (Alavanja & Hoppin, 2004; Arcury et al., 2002; Ye et al., 2013). According to Arcury et al. (2002), knowledge of pesticide exposure and perceived risk have a strong correlation. There are many farmworkers who believe the safety precautions limit their productivity, so they decide to not abide by them or wear the protective gear. When the workers have financial pressure and need to

work fast, they are less likely to use protective equipment and gear (Snipes et al., 2009). A few other approaches for prevention are increased research on the health effects pesticides have on humans, increased inspection of pesticide poisoning, and monitoring exposures (Alavanja & Hoppin, 2004). Better exposure assessment techniques for studies on health effects of pesticides would also be very beneficial in understanding the impact they have on human health (Alavanja & Hoppin, 2004). Although an adequate number of farmworkers know that pesticides are hazardous, they do not always know the routes of how they are exposed to them, the exact health effects they cause, or how to avoid the exposure (Arcury et al., 1999). If farmworkers were knowledgeable about those topics, preventing exposure would be much more likely.

Policy Proposal

Pesticides are very beneficial for killing pests on crops, but they are also killing hundreds of thousands of agricultural workers who are applying them as well. There are a few different solutions to address this problem. A structural solution would be taxing agricultural farms that use pesticides and subsidizing or having a tax benefit for farms that use alternate pest control solutions rather than toxic pesticides. This would make agricultural farms who use pesticides want to switch to using non-chemical pest control methods or other alternative methods to avoid the high tax. If many agricultural farms refrained from using pesticides on their crops, it could lead to fewer agricultural workers who die each year from pesticide exposure.

The regulations and standards for wearing protection gear and using protective equipment must also be more harshly enforced and there should be more government intervention. Any agricultural worker applying or in contact with pesticides must wear personal protective gear and use personal protective equipment no matter how short of a time they will be working with the pesticides, the quantity, or the toxicity of the pesticides. Health problems are already a consequence

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of them not abiding by those rules but there could also be other consequences such as a law stating if protective gear and equipment is not used during application, they will have to pay a monetary fine. In addition, before workers use the equipment and gear they must be checked to make sure they are still safe to use. Following the regulations of wearing pesticide resistant clothing, protective gloves and boots, and washing all gear after use is crucial for the workers' health and safety.

Another solution to combat farmworkers ignoring the safety precautions while working with pesticides due to some of their beliefs that it will lessen their productivity would be organized labor. Their safety would be improved, and their risks of injury and illness would be reduced. By having organized labor, the workers would be protected from the pesticides by not being allowed to apply or work with the pesticides in a way that would be hazardous to them (Environmental Protection Agency, 2015).

There are also many other solutions such as more education, more safety training, increasing protection standards, and having ad campaigns showing the pesticide health risks so the agricultural workers themselves can make better health related decisions when using pesticides. Often, workers wait to go to the doctor even after they have symptoms because they do not think the illness is worth going to the doctor for or they think it is not caused by pesticides. Ad campaigns can motivate the workers to act immediately as soon as they think they may have come into direct contact with the pesticide or once they start noticing symptoms. If they go to the doctor immediately, it could decrease the health effect they may have in the long run. The workers must be convinced that it is in their best interest to use protection gear while they apply pesticides.

For addressing the problem technologically, there should be alternate methods for keeping pests away from crops other than toxic chemical pesticides. The use of pesticides with toxic

chemicals should be much more limited and instead, there should be a non-toxic method to keep the pests away from crops (Aktar, Sengupta, & Chowdhury, 2009). If a more organic or natural pest control was used on crops, it would be much more sustainable and safer for agricultural workers to apply. Although pesticides are effective, inexpensive, and quick, they come with such high consequences and need to be handled with vast precaution if used.

Conclusion

Agricultural workers have great health risk associated with their job due to the exposure they have from pesticide application to destroy organisms that are harmful to crops. Reducing pesticide exposure is an extremely important topic of research for social scientists because there are thousands of people who die due to these exposures. Although there are certain factors that can vary the degree of the effects, agricultural workers are likely to be at high risk of exposure. There are safety precautions that can be taken to help reduce the exposure, but not all workers are educated on what those safety precautions are. Since false beliefs about pesticides are very common amongst farmworkers, education on pesticides and their effects would be very beneficial. A few of the many ways to reduce the workers exposure would be increased safety training, better protective gear, more education, and ad campaigns. There are many downsides to agricultural workers using pesticides and they lead to very harsh outcomes.

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