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The Dangers of Pesticides Associated with Public Health and Preventing of the Risks

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Abstract

Pesticides in most cases are designed to kill pests; however, many pesticides can also pose risks to the peoples. But, in many cases the amount of pesticide to which peoples are likely to be exposed, is too small to pose a health risk. To determine risks, one must consider both the toxicity and hazard of the pesticide and the likelihood of exposure. A low level of exposure to a very toxic pesticide may be no more dangerous than a high level of exposure to a relatively low toxicity pesticide. The health effects of pesticides depend on the type of pesticide, some chemicals such as the organophosphates and carbamates; affect the nervous system, while others may irritate the skin or eyes. Some pesticides may be carcinogens, but others can affect the hormone or endocrine system in the body. The product label may have more specific instructions and try to identify and use products that are low in toxicity. As a medical professional, collecting of a thorough and complete exposure history of patients is essential to treat the case of pesticide poisoning. In either scenario, it is important to minimize the adults and children exposure to pesticides. Precautionary, store all pesticides out of the reach of children and in case of any accidental occasion contact to a medical professional. One way to minimize exposure to pesticides is to take approaches called Integrated Vector Management (IVM) and Integrated Pest Management (IPM) that are vector and pest control strategies which use a combination of methods to prevent and eliminate problems in the most effective and the least hazardous manner.

Keywords

Pesticides, Integrated Management, Public Health, Preventing Risks, Health Effects

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1. Introduction

Pesticides are designed to kill or harm pests and because their mode of action is not specific to one species, these often kill organisms other than pests including humans. The World Health Organization (2001) estimates that there are 3 million cases of pesticide poisoning each year and up to 220,000 deaths, primarily in developing countries. The application of pesticides is often not very precise, and unintended exposures occur to other organisms in the general area where pesticides are applied. Children, and indeed any young and developing organisms, are particularly vulnerable to the harmful effects of pesticides. Even very low levels of exposure during development may have adverse health effects.

Pesticide exposure can cause a range of neurological health effects such as memory loss, loss of coordination, reduced speed of response to stimuli, reduced visual ability, altered or uncontrollable mood and general behavior, and reduced motor skills. These symptoms are often very subtle and may not be recognized by the medical community as a clinical effect. Other possible health effects include asthma, allergies and hypersensitivity, and pesticide exposure is also linked with cancer, hormone disruption, and problems with reproduction and fetal development (Katarina, 2011).

Pesticide formulations contain both ‘active’ and ‘inert’ ingredients. Active ingredients are that which kill the pest, and inert ingredients help the active ingredients to work more effectively. These inert ingredients may not be tested as

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thoroughly as active ingredients and are seldom disclosed on product labels. Solvents, which are inert ingredients in many pesticide formulations, may be toxic if inhaled or absorbed by the skin (Jeyaratnam, 1990; Levine, 2007).

2. Purpose of Pesticides in Society

Pesticides are the only toxic substances released intentionally into our environment to kill living things. This includes substances that kill weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides), and others. Pesticides are used in our schools, parks and public lands. Pesticides are sprayed on agricultural fields and wood lots. Pesticides can be found in our air, our food, our soil, our water and even in our breast milk. Because peoples use pesticides to kill, prevent, repel or in some way adversely affect some living pest organisms, the pesticides by their nature are toxic to some degree. Even the least-toxic products, and those that are natural or organic, can cause health problems if someone is exposed to enough of these (Khan et al., 2010; Sarwar et al., 2011). Due to the great toxicity of insecticide, these are used heavily in the control of pests or vectors that also impact applicator and public as include subsequently:-

2.1. Organochlorines

Acute ingestion of organochlorine insecticides can cause a loss of sensation around the mouth, hypersensitivity to light, sound and touch, dizziness, tremors, nausea, vomiting, nervousness, and confusion.

2.2. Organophosphates and Carbamates

Acute organophosphate and carbamate exposure causes signs and symptoms of excess acetylcholine, such as increased salivation and perspiration, narrowing of the pupils, nausea, diarrhea, decrease in blood pressure, muscle weakness, and fatigue. These symptoms usually decline within days after exposure ends as acetylcholine levels return to normal. Some organophosphates also have a delayed neurological reaction characterized by muscle weakness in the legs and arms. The human toxicity of organophosphates caused a decline in their use and spurred the search for new alternatives.

2.3. Pyrethroids

Among the most promising alternatives to organophosphates are synthetic pyrethroids. However, pyrethroids can cause hyper-excitation, aggressiveness, uncoordination, whole-body tremors and seizures. Acute exposure in humans, usually resulting from skin exposure due to poor handling procedures, usually resolves within 24 hours. Pyrethroids can cause an allergic skin response, and some pyrethroids may cause cancer, reproductive or developmental effects, or endocrine system effects.

The use of toxic pesticides to manage pest problems has become a common practice around the world. Pesticides are used almost everywhere, not only in agricultural fields, but also in homes, parks, schools, buildings, forests and roads. It is difficult to find somewhere where pesticides are not used starting from the bug spray, under the kitchen sink, the airplane to crop dusting acres of farmland, which filled our world with pesticides. In addition, pesticides can be as well found in the air we breathe, the food we eat and the water we drink. And all the time there is more evidence surfacing that human exposure to pesticides is linked to health problems. For example, a study found that exposure to pesticide residues on vegetables and fruits may double a child's risk of attention deficit hyperactivity disorder- a condition that can cause inattention, hyperactivity and impulsivity in children (Beseler et al., 2008).

3. Pesticides and Human Health

The pesticides literature review, which is based on studies conducted by a multi-university research teams, concludes that the peoples should reduce their exposure to pesticides because of links to serious illnesses. Results of this study found consistent evidence of serious health risks such as cancer, nervous system diseases and reproductive problems in peoples exposed to pesticides through home and garden exposure. Similar research has linked exposure to pesticides to increased presence of neurological disorders, Parkinson's disease, childhood leukemia, lymphoma, asthma and many more (Lockwood, 2000; Sheiner et al., 2003).

Not only are pesticides dangerous to the environment, but these are also hazardous to a person's health. Pesticides are stored in colon, where these slowly but surely poison the body. A person may not realize this, but when he is eating a non-organic apple, is also eating several different pesticides that have been sprayed on the apple. Even if a piece of fruit is washed such as an apple, there are still many pesticides lingering on it and these could have seeped into the fruit or vegetable. Although one piece of fruit with pesticides cannot kill, but if these build up in the body, they can be potentially detrimental to health and should be avoided as much as possible.

After countless studies, pesticides have been linked to cancer, Alzheimer's disease and even birth defects. Pesticides also have the potential to harm the nervous system, the reproductive system, and the endocrine system. Pesticides

can even be very harmful to fetuses because the chemicals can pass from the mother during pregnancy or if a woman nurses her child (Katarina, 2011).

Pesticides have been linked to a wide range of other human health hazards, ranging from short-term impacts such as headaches and nausea to chronic impacts like cancer, reproductive harm, and endocrine disruption. Acute dangers, such as nerve, skin and eye irritation and damage, headaches, dizziness, nausea, fatigue, and systemic poisoning can sometimes be dramatic, and even occasionally fatal. Chronic health effects may occur years after even minimal exposure to pesticides in the environment, or result from the pesticide residues which are ingested through food and water. Study conducted by researchers found a six fold increase in risk factor for autism spectrum disorders for children of women who are exposed to organochlorine pesticides (Alavanja et al., 2004; Kamel and Hoppin, 2004; Montgomery et al., 2008).

Pesticides can cause many types of cancer in humans; some of the most prevalent forms include leukemia, non-Hodgkins lymphoma, and brain, bone, breast, ovarian, prostate, testicular and liver cancers. A study published found that children who live in homes where their parents use pesticides are twice as likely to develop brain cancer versus those that live in residences in which no pesticides are used. Studies found that farmers, who in most respects are healthier than the population at large, have startling incidences of leukemia, Hodgkins disease, non-Hodgkins lymphoma, and many other forms of cancer. There is also mounting evidence that exposure to pesticides disrupts the endocrine system, wreaking havoc with the complex regulation of hormones, the reproductive system and embryonic development. Endocrine disruption can produce infertility, a variety of birth defects and developmental defects in offspring, including hormonal imbalance and incomplete sexual development, impaired brain development, behavioral disorders, and many others. Examples of known endocrine disrupting chemicals which are present in large quantities in our environment include DDT, lindane, atrazine, carbaryl, parathion, and many others. A multiple chemical sensitivity is a medical condition characterized by the body's inability to tolerate relatively low exposure to chemicals. This condition is also referred to as environmental illness, which is triggered by exposure to certain chemicals or environmental pollutants. Exposure to pesticides is a common way and once the condition is present, pesticides are often a potent trigger for symptoms of the condition. The variety of these symptoms can be dizzying, including everything from cardiovascular problems to depression to muscle and joint pains (Gilden et al., 2010; Sarwar, 2015 a; 2015 b; 2015 c; 2015 d; 2015 e).

4. Pesticides and Children

Children are particularly susceptible to the hazards associated with pesticide uses; particularly they have not developed their immune systems, nervous systems or detoxifying mechanisms completely, leaving them less capable of fighting the introduction of toxic pesticides into their systems. Many of the activities that children engage in are playing in the grass, putting objects into their mouth and even playing on carpet; increase their exposure to toxic pesticides. The combination of likely increased exposure to pesticides and lack of bodily development to combat the toxic effects of pesticides means that children are suffering disproportionately from their impacts (Jurewicz and Hanke, 2008).

5. General Symptoms of Pesticide Poisoning

Some health effects from pesticide exposure may occur in the right away as anyone is exposed, some symptoms may occur several hours after exposure and other effects may not be noticed for years, for example cancer. Peoples come into contact with pesticides in many ways, including when pesticides are used in and around our homes and gardens, used on pets or on the food eaten while working with pesticides that is used in our communities or in our environment. The risk of health problems depends not only on how the ingredients are (Pesticide Ingredients), but also on the amount of exposure to the product. In addition, certain peoples like children, pregnant women and sick or aging populations may be more sensitive to the effects of pesticides than others (Pimentel et al., 2013).

5.1. Mild Poisoning

Any of the following symptoms of pesticide poisoning may take place, irritation of the nose, throat and eyes or skin, headache, dizziness, loss of appetite, thirst, nausea, diarrhoea, sweating, weakness or fatigue, restlessness, nervousness, changes in mood and insomnia.

5.2. Moderate Poisoning

Any of the mild symptoms, plus any of the following can happen, like vomiting, excessive salivation, coughing, feeling of constriction in throat and chest, abdominal cramps, blurring of vision, rapid pulse, excessive perspiration, profound weakness, trembling and muscular incoordination, and mental confusion.

5.3. Severe Poisoning

In this category, any of the mild or moderate symptoms, plus

any of the following may occur, inability to breathe, extra phlegm or mucous in the airways, small or pinpoint pupils, chemical burns on the skin, increased rate of breathing, loss of reflexes, uncontrollable muscular twitching, unconsciousness and death.

Some symptoms of pesticide exposure may go away as soon as the exposure stops and others may take some time to go away. For peoples exposed to pesticides on a regular basis, long-term health effects are a concern. Women who are pregnant or breast-feeding should check with their doctors before working with pesticides as some pesticides may be harmful to the fetus (unborn baby) or to breast-fed infants.

6. Mode of Entry of Pesticides in Body

Pesticides can enter the body during mixing, applying, or clean-up operations. There are generally three ways a chemical or material can enter into the body, through the skin (dermal), through the lungs (inhalation) and by mouth (ingestion).

6.1. Dermal Entry of Pesticides

In this mode of entry of pesticides in body, the absorption occurs through skin. In most working situations, absorption through the skin is the most common route of pesticide exposure. Peoples can be exposed to a splash or mist when mixing, loading or applying the pesticide. Skin contact can also occur when a piece of equipment is touched, protective clothing, or surface that has pesticide residue on it.

6.2. Inhalation of Pesticides

This mode of entry of pesticides in body is through the lungs of a person. Inhalation may occur when working near powders, airborne droplets (mists) or vapours. The hazard from low-pressure applications is fairly low because most of the droplets are too large to remain in the air. Applying a pesticide with high pressure, ultra-low volume, or fogging equipment can increase the hazard because the droplets are smaller and these can be carried in the air for considerable distances. Pesticides with a high inhalation hazard should be labelled with directions to use a respirator.

6.3. Ingestion of Pesticides

The way of entry of pesticides into body by ingestion (by mouth) may be less common way to be exposed and it can result in the most severe poisonings. There are numerous reports of peoples accidentally drinking a pesticide that has been put into an unlabeled bottle or beverage cup or container (including soft drink cans or bottles). Workers who handle pesticides may also unintentionally ingest the substance when eating or smoking if they have not washed their hands first.

Because there are so many types of pesticides, accordingly, their ity can vary greatly. In general, the risk of illness increases as the concentration (strength) of the pesticide and duration (length) of exposure increase. The likelihood of becoming ill from exposure to pesticides depends on a number of factors including, the type of pesticide (some pesticides are more harmful than others), amount of pesticide to which a person is exposed to (how much), concentration or strength (how strong or dose), length of exposure (how long time), route of entry into the body (skin, ingestion or inhalation), and other carriers or chemicals in the pesticide products.

7. Reducing the Risk of Health from Use of Pesticide

It is necessary to always read the pesticide label first, and then select the appropriate product for site to be treated, method and goals. Thoroughly, read all precautions and warnings on the pesticide label prior to use. The product must be approved for the intended use and applied according to label directions. These are intended to help for preventing harmful exposures. Seek the least- pesticide option available and take steps to minimize the exposure of pesticide applicators, even when using low ity pesticides.

Choose to use an appropriate pesticide and keep in mind the tips to minimize risk to infants and children. Allow plenty of time for the pesticide to dry and the home to ventilate before returning back. Keep children out of treated areas while pesticides are being applied and until areas are dry. If a lawn or carpeting has recently been treated with pesticides, consider using shoes, blankets or another barrier between the treated surface and children's skin. Be sure about the children to wash their hands before eating, especially after playing outdoors. If pesticide is applied to pets, be sure to keep children from touching the pet until the product has completely dried. Place ant, snail and rodent baits in locked bait stations or safely out of reach of children. Never use mothballs outside of sealed or airtight containers as children often mistake mothballs for food when used improperly around the home. Never use prohibited pesticides, such as Chalk because it looks like normal chalk, and the pesticide dust can be breathed in, get on kid’s hands or end up in their mouths. Store all pesticides out of the reach of children and in case of any accidental occasion contact to a medical professional.

Be sure to store pesticides in their original containers and never use food or beverage utensils or containers to mix or

store pesticides. If someone in the household works with pesticides, take steps to reduce the amount of pesticide residues they bring into the home. If possible, wash and dry the work clothes separate from family laundry. Finally, call to a pesticides professional to learn more about the ity of pesticides and ways to minimize exposure (Council on Scientific Affairs, 1997).

Skilled pesticide applicators or peoples who work with pesticides are encouraged to have regular medical check-ups. In case of any accidental poisoning, tell to doctor about which pesticides are working with or exposed to. Now this article has informed about pesticides, it is up to applicators or peoples to make the healthy choices that can lead them, and to their friends and family to a healthier lifestyle. In order to avoid as many pesticides as possible, it is better to grow one's own fruits and vegetables in backyard. By doing this, one can know that his food is not being sprayed with chemicals and it tastes a lot fresher.

8. Future of Pesticides in Public Health Programs

Public health pesticide use has been controversial since their first use, and remains so to this day. As with all contentious public policy issues, attitudes of neither side has achieved a total victory, and probably neither ever will. One result of this continuing struggle is the situation that should be added to an ever-improving pesticide application technology, better methods for surveillance of both vector-borne diseases and vector infestations, and much better training of pesticide applicators.

It is unlikely that effective control of public health pests can ever be achieved based entirely on non-pesticide methods. Pesticides remain useful and necessary tools, widely available and frequently used by almost everyone. These influence our daily lives in dozens of positive ways, they increase our ability to produce food, help to protect us from diseases like malaria and plague, and help to make our general environment a more pleasant place in which to live. However, pesticides are not without disadvantages, they are expensive, may themselves create human health problems, may damage pets and wildlife in some instances, may actually increase our pest problems by suppressing beneficial insects, and they may damage valuable agricultural crops. Pesticide applicators should continually be aware of the hazards associated with pesticide use, even though products used today in public health programs are far less hazardous than some years ago.

When any one considers pesticides as tools to be used in vector control operations and not as the sole methods available, efforts to promote development and use of alternative tools become fully supportable. Some of these alternatives include biological control, habitat modification, genetic alteration of vector populations, and selective application of vector control operations. An example of selective application might be the ignoring of populations of potential vector mosquitoes in areas where the chance of contact of peoples with the vectors is very low. In this case, it is more efficient for peoples to rely on protective clothing and repellents to avoid mosquito bites (Sarwar, 2014 a; 2014 b; 2014 c; 2014 d).

Several vector control specialists have advocated the use of the term Integrated Vector Management (IVM) to represent the preferred modern approach to vector control, and to mirror the modern approach to management of agricultural pests called Integrated Pest Management (IPM). These are called the important modern approaches for vector or pests controls and there are only few differences in the principles of IVM and IPM (Sarwar, 2013 a; 2013 b).

9. Pesticide Information for Medical Professionals

As a medical professional, a Physician may have patients with a known history of pesticide exposure, or patients who report symptoms but are unsure about their pesticide exposure. In either scenario, collecting a thorough and complete exposure history of patients is essential. The information required include, to what pesticide is the patient exposed, when does the exposure occur, what is the route of exposure (oral, dermal, inhalation), how long or often is the patient exposed to the pesticide, when does the patient's symptoms begin following the exposure, how long have the symptoms persisted, have these improved or worsened over the time and are there additional exposures or circumstances that may be relevant. In some cases laboratory testing for exposure to pesticides may be considered. While laboratory testing is possible for many pesticides, analytical methods are not available for all pesticide's active ingredients. Additionally, health-based guidelines may not be established for pesticides detected in biological samples. Detecting pesticides in the body does not necessarily mean that a health effect can occur, or that the current health complaints are related. For certain cases, applicators may choose to consult with a clinical Biologist, occupational or environmental health specialist for assistance. There may be a medical Biologist staff available at the hospital to physicians seeking consultation on emergency cases of pesticide exposure (Sarwar et al., 2014; 2015).

10. Conclusion

There are various methods that are implemented today in various parts of the world to reduce the consequences of pesticides caused to human beings. Pesticides are intended to kill organisms that cause disease and threaten public health, control insects, fungus and weeds that damage crops, control pests that damage homes and structures which are vital to public safety. Progressing to organic repellents is a logical step to potentially help to reduce the chances of disease or disease acceleration. Fruits and vegetables are just a few types of food that should not be eaten if they are not organic because the pesticide level is the highest on them. Children are at greater risk from exposure to pesticides because of their small size, relative to their size children eat, drink and breathe more than adults. Their bodies and organs are growing rapidly, which also make them more susceptible, and in fact, children may be exposed to pesticides even while in the womb. Before a pesticide is allowed to be used or sold, it must undergo a rigorous scientific assessment process to ensure that no harm can occur when pesticides are used according to label directions. All pesticides registered in a state, including for agricultural, forestry and domestic uses must undergo this level of scrutiny. Always be sure to read the products label first and reduce the risk of health problems through the least- way to control the pest and learn about integrated vector or pest management.

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