



Agriculture workers health; Review Article

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Abstract:

Agricultural workers are susceptible to several health problems as a result of occupational exposure to toxic substances, especially pesticides. The aim of this review was to describe the health issues associated with occupational exposure to pesticides in agricultural workers. Educational and preventive measures must be implemented to promote the health of rural workers. Furthermore, it is crucial that governments play an active role in these initiatives and provide alternatives to pesticides for pest control.

Keywords: Agriculture, workers, health.

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Introduction:

The word 'agriculture' covers a wide range of activities that involve the cultivation, growth, harvest, and primary processing of agricultural products, as well as the breeding of animals and livestock, including aquaculture and agroforestry. Agriculture is a hazardous occupation, it has one of the highest rates of fatalities among workers in this sector (1).

Agriculture is a major source of employment across the globe. It accounts for about 40% (450 million) of all workers who are engaged in the farming sector and make up more than 40% of the total agricultural labor force. In 2016, 40% of the people

living in developing countries had jobs in the agricultural sector or in agriculture-related activities, while only 3% of the population in developed and industrialized countries worked in this sector. However, even in industrialized countries, this sector represents a significant part of the total workforce (2).

A common view among scholars is that the emergence of agriculture was associated with the genesis of various significant human illnesses (2).

The agricultural sector is one of the most hazardous for workers, with an estimated 170,000 fatalities every year due to work-related causes. In addition, millions of agricultural workers suffer from various

occupational health issues that affect their well-being and productivity (3).

The international labor organization (ILO) reports that occupational accidents and diseases cause the death of 2.34 million people across the globe every year, and another 317 million people are injured at work. The industrial sector in Latin America has a rate of 11.1 fatal accidents per 100,000 workers, while the agricultural sector and the agricultural services sector have rates of 10.7 and 6.9 per 100,000 workers, respectively (2).

A report from the Bureau of Labor Statistics (BLS) revealed that agricultural workers had the highest injury rate of any industry in 2013, with more than 40% of them suffering some kind of harm. The report also showed that workers in crop production and animal production had injury rates of 5.5 and 6.7 per 100 workers, respectively. While the average injury rate for all industries was 3.8 per 100 workers(2).

Working in agriculture exposes people to various hazards and leads to the highest number of health problems every year globally (3). The health of workers and the environment can be harmed by various agents in the soil, water, and air. These agents can be chemical, biological, physical, or radiological. They can cause injury by exposure to harmful radiation or exposure to substances that can cause cancer, birth defects, or damage to the lungs and heart. Some environmental factors can lead to immediate death or chronic diseases due to unsafe working or living conditions. The environment affects different groups of

people from small workplaces to large communities (4, 5).

The work environment poses common health risks for workers, as well as some unique ones related to their occupation. These are the main challenges for their well-being (4). The agricultural sector has seen many advances and improvements in crop production, but this has also brought various health challenges. The sector is regarded as one of the most health-risky in the world by the ILO (6).

To enhance the quality of life for the farmers, it is essential to educate them about the best practices. The researchers and policymakers should work together to design and implement effective policies and programs that can address the challenges and needs of the farmer's health. This requires a combination of existing and new strategies that are based on evidence and feedback (7).

Chemical hazards, such as pesticides and other substances, are common in farm work, farm workers also face physical challenges and harsh environments (e.g., low, or high temperatures), Moreover, they use different kinds of vehicles, machines, and equipment, which can cause excessive noise and vibration. These occupational exposures can increase the risk of musculoskeletal disorders due to biomechanical and physical factors, or can cause cancer, Parkinson's disease and respiratory diseases due to pesticides, which may also lead to other occupational diseases (3).

Exposure to agrochemicals can cause skin or respiratory problems for many agricultural workers. According to some estimates, these health issues affect between

29% and 44% of the people who work in this sector (8).

Factors affecting agriculture workers health:

Chemicals exposure:

Chemical agents are often used by farmers in their work, which exposes them to high levels of these products. Many studies have examined how chemical compounds affect occupational health in agriculture, mainly pesticides, and their relation to health problems among farm workers. The results showed a significant higher risk of health problems, especially different cancers (prostate and lung) (3).

The amount of pesticides or substances that protect plants from pests used in agriculture worldwide has risen significantly from 2.3 million tons in 1990 to 4.1 million tons in 2018 (9).

According to (10), many pesticides (e.g. chlorpyrifos and diazinon) can be found in remote locations, indicating that they are persistent enough to travel long distances through the atmosphere. Moreover, pesticides are frequently detected in various matrices such as waters, soils, biota or even human urine worldwide (11). Implying their widespread presence in the environment and subsequent exposure of biota and humans have regarded pesticide exposure as one of the main chemical threats on human health(9).

Acetochlor, a pesticide, may raise the chances of some cancers. People who used it a lot in their lives had more colo-rectal cancer than others. People who used it at least once or a little had more lung cancer than others. Also, using it more often or at least once was linked to a slightly higher

chance of melanoma. The number of cases with acetochlor exposure was low, but there was a slight increase in pancreatic cancer for those who ever used it (12).

Air pollution:

Farm workers often suffer from respiratory problems, such as chronic cough, chronic phlegm, reduced lung function, shortness of breath and wheezing due to inhaling dust particles from agricultural activities, especially grain dusts (13). Grain dust is a complex mixture of organic and inorganic substances, mainly consisting of seed coatings made of cellulose and carbohydrate, as well as fungal and bacterial contaminants, endo- and mycotoxins, mites, insects and small amounts of crystalline silica (14). These substances can cause acute and chronic respiratory symptoms that result in impaired lung function. However, the exact cause or causes of the chronic respiratory effects from grain dust are still unclear (15).

A higher likelihood of developing lung cancer was found among workers in agriculture and those exposed to inorganic dust than among office workers. The study also revealed that pesticide use was linked to the increased risk for workers in agriculture. This is consistent with many other studies that have shown that pesticides increase the risk of lung cancer in workers in agriculture (16, 17).

Climate heat injury:

Agricultural workers face serious and often overlooked dangers of heat strain and dehydration, especially when they work in hot and humid conditions, do heavy physical work and drink little fluids (18). These hazards are likely to worsen as the global

climate change leads to more hot days and heat waves, which could increase the risk of heat-related illnesses and deaths among this vulnerable population (19). High temperatures can have harmful effects on health, such as impairing vital organs or causing fatal hyperthermia if the body's core temperature goes above 42°C (20).

According to BLS, 359 workers died from heat exposure between 2000 and 2010. The agricultural sector had the highest heat-related mortality rate, with an average of 3.1 deaths per million workers per year. This was 35.2 times higher than the rate for all industries combined (21).

Physical injury

Workers in agriculture may suffer from musculoskeletal injuries because of performing operations or movements that are repetitive and awkward. Ergonomic problems are common when workers exert their shoulders and head for long periods of time by pushing, pulling and lifting heavy loads or adopting improper postures (22).

Previous studies have linked health problems to multiple physical exposures such as noise and vibration (22). Forestry workers who were exposed to both noise and hand-arm vibration for at least 25 years had a higher risk of hearing loss (3).

Agriculture mortality rate from work-related accidents is twice as high as the global average for all other industries. According to estimates, about 170,000 agricultural workers die every year out of a total of 335,000 workplace fatalities worldwide. The main causes of these deaths are the increased use of machinery and of pesticides and other chemicals in farming. Equipment such as tractors and harvesters

are involved in the most frequent and lethal injuries (23).

Infectious diseases:

Agriculture-related infectious diseases are becoming more important in both transmissible and chronic diseases, and this is worsened by the large number of people with weakened immune systems in sub-Saharan Africa. For example, a high rate of *Cryptosporidium parvum*, spread through contaminated water among HIV/AIDS patients. Also observed that cancer patients in Cameroon often suffer from fevers caused by *Plasmodium falciparum* and *Salmonella enterica*, Serovar Typhi, which are both common in farming environments (24).

Occupation as a farmer is linked to leptospirosis, this means that farmers have a fivefold higher risk of contracting leptospirosis than other occupations. This is because of the farmer's work environment and tasks. Farmer work in rice fields that are often flooded with water for several weeks, which is a hazardous place for leptospirosis, the bacteria can live in the water and penetrate human blood vessels through injuries(25).

According to (26) in Brazil, Leptospirosis was a major health risk for farmers who grew rice or kept small animals. This disease could be transmitted by contact with contaminated water or soil.

Several studies have examined the role of agriculture and farmers in relation to biological agents, especially microalgae, which can produce various metabolites that act as bio control agents against soil and plant pathogens. These agents can also have indirect effects on human health. However, a recent study showed that agricultural

workers had low awareness and knowledge of the risk of exposure to biological agents, as well as the preventive measures available to them (27). A 2016 Polish research on work-related illnesses in farmers showed the importance of regular health check-ups for farm workers to track their health and well-being and enhance their work conditions and environment (28, 29).

Agriculture workers are exposed to parasitic infestation, the main ways that parasites infect humans are three. The first one is faeco-oral infection, this when people swallow intestinal parasites that come from human or animal stools, usually through food or water that is not clean. The second one is infection by direct environmental contact, this when people get infected by touching the environment where the parasites live. The third one through insect bite which vectors the parasite (24).

According to study done to estimate prevalence of helminths contamination by irrigated wastewater (30). Workers in agriculture may be also exposed to them when they apply wastes to soil as a way of enriching it and through the food they produce and consume (24). According to (30) the results of their study indicated that vegetables irrigated with wastewater had a high level of helminths contamination, with all vegetable types used in the study being contaminated by at least one of the three soil transmitted helminths. The most common helminth was *Ascaris lumbricoides*, followed by hookworm and *Trichuris trichiura*. The helminth infestation rates differed among the study sites. The study also revealed a statistically significant positive association between vegetable

production and female farmers risk of infections. The farmers had a 1.92 times higher risk of getting soil transmitted helminths infections from working on the farm (30).

A variety of diseases caused by bacteria, viruses, fungi, and parasites can be found in animal wastes and human fecal matter. These include *Campylobacter*, *Listeria monocytogenes*, *Salmonella*, pathogenic *Escherichia coli*, *Yersinia*, *Leptospira*, *Coxiella*, *Mycobacteria*, *Giardia*, *Taenia*, *Cryptosporidium*, *Entamoeba*, *Candida*, *Rotavirus* and *Hepatitis*. Farmers and agricultural workers are often exposed to these infections (24).

Some of the viral diseases that affect people who work in agriculture are spread by insects that bite, as we have seen before with some of the diseases caused by parasites. In sub-Saharan Africa, there are many viruses that mosquitoes can transmit, such as Dengue fever and West Nile virus (WNV). The WNV can infect birds and mosquitoes, and they pass it on to each other. When a mosquito bites a human, it can give them the virus, but humans cannot infect other animals or humans. Working in farming can increase the chance of getting the disease, according to some studies (24).

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