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The Situation of Agricultural Pesticide Use and Its Human Health Hazards in Iran, a Qualitative Study

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Abstract

Background: Agricultural pesticide poisoning is a common and serious occupational hazard for farmers in developing countries.
Objectives: In this study, we try to explain the pattern of agricultural pesticide use and its hazards in Iran.
Methods: In this qualitative study, purposeful sampling was performed, and 8 farmers and 2 agriculture engineers participated.
Results: Information collected about pesticide use in Iran was categorized into 4 themes. First, "no supervision for the use and distribution of pesticides". Second, "farmers' knowledge is inadequate about the hazards of pesticides, and no organization is responsible for educating them". Third, "safety instructions are not obeyed, and the hazardous effects of pesticides are frequently observed among farmers". Fourth, "the use of pesticides is irrationally high in Iran".
Conclusions: Serious action should be taken to prevent pesticide human health hazards in Iran, including comprehensive training programs about proper preparation, storage, and use of agricultural pesticides for farmers and pesticide retailers. Also, it is necessary to continuously supervise pesticide sales, distribution, and use in the country.

Keywords: Pesticide, Health Hazards, Iran

1. Background

Poisoning with pesticides among farmers is a common and serious occupational hazard. Meanwhile, pesticide use is considered the most effective, fastest, and cheapest method of pest control (1, 2) in modern agriculture for protecting crops from pests and increasing production (3). However, many agricultural workers are exposed to pesticides in concentrations that are capable of causing adverse health effects (4).

2. Objectives

Iran has many agricultural workers exposed to pesticides. This qualitative study aimed to investigate the pattern of agricultural pesticide use in Iran.

3. Methods

In this qualitative study, purposeful sampling was done. Eight experienced farmers who worked in the citrus gardens of Jahrom and Bam and two agriculture engineers with administrative jobs were invited to participate and interviewed.

Deep semi-structured interviews were conducted. The 4 criteria of credibility, transferability, dependability, and confirmability were used for checking trustworthiness.

3.1. Ethical Concerns

The Ethics in Research Committee of Kerman University of Medical Sciences approved the study protocol under code IR.KMU.REC.1398.213.

4. Results

Participants were all male and included 8 farmers and 2 agriculture engineers with 10 to 26 years of job experience. The information collected about agricultural pesticide use in Iran was categorized in the following headings.

4.1. No Supervision on the Distribution and Use of Pesticides

All farmers stated that they can buy any pesticide in any quantity without needing an order or document from an agricultural expert.

"… There is no supervision on pesticide retailers. Pesticides are smuggled into the country… Some pesticides have been banned worldwide for several years but are still used in Iran."

4.2. Lack of Sufficient Knowledge About Pesticides Among Farmers

Participants stated that no training is given to them by any organization about the use of pesticides, and no expert is deployed to give them information about how to use pesticides on their farms or orchids.

"We use pesticides and spray them based on our experience. No organization has come to educate us about how to use pesticides."

An agricultural expert admitted that pesticide retailers do not have enough information about using pesticides properly either.

"Occasionally [it is trained to pesticides retailers]. Of course, the Department of Agriculture should approve legislation that pesticide retailers must be plant pathologists. But, this has not been performing."

4.3. Safety Measures are not Observed When Applying Pesticides

"I do not use any protective gear, and the workers who work for me don't use any either because we think it's no problem. Also, it is not affordable to buy masks and gloves..."

Farmers stated that they had seen toxic symptoms in themselves or their workers and did not know that these were signs of getting poisoned with pesticides.

"... These symptoms include dizziness, headache, and runny nose. I have seen these symptoms in myself and my workers several times."

"Some workers get headaches, dizziness, constipation, and digestive problems after spraying pesticides. For example, the Ortus pesticide causes constipation, which I notice after spraying."

Also, workers did not know pesticides must be kept in safe storage and away from easy access.

"I do not have a special place to store pesticides, and I put them anywhere."

4.4. High Use of Pesticides in Iran

All farmers admitted that they must use pesticides because pests attack their crops, and one of them said that he sprayed his farm seven times a year.

5. Discussion

Our findings show that safety regulations are not observed when applying pesticides, and farmers frequently show signs of pesticide intoxication. Several studies have shown that people poisoned with organophosphate compounds show cardiovascular symptoms such as hypotension and arrhythmia (5, 6). Also, other studies have shown environmental and occupational exposure can harm health (7, 8).

In this study, most farmers confessed to using no protective gear when spraying pesticides. Yang et al. reported that most farmers in China applied pesticides without observing any protective measures (9). Also, in this study, workers did not know pesticides must be kept in safe places. Bagheri et al. showed that 60% of farmers stored pesticides in northern Iran in inappropriate places (10).

Another finding of this study was that farmers did not have sufficient knowledge of pesticides, and no organization was responsible for educating them. A study from Brazil showed that low educational levels among agriculture workers were associated with higher pesticide exposure (11).

Pesticide retailers and authorities are important in providing farmers with information and guidance on pesticide selection and improving their awareness and behavior. Yang et al. emphasized the need for effective educational and supervision programs for pesticide retailers. Pesticide retailers have been criticized for inefficiency in providing services and guiding farmers on pesticide use in China (9).

The use of pesticides is high in Iran, and farmers use pesticides more than necessary (4, 12).

According to the information in this study, there is no supervision over the distribution of pesticides in Iran. Dehghani et al. stated that in Iran, most people use pesticides without considering their hazards (13).

5.1. Conclusion

Farmers in Iran can access any pesticides in any quantity without prior approval by an agricultural expert. Most farmers have inadequate knowledge of the hazards of pesticides, and no organization is responsible for educating farmers. Poisoning with pesticides is common in Iran due to easy access, improper protective measures, and improper use. Therefore, comprehensive training programs about preparing, storing, and using agricultural pesticides should be implemented for farmers and pesticide retailers to prevent health hazards. Also, it is necessary to continuously supervise pesticide retailers and pesticide distribution in the country.

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Footnotes

Authors' Contribution: NK, supervised this study, and the proposal edited the draft; MAF, wrote the initial draft, Collecting data. All the authors read, commented, and approved the final article.

Conflict of Interests: The authors have no conflicts of interest.

Ethical Approval: The Ethics in Research Committee of Kerman University of Medical Sciences approved the study protocol under code IR.KMU.REC.1398.213 (https://ethics.research.ac.ir/EthicsProposalView.php?id=74547).

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References

1. Palis FG, Flor RJ, Warburton H, Hossain M. Our farmers at risk: behaviour and belief system in pesticide safety. *J Public Health (Oxf)*. 2006;**28**(1):43–8. [PubMed ID: 16436451]. https://doi.org/10.1093/pubmed/fdi066.
2. Wilson C, Tisdell C. Why farmers continue to use pesticides despite environmental, health and sustainability costs. *Ecol Econ*. 2001;**39**(3):449–62. https://doi.org/10.1016/s0921-8009(01)00238-5.
3. Damalas CA. Understanding benefits and risks of pesticide use. *Sci Res Essays*. 2009;**4**(10):945–9.
4. Sharafi K, Pirsaheb M, Maleki S, Arfaeinia H, Karimyan K, Moradi M, et al. Knowledge, attitude and practices of farmers about pesticide use, risks, and wastes; a cross-sectional study (Kermanshah, Iran). *Sci Total Environ*. 2018;**645**:509–17. [PubMed ID: 30029126]. https://doi.org/10.1016/j.scitotenv.2018.07.132.
5. Akdur O, Durukan P, Ozkan S, Avsarogullari L, Vardar A, Kavalci C, et al. Poisoning severity score, Glasgow coma scale, corrected QT interval in acute organophosphate poisoning. *Hum Exp Toxicol*. 2010;**29**(5):419–25. [PubMed ID: 20203133]. https://doi.org/10.1177/0960327110364640.
6. Gheshlaghi F, Piri-Ardakani MR, Yaraghi M, Shafiei F, Behjati M. Acute poisoning in children; a population study in isfahan, iran, 2008-2010. *Iran J Pediatr*. 2013;**23**(2):189–93. [PubMed ID: 23724181]. [PubMed Central ID: PMC3663311].
7. Farahmandfard MA, Ebrahimi HA, Khanjani N, Mirzaee M. Air Pollution and Hospital Admission for Epilepsy in Kerman, Iran. *Health Scope*. 2022;**11**(3). e124245. https://doi.org/10.5812/jhealthscope-124245.
8. Ramzani S, Khanjani N, Mohammadyan M, Babanezhad E, Yazdani-charati J. Occupational Exposure to Manganese Among Welders: Association Between Airborne Manganese Concentration and Blood Manganese Levels. *Health Scope*. 2022;**11**(1). e120968. https://doi.org/10.5812/jhealthscope.120968.
9. Yang X, Wang F, Meng L, Zhang W, Fan L, Geissen V, et al. Farmer and retailer knowledge and awareness of the risks from pesticide use: a case study in the Wei River catchment, China. *Sci Total Environ*. 2014;**497-498**:172–9. [PubMed ID: 25128887]. https://doi.org/10.1016/j.scitotenv.2014.07.118.
10. Bagheri A, Emami N, Allahyari MS, Damalas CA. Pesticide handling practices, health risks, and determinants of safety behavior among Iranian apple farmers. *Hum Ecol Risk Assess*. 2018;**24**(8):2209–23. https://doi.org/10.1080/10807039.2018.1443265.
11. Recena MC, Caldas ED. [Risk perception, attitudes and practices on pesticide use among farmers of a city in Midwestern Brazil]. *Rev Saude Publica*. 2008;**42**(2):294–301. Portuguese. [PubMed ID: 18372981]. https://doi.org/10.1590/s0034-89102008000200015.
12. Pirsaheb M, Fattahi N, Rahimi R, Sharafi K, Ghaffari HR. Evaluation of abamectin, diazinon and chlorpyrifos pesticide residues in apple product of Mahabad region gardens: Iran in 2014. *Food Chem*. 2017;**231**:148–55. [PubMed ID: 28449991]. https://doi.org/10.1016/j.foodchem.2017.03.120.
13. Dehghani R, Sabahi Bidgoli M, Asgari Arani J, Rashedi Vahed GH, Heydari F, Soheili Z, et al. A Survey on the application and storage conditions of pesticides in Kashan, Iran, 2012. *J Occup Health Epidemiol*. 2013;**2**(1):54–9. https://doi.org/10.18869/acadpub.johe.2.1.2.54.