

Pesticide Use Knowledge, Attitudes, and Practice and Related Short-Term Health Problems among Farmers Using Irrigation in Southwest Ethiopia, 2014

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Project Summary

Background: Pesticides are toxic hazards by design; they are biocides designed to kill, reduce, or repel insects, weeds, rodents, fungi, or other organisms that can threaten public health and the economy. Their mode of action is to target systems or enzymes in the pests that may be identical or similar to those in humans. Therefore, they pose risks to human health and the environment. The aim of this study was to assess pesticide use knowledge, attitude, and practice and short-term health problems related to pesticides among farmers who use irrigation in Jimma Zone, southwest Ethiopia.

Methods: The study employed a community-based cross-sectional study design. A sample of 796 farmers who have irrigation were randomly selected. To collect data from the farmers,

a pretested and structured questionnaire was used. The data were edited manually immediately after data collection. They were then coded and entered into Epi-data and exported to SPSS 20 software for analysis. Summary values such as mean, median, and percentages were used to present the data. Bivariate and multivariable logistic regression analysis were computed to see associations between dependent and independent variables. Ethical clearance was obtained from the Jimma University Ethical Review Board.

Results: A total of 719 farmers participated in the study, with a response rate of 90.3%. Regarding knowledge of safe pesticide use, around one-half (54.4%) knew at least one pesticide control method, such as manual removal, use of bed nets, personal and environmental hygiene, and applying smoke to repel insects and flies. Concerning routes of exposure, a majority of the participants knew about ingestion (88.9%) and inhalation (90.4%). Only 6.3% of the participants knew about the effects of pesticide exposure on human pregnancy, mentioning congenital malformation (4.1%) and prenatal death (2.2%). However, more than one-half (53.8%) knew about the effect of pesticide exposure on animal health. More than one-half (53.7% of the farmers had a positive attitude to safe use of pesticides, and the mean score of attitude was 3.9 (± 0.4). Regarding actual practice, 89.6% of the participants had ever used pesticides, of which 93.0% were using them at the time of data collection. Of the farmers who had ever used pesticides, 81.7% had used them for more than 3 years, and 56.6% followed the instructions on the pesticide containers. Concerning the use of personal protective equipment (PPE), 58.2% had used at least one PPE, but 9.8% of those had experienced at least one short-term health problem following pesticide exposure. Knowledge of the names of pesticides, methods of pest control, and the use of gloves during pesticide exposure were found to be independent predictors of farmers' attitude toward safe use of pesticides.

Conclusions: The study found that the majority of the farmers in Jimma Zone are using pesticides. There is a gap in their awareness of the routes of exposure and the health effect of pesticides in the absence of preventive mechanisms.

1 Introduction

Pesticides are toxic hazards, designed to kill, reduce, or repel insects, weeds, rodents, fungi, or other organisms that can threaten public health and the economy. Because they target systems or enzymes in pests that may be identical or similar to those in humans, they pose risks to human health and the environment. This study assessed knowledge, attitude, and practice and short-term health problems related to pesticides among farmers who use irrigation in Jimma Zone, southwest Ethiopia.

2 Project Outputs and Outcomes

A final report has been completed, and a manuscript is being prepared for submission to a peer-reviewed journal for wider visibility. This project created an opportunity for real-life

collaborative work with key stakeholders, colleagues, and tea mates, which in turn created an opportunity for peer learning and development.

3 How Did You Go about Achieving Your Outputs/Outcomes?

The project was successful because of the strong collaborative effort of the investigators, data collectors, study participants, and partners, particularly the local/branch office of the Red Cross Society. The regular discussions held before and during the project made the subsequent activities go smoothly. The involvement of the zonal Red Cross Society, Health Offices, and agriculture sector simplified the bureaucratic administration processes to select the farmers. The project finance managers at Jimma University significantly contributed to the financial management of the project. Methodologically, experienced and competent data collectors were recruited and trained. There was close follow-up of the field work by the supervisors on a daily basis, followed by meticulous data management. All these interventions helped achieve the proposed aim of the study.

4 What Did You Learn?

A total of 719 farmers participated on the study, with a response rate of 90.3%. Around one-half (54.4%) knew at least one pesticide control method, such as manual removal, use of bed nets, personal and environmental hygiene, and applying smoke to repel insects and flies. Most of the participants knew that pesticides could be ingested (88.9%) and inhaled (90.4%); 6.3% knew about possible health problems for pregnant women following pesticide exposure, mentioning congenital malformation (4.1%) and prenatal death (2.2%). More than one-half (53.8%) knew about the effect of pesticide exposure on animal health. A similar proportion (53.7%) had a positive attitude toward safe use of pesticides, with a mean score of attitude of 3.9 (± 0.4), and of the 89.6% of participants who had ever used pesticides, 93.0% were using them at the time of data collection. Of the farmers who had ever used pesticides, 81.7% had used them for more than 3 years, and around one-half (56.6%) said they followed the instructions on the containers. Concerning the use of personal protective equipment (PPE), 58.2% of participants had used at least one PPE, and 9.8% of those had experienced at least one short-term health problem following pesticide exposure. Although most of the farmers are using pesticides, not all are aware of the key routes of exposure and the health effects of pesticides without mechanisms to prevent exposure. Knowledge of the names of pesticides, methods of pest control, and use of gloves during pesticide exposure were found to be independent predictors of the farmers' attitude toward safe use of pesticides.

5 Immediate Impact

The project generated systematic evidence on knowledge, attitude, and practice regarding safe pesticide use and related short-term health problems among farmers using irrigation. It also facilitated collaborative and peer learning. The strong interest of key stakeholders,

particularly, the Red Cross Society, will ensure smooth implementation of similar work in the future. The research team had an opportunity for hands-on practice of project management in the real world in collaboration with the key partners. Ultimately, the team understood the extent of the pesticide problem and identified gaps in knowledge, attitude, and practice and related short-term health problems among farmers using irrigation.

6 Future Impact

This work will be published in a peer-reviewed journal to reach target audiences and encourage other researchers to explore the problem further. In collaboration with the federal government and major partners working on pesticides in the study area, the investigators, together with other relevant professionals and practitioners, will prepare short training courses focusing on the identified gaps, depending on the availability of funding.

7 Conclusions

The majority of the farmers interviewed in the study were aware of pesticide exposure through ingestion and inhalation, the adverse effects of pesticides on the gastrointestinal tract and respiratory system, and the existence of pesticide residuals in the air. However, not all were aware of pesticide exposure through the skin; the effects of pesticides on pregnancy, animal health, and the environment; the existence of pesticide residuals in soil, fruits, cereals/legumes, and vegetables; and the use of gloves, goggles, wide brimmed hats, and special boots to protect against pesticides. Knowledge of the names of pesticides, methods of pest control, and the use of gloves during pesticide exposure were found to be independent predictors of the farmers' attitude toward safe use of pesticides.

8 Implications for the Future

Based on the findings, training should be provided for the farmers focusing on the specific gaps identified. A further large-scale study, involving sectors other than health, could increase comprehensive understanding of the situation in the zone.

10 Publications

A manuscript is being prepared for submission to a peer-reviewed journal.

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Appendix 1.

Informed Consent Form

Instruction: Read and give a copy of the full information sheet to the participants.

Good morning/good afternoon! My name is _____ and I am working for Jimma University. Researchers from Jimma University are conducting an applied research on Disaster Preparedness and Response in collaboration with the Ethiopian Red Cross Society (ERCS) Oromia Region, Jimma Zone Branch Office. The purpose of the study is to assess knowledge, attitude and practice of safe pesticide use and related short term health problems in Jimma Zone, southwest Ethiopia. So, I am serving as a field researcher to collect the required data from selected health facilities and Woreda Health Offices.

You are one of the eligible participants for this interview, which may take around 20 minutes. You do not have to take part in this research if you do not wish to do so, or you can withdraw at any time after starting the interview. Refusing to participate will not affect you in any way. If you feel uncomfortable about sharing any of the information, you have the right to decide not to answer any question. This will not result in you being treated differently during the study or any other time. The information provided in this study is strictly confidential.

This research has been reviewed and approved by Jimma University Ethical Review Committee. If you have any questions about your rights or any as a research participant, you may contact the Principal Investigator, Professor Kifle Woldemichael;
Telephone number +251935123168.

Therefore, do you agree to participate in this discussion? Yes _____ No _____
If yes, continue interviewing but if no, say thank you and go to next.

Appendix 1. Survey Questionnaire

Part I. Identification		
103	Woreda	
104	Kebele	
105	Gere/gote	
106	Participant ID	
Part 2. General information about participants		
Name of Respondent: _____ Telephone No _____		
201	Sex	1. Male 2.Female
202	Age	in years_____
203	Marital status	1. Single 2. Married 3. Divorced 4. Widowed 5. Separated
204	Educational status	1. Illiterate 2. Read and write 3. Literate, grade completed _____
205	Do you have children at home/household?	1. Yes 2. No
206	Is there either a pregnant or lactating mother in the household?	1. Yes 2. No
207	Average monthly income	_____Birr
208	Do you smoke cigarettes?	1. Yes 2. No
209	Do you chew khat?	1. Yes 2. No
210	What are the types of crop you cultivate (more than one response is possible)?	1. Cereals 2. Legumes 3. Fruits 4. Vegetables 5. Others (specify)_____

III. Knowledge of farmers about pesticides' adverse effect on human health

General Knowledge about Pesticides		Skip
301	Do you know name/s of any pesticide/s?	1. Yes 2. No
302	If reply in Q.301 Yes, please specify the name of it?	1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 5. _____

303	Do you know any other ways for pest control rather than pesticides use?	1. Yes 2. No	
304	If reply to Q.303 is yes, the pest controls which you know are:	1. _____ 2. _____ 3. _____ 4. _____	
305	Do you know problems related to the exposure to the pesticides?	1. Yes 2. No	
306	If reply to Q.303 is yes, what are they?	1. Health adverse effect for humans 2. Health adverse effect for animals 3. Environmental pollution 4. Others (specify)----- -	
307	If health adverse effect for humans For Q. 305, what are adverse health effects of pesticides?	1. Skin rash/allergic irritation 2. Aspiration pneumonia 3. Congenital malformation 4. Susceptibility to infection 5. Perinatal death 6. Asthma 7. Death 8. Other (specify)- _____	9. Cancer 10. shock 11. coma 12. paralysis 13. infertility 14. seizure 15. Abortion 16. COPD
308	What are the <i>routes</i> of <i>pesticides to enter the human body</i> /portal of entry/route(s) of exposure? <i>Multiple answers: - Probe by asking what else?</i>	1. Skin (dermal absorption) 2. Inhalation 3. Ingestion 4. Transplacental	

		5. Other (specify)- :_____
309	Which mode of pesticides exposure is most common [among those you have mentioned above]?	_____ _____
310	Which pesticides exposure is most dangerous [among those you have mentioned above]?	_____ _____
311	Can you mention the common first aid management/treatment measures that families' households/communities should give/apply in the event of ingestion of suspected poisonous chemicals? (list)?	_____ _____ _____
312	Do you know that pesticide residue may exist in the following?	The air 1. Yes 2. No 3. Don't know The soil 1. Yes 2. No 3. Don't know Ground water 1. Yes 2. No 3. Don't know Fruits 1. Yes 2. No 3. Don't know Seeds 1. Yes 2. No 3. Don't know Vegetables 1. Yes 2. No 3. Don't know
313	Can you mention the personal protective equipment that can reduce pesticide exposure?	----- ----- ----- -----

IV. Attitude of farmers about pesticide use and its adverse effect on human health

4	<i>In relation to preventive and promotive measures</i>
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To what extent do you agree on the following statements (rate your answer based on the scale)							
		<i>Strongly disagree (1)</i>	<i>Disagree (2)</i>	<i>Undecided (3)</i>	<i>Agree(4)</i>	<i>Strongly agree (5)</i>	Code #
401	<i>Most pesticides create some risk of harm to humans, animals, or the environment.</i>						
402	Most pesticide exposures happen not in the workplace, but through food and in the home or garden.						
403	It is very likely for <i>pesticide residues</i> to be present inside or on the surfaces of the foods we eat and water we drink.						
404	Reuse of empty pesticide containers predisposes to pesticides exposure and poisoning.						
405	Personal protective equipment use can reduce pesticides exposure and poisoning.						
406	Eating, chewing, or drinking in sprayed agricultural field increases pesticides exposure and poisoning						
407	<i>Pregnant women</i> handling pesticides in the first trimester have greater health risk and as well to the fetus						
408	Children of farming families are at greater risk of pesticide exposure and poisoning.						
409	Disposing of pesticides properly can help to protect the environment.						

V. Practice of farmers about pesticides use and its adverse effect on human health

5	General practice on pesticides		Skip
501	Have you ever used pesticides?	1. Yes 2. No	
502	Are you using pesticides currently?	1. Yes 2. No	
503	If yes to Q. 502, how long have you been using pesticides?	_____	
504	Has any member of your family ever had a health adverse effect of pesticide exposure or toxicity?	1. Yes 2. No	
505	If yes for Q. 504, what were the signs and symptoms?	----- -----	

506	If yes for Q. 504, from where did you seek care?	_____ _____	
507	If yes for Q. 504, what was the outcome?	----- -----	
508	Do you follow the instruction on pesticide bottle's label?	1. Yes 2. No	
509	If no to Q. 504, why?	_____ _____	
510	Where do you store empty pesticide bottles or cans?	1. In specific storage in the farm site 2. In the home 3. Other places (specify)- -----	
511	What are you doing with the empty pesticide bottles or cans?	1. For home uses to store food or water 2. Use for storage of other pesticides 3. Throw it on garbage sites, family site, or along the sides of streets 4. Burying or burning the empty pesticide bottles or cans 5. Other (specify)_____	
512	Which personal protective equipment do you wear during preparing or spraying pesticides?	----- ----- -----	
513	During spraying, are you doing the following? (more than one answer is possible)	1. Smoking 2. Drinking 3. Eating 4. chewing	
514	Do you take a shower immediately after finishing spraying?	1. No 2. Yes, sometimes 3. Yes, always	
515	How long after the field has been sprayed with pesticides do you re-enter to work?	_____ hours	

