

Research Article

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Pesticide Used, Related to Knowledge and Perception of Farmer Practice on The Negative Impact of Pesticides

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Pesticides play a vital role in ensuring food security and economic growth, but their use can cause harmful effects to human health and the environment. A significant number of the respondents were observed in Abuna Gindeberet, nearly 95.83% of farmers knew the pesticide had a negative effect, and only 4.17% of farmers had poor knowledge of pesticides had a negative impact. Whereas, in Gindeberet, nearly 89.86% of farmers knew pesticides harmed human health and the environment, and only 10.14% of farmers had poor knowledge of pesticides. In both districts, farmers normally got pesticide information from the Agricultural extension service providers, followed by NGOs, Friends, and families. In Abuna Gindeberet, routes of exposure to pesticides or pesticides entering the body were pesticide entry in the eye (41.11%), pesticide ingestion (21%), pesticide inhalation (15.55%), and pesticide in the skin (22.22%). Similarly, in the Gindeberet district, the most commonly used routes of exposure to pesticides or pesticides entering the body were the following: pesticides entering the eye (33.33%), pesticides entering the body through ingestion (22.22%), and pesticides entering the body through inhalation (22.22%).

Keywords: farmers knowledge; perception; pesticides; training; toxicity**Introduction**

The use of pesticides harms agricultural land, fauna, flora, and overall agricultural and environmental sustainability [1]. Despite these facts, in Ethiopia, there is a lack of stringent controlling mechanisms on the importation of hazardous chemicals; the absence of well-established institutions to provide farmers with the knowledge of pesticide application and safety issues, and the expansion of non-licensed vendors increase the importance of establishing effective guidelines to minimize the negative impact of pesticides on the health of farmers and environmental sustainability [2]. The amount of farm pesticide use has increased rapidly in recent years. Excessive use of pesticides aiming to control major crop plant insects, pests, and diseases, as well as fertilizer and other chemicals, has become one of the major factors that pollute and degrade the water quality. Evidence is sparse for African countries, with some estimates showing that 46% of fatal and non-fatal hospital admissions were about 50% in Ethiopia in the early 1980s [3]. In addition, occupational illness was also common because it is impractical and expensive for farmers in the tropics to use safety equipment [4]. Safety instructions are often written in unfamiliar languages, and most farmers in developing countries

are illiterate, and the instructions are difficult to follow.

Pesticide use in vegetable growth negatively affects both the surrounding environment and human health and farmer productivity [5]. Numerous studies in Africa have shown misuse and improper handling of pesticides and poor knowledge of pesticides among farmers in general [6, 7]. This lack of awareness of proper pesticide management practices poses a risk to human health and the environment. Ensuring environmental protection and sustainability of pesticide supply and use are fundamental challenges of pesticide administration [8]. Likewise, misuse and poor management of pesticides in Ethiopia are increasing due to the rapid growth of large-scale farms [9]. Even though there is an indication of the occurrence of more suicidal deaths, there is no proper registration and certification of suicidal deaths that is meant for public health purposes in the concerned governmental organizations [10]. However, the pesticides also have negative human health and environmental impacts. Such impacts are especially important in developing countries where a majority of farmers are illiterate and regulations are either underdeveloped or less enforced [11,12]. The present study aimed to investigate pesticide utilization in

small-scale farm fields in West Shoa of Oromia, Ethiopia.

Materials and Methods

The study areas were conducted in two districts of Western Shoa, Ethiopia (Abuna Gindeberet and Gindeberet), which are major crop-growing areas. The locations were selected according to the potential area of the crops in each district. three kebeles were selected in each kebele 30 farmers were selected depending on their pesticide use practices. In the study areas, data were collected by assisted, questionnaire-based face-to-face interviews. Three well-trained individuals with previous experience in data collection were employed after training on administering the questionnaires. Data were collected using a structured and pre-tested questionnaire that consisted of closed questions, some of them with open-ended parts: Training, handling, and management of pesticides, and Health effects. Data analysis was conducted using the SPSS Version 23 statistical package.

Results and Discussions

The pesticide used relates knowledge and perception of farmers' practice on handling pesticides. In Abuna Gindeberet's present study, farmers normally got pesticide information from Agricultural extension service providers (28.37%), followed by NGOs (22.37%), Friends and families (17.77%), and Agro dealers (13.27%). Similarly, in the Gindeberet district, farmers got information from the Agricultural extension service (31.27) followed by NGOs (27.64%, nowhere any information (16.72%), and about (13.27 and 8.27%) who stated that they had learned the information by communicating with Agrodelaears, in Abuna Gindeberet, and Gindeberet districts, respectively.

In Abuna Gindeberet, most Pesticide containers have labels when buying from dealers (67.33%) and General household shops repackaged products without nearly labeling the container (22.25%). The farmers with good knowledge or who could read and understand pesticide labels (34.75%) reported that they received information by reading the instructions on the pesticide containers and previous experience. The majority of the farmers with not have good knowledge or could not read and understand pesticide labels on the pesticide containers (58.88%) reported that they had not received information by reading the instructions on the pesticide containers.

The farmers had been trained on the use and handling of pesticides nearly (12.22%) and most farmers were non-trained, 87.78%). The train took short hours (78.33%), and days (21.67%). Whereas, in Gendeberet districts, the farmer had trained on the use and handling of pesticides (16.33%), and the farmer had not trained on the use and handling of pesticides (83.67%). The train took short hours (83.57%), and farmers took training a day (16.43%) (Figure 1). These findings disagree with Sapkota et al. [13] also reported that agro-dealers were the primary source of information for pesticide selection, which contrasts with our finding, where the majority of respondents gained information from Agricultural extension providers.

A significant number of the respondents were observed in Abuna Gendeberet, nearly (95.83%) of farmers knew the pesticide had a negative effect, and only (4.17%) of farmers had poor knowledge of pesticides had the negative impact. Routes of exposure to pesticides or pesticides enter the body where pesticide enters in the eye (41.11%), pesticide ingestion (21%), pesticide enters inhalation (15.55%), and pesticide in the skin enter (22.22%). The farmer felt ill immediately after handling pesticides (45.55%) of respondents and (54.44%) of respondents did not feel ill immediately after handling pesticides. The respondents who felt ill immediately after handling pesticide felt Nausea (1.11%), Blurred vision (4.44%), Salvation (4.44%), skin irritation (8.88%), headache (21.33%), respiratory difficulty (3.77%). The pesticide symptoms last on the respondent's hour (11.11%), last on the respondent's days (27.77%), and last on the respondent's weeks (15.55%) (Table 1).

In Gendeberet, nearly 89.86% of farmers knew that pesticides harmed human health and the environment, while only 10.14% had poor knowledge of pesticides. The most commonly used routes of exposure to pesticides, or how pesticides enter the body, included: entering the eye (33.33%), ingestion (22.22%), and inhalation (22.22%). This result is consistent with the work of Ye et al. [14] and Lesmes-Fabian and Binder [15], who reported that inhalation and skin contact are the dominant exposure routes during pesticide spraying. Other studies have indicated that pesticide sprayers can develop impaired respiratory function [16, 17]. Pesticides also enter the body through the skin (22.22%). In total, 44.44% of farmers felt ill immediately after handling pesticides, while 54.55% did not. Among those who felt ill, symptoms included nausea (3.33%), blurred vision

(2.22%), Salivation (6.66%), skin irritation (11.11%), headache (25.55%), and respiratory difficulty (1.1%). This result also aligns with the findings of Hernandez et al. [18] and Ye et al. [14], who reported that exposure to several pesticides leads to irritation in the respiratory system. The duration of pesticide

symptoms among respondents was: hours (14.44%), days (26.66%), and weeks (12.22%) (Table 1). However, previous studies indicate that sprayers are more exposed to pesticides than other workers on flower farms [19-21].

Table 1: The bad effects, routes of exposure, and impact of pesticides on user Respondents in Selected Districts of West Show Zone, Oromia Regional State, Ethiopia.

Variables		Districts			
		Abuna Gindeberet (n=90)		Gindeberet (n=90)	
		N	%	N	%
Do you think pesticides can have any bad effect	Yes	86.25	95.83	80.87	89.86
	No	4	4.17	19.13	10.14
How do pesticides enter your body	Eye	37	41.11	30	33.33
	Ingestion	19	21.11	20	22.22
	Inhalation	14	15.56	20	22.22
	Skin	20	22.22	20	22.22
In last year felt ill after handling pesticide	Yes	41	45.55	40	44.44
	No	49	54.44	50	55.55
If yes, what symptoms did you suffer?	No disease	48	53.33	45	50
	Nausea	1	1.11	3	3.33
	Blurred vision	4	4.44	2	2.22
	Salivation	4	4.44	6	6.66
	Skin irritation	8	8.88	10	11.11
	Headache	21.33	26.66	23	25.55
	Respiratory difficulty	3.77	1.11	1	1.11
	No symptoms	41	45.55	43	47.77
How long did the pesticide symptoms last on you	Hour	10	11.11	12	13.33
	Day	25	27.77	24	26.66
	Week	14	15.55	11	12.22

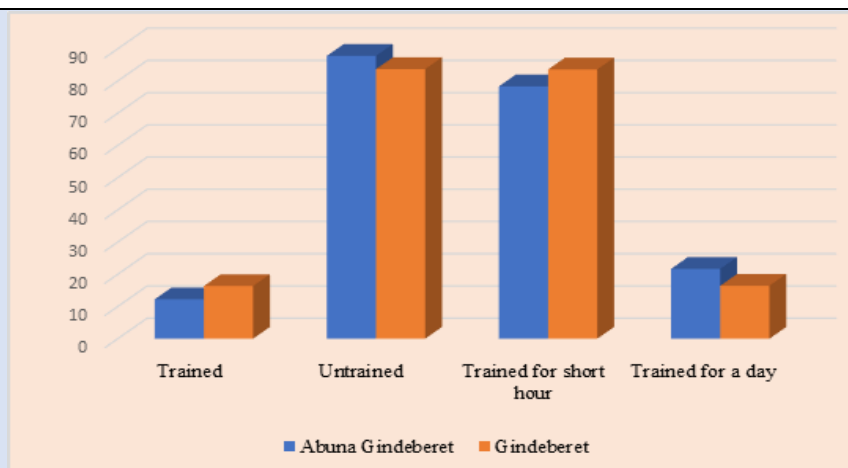


Figure 1: Farmers' knowledge of information regarding pesticide application training.

Table 2: Farmers' knowledge of information regarding pesticide information

Categories	Variables	Abuna Gindeberet	Gindeberet
Where do you get pesticide information	NGOs	22.37	27.64
	Extension service	28.37	31.27
	Agro dealers	13.27	8.27
	Friends & Family	17.77	12.33

	Reading instruction	6.68	3.77
	Nowhere	11.27	16.72
Do pesticide containers have label	Yes	67.33	59.37
	No	22.25	34.52
	Sometimes	10.42	6.11
Can you read & understand instruction on pesticide label	Yes	34.75	29.47
	No	58.88	62.54
	sometimes	6.37	7.99
If not why?	No education	78.35	70.27
	Written in English	21.65	29.33

Management of pesticides during Pesticide application.

Table 3 shows that the instruments used for applying the pesticide, managing the pesticide, mixing the pesticide, and measuring the dosage vary according to the size of the farm and the amount of pesticide needed. More than eighty percent of the farmers in three districts and more than twelve percent in other districts used knapsack sprayers. In Abuna Gendeberet district, the use for applying the pesticide Knapsack sprayer for applying the pesticide, Knapsack sprayer (83.33%), and Other (16.55%). When the farmer gets a blocked knapsack nozzle to open, they nozzles use their mouth to blow to unblock (41.11%), use a sharp object to (36.66%), or only replace with another nozzle and take it to a technician for repair (22.22%). The farmer always cleans the knapsack (sprayer) after use (74.44%), does not clean it after use sprayer simply puts it after use (11.11%), and cleans it sometimes clean (14.44%). The farmer just like that cleaning knapsack aver were the farmer mixing pesticide in different places, they were mixing in the house (3.33%), outside the house (17.77%), in the field (52.22%), and beside the water resource (26.66%). Table 4 shows the measurement of pesticide dosage anomaly by cup the most one (93.33%) remaining only by the other (6.66%). The farmer mixes several pesticides, mostly for two purposes the most farmers to save time (33.33%) and

to get a better effect (44.44%), and doesn't know (22.22%).

In Gendeberet district, the farmers use Knapsack sprayer for applying the pesticide, Knapsack sprayer (80%) and Other (20%). When the farmer gets a blocked knapsack nozzle to open the nozzles use their mouth to blow to unblock (36.66%), use a sharp object to unblock (34.44%), and only replace with another nozzle, taking it to the technician for repair 28.88%). The farmer always cleans the knapsack (sprayer) after use always (83.33%), does not clean after use sprayer simply put it after use (5.55%) and cleans some sometimes or does not clean at always (11.11%). The farmers where cleaned the knapsack in different places they were in the house (8.88%), outside the house (13.33%), in the field (45.55%), beside the water resource (lake or river) (32.22%). The mean number of households the farmers just like that cleaning knapsack sprayer were the farmer mixing pesticide in different places, they were mixing in the house (5.55%), outside the house (2.22%), in the field (47.77%), and beside the water resource (44.44%). The measurement of pesticide dosage anomaly by cup is the most common one (81.11%) they remain one by the other (18.77%). Mixing several pesticides (72.22%), Not Mixing several pesticides (25.55%), and mixing several pesticides sometimes (13.33%). The farmer for two purposes: mixing several pesticides mostly to save time (32.22%) and to get a better effect (46.66%), and I don't know (21.11%), (Table 3).

Table 3: Management of pesticides during Pesticide application.

Variable	Category	N (%)	Districts			
			Abuna Gendeberet (n=90)		Gendeberet (n=90)	
			N	%	N	%
What do you use for applying the pesticide	Knapsack sprayer	226(83.70%)	75	83.33	72	80
	Other	44(16.29%)	15	16.66	18	20
In case you get a blocked sprayer nozzle	Use mouth to blow to unblocked	108(40%)	37	41.11	33	36.66
	Use sharp object to unblock	98(36.29%)	33	36.66	31	34.44
	Replace nozzle & take to technicians for repair	64(23.70%)	20	22.22	26	28.88
Do you clean knapsack	Yes	211(78.14%)	67	74.44	75	83.33

	No	23(8.51%)	10	11.11	5	5.55
	Sometime	36(13.33%)	13	14.44	1011	11.11
If yes where do you clean it	In house	14(5.18%)	3	3.33	8	8.88
	Outside the house	39(14.44%)	16	17.77	12	13.33
	In the field	142(52.59%)	47	52.22	41	45.55
	Beside the water resource	75(27.77%)	24	26.66	29	32.22
Where do you mix your pesticides	In the house	17(6.29)	9	10	5	5.55
	Outside the house	9(3.33%)	4	4.44	2	2.22
	In the field	148(54.81%)	47	52.22	43	47.77
	Besides water resource	96(35.55%)	30	33.33	40	44.44
How do you measure the dosage of pesticide	By cup measuring	238(88.14%)	84	93.33	73	81.11
	Other	32(11.85%)	6	6.66	17	18.88
Do you mix several different pesticides	Yes	174(64.44%)	66	73.33	65	72.22
	No	65(24.07%)	12	13.33	23	25.55
	Sometime	31(11.48%)	12	13.33	12	13.33
If yes why	I don't know	55(61.11%)	20	22.22	19	21.11
	To get a better effect of the pesticide	122(45.18%)	40	44.44	42	46.66
	To save time	86(31.85%)	30	33.33	29	32.22

Conclusion

The results could be concluded that farmers lack knowledge and practical use of pesticides, and safety measurement during pesticide handling, the farmers lacked sufficient understanding of appropriate pesticide handling during application in both districts.

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