

## **Pesticide Handlers' Knowledge, Attitude and Practice**

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**Background:** Pesticide handlers' knowledge, attitude and practice towards health hazard of pesticides might reduce exposure to these hazardous materials.

**Objective:** To assess pesticide handlers' knowledge, attitude and practice during pesticides handling.

**Design:** Cross sectional study.

**Setting:** Occupational Health clinic, Bahrain.

**Method:** Periodic medical examination questionnaire was administered to all pesticide handlers working in the environmental section of the Public Health Directorate from October to December 2009.

**Result:** One hundred sixty-five pesticide handlers completed the questionnaire. One hundred fifty-six (94.5%) reported using personal protective equipments (PPE). Ninety-five (60.9%) were not satisfied with PPE and ninety-eight (62.8%) were advised/instructed to the use of PPE.

A considerable number of handlers were engaged in eating and drinking during work with pesticides. One hundred fifty-nine (96.4%) did not take shower after pesticide use and 158 (95.8%) did not change their clothes before and after pesticide exposures.

**Conclusion:** The study revealed that pesticide handlers are unaware of the pesticide exposure level. Instructions on pesticide packets are not read. The use of personal protective equipments is low. Negative attitude towards personal hygiene and sanitation was observed.

The study revealed the need for pesticide safety education and training, which seems to be a universal problem in pesticide handling.

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Various kinds of pesticides have been widely used in the Kingdom of Bahrain to control flying

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and crawling insects and rodents. Pesticides come in various formulations and are used differently<sup>1</sup>. Some are to be used directly from the package, while others need to be diluted with water, oil or other carriers. The reason for mixing the active ingredient with other substances is to make handling and application safer, easier and more accurate<sup>1</sup>. These pesticides are usually synthetic pyrethroids, organophosphates and coumarins.

The methods of application of pesticides are different; the choice depends on the pest, the site, the properties of the pesticide, the suitability of the application equipment and the cost and efficacy of alternative methods<sup>2</sup>. Some pesticides (products containing cypermethrin) are classified as restricted use pesticides (RUP) by the Environmental Protection Agency (EPA)<sup>3</sup>. Pesticide handlers are regularly involved in pesticide mixing, loading or application of these chemicals at work.

Overuse of pesticide will cause adverse effects on health<sup>4-12</sup>. There are different routes in which pesticides can enter the human body including dermal, oral, respiratory and eyes.

Special precautions have to be taken during preparation, transport, storage and handling of pesticides. People who work with these chemicals should receive proper training on their safe use and personal protective equipments (PPE) to minimize exposure and reduce health risks<sup>13</sup>.

Pesticide handlers' knowledge, attitude and practice (KAP) towards safe use of pesticides might reduce the exposure to these hazardous materials<sup>14-16</sup>. KAP has not been assessed in the Kingdom of Bahrain. Serious concerns have been raised about health risks resulting from occupational exposure to pesticides if not handled properly.

The aim of this study is to assess pesticide handlers' knowledge, attitude and practice during pesticides handling in the Kingdom of Bahrain.

## **METHOD**

Pesticide handlers working in the environmental section of the Public Health Directorate (PHD) were included in the study. In 2009, 165 pesticides handlers were working in PHD; the handlers were responsible for mixing the pesticides, loading them into the containers prior to application, as well as spraying.

The study subjects are distributed in 8 centers. Prior to the periodic medical examination of pesticide handlers, a questionnaire was administered, which contained questions related to knowledge, attitude and practice adapted from the World Health Organization (WHO) Field Surveys of Exposure to Pesticides Standard Protocol<sup>17</sup>. During the consultation time, the examining doctor reviews the response to the questionnaire before examination. The study was conducted from October to December 2009.

Data analysis was performed using the software SPSS version 15.

## RESULT

The personal characteristics of 165 pesticide handlers are summarized in table 1. The median age of the handlers was 40 years (range 27-60 years). All were males with an average of 17 years work experience. Forty handlers (24.2%) had secondary, 57 (34.5%) had elementary and 68 (41.2%) had primary school certificates.

**Table 1: Demographic Features of the Pesticide Handlers in Bahrain**

Characteristics		N=165
Age	Mean	41.82
	Median	40.00
Current Grade	SR. Controller	27 (16.4)
	Controller	132 (80)
	SR. Rodent	6 (3.6)
Years in Service	Mean	20.87
	Median	20.00

One hundred fourteen (69.1%) were instructed about safe pesticide handling methods, 115 (69.7%) were unaware of pesticide exposure level. One hundred fifty-six (94.5%) use PPE at work; however, only 77 (49.4%) stated that PPE are appropriately provided, readily available or offered. Sixty-one (39.1%) were satisfied with the PPE provided and 98 (62.8%) received advice on how to use them, see table 2.

**Table 2: Usage of PPE by Pesticide Handlers in Bahrain**

	Yes	No
	Number & Percentage	
Do you use protective equipment at work?	156 (94.5)	9 (5.5)
Are protective equipment appropriately provided?	77 (49.4)	79 (50.6)
Are you satisfied with protective equipment provided?	61 (39.1)	95 (60.9)
Have you been advised/instructed to the use of protective equipment?	98 (62.8)	58 (37.2)

One hundred thirty-five (86.5%) use safety shoes, 90 (57.7%) use gloves, 93 (59.6%) use safety glasses, 80 (51.3%) use respirator and only 4 (2.6%) use aprons, see table 3. Written information on pesticide packages was not read by 108 (65.5%); could not understand were 88/108 (81.5%); did not give attention were 20/108 (18.5%), see table 4.

**Table 3: Types of PPE Used by Pesticide Handlers in Bahrain (n=156)**

	Yes	No
	Number & Percentage	
Gloves	90 (57.7)	66 (42.3)
Safety Shoes	135 (86.5)	21 (13.5)
Mask	69 (44.2)	87 (55.8)
Aprons/Overall	4 (2.6)	152 (97.4)
Respirator	80 (51.3)	76 (48.7)

Safety Glasses	93 (59.6)	63 (40.4)
Hats	34 (21.8)	122 (78.2)
Other	1 (0.6)	155 (99.4)

**Table 4: Knowledge, Attitude and Practice of Pesticide Use**

	Yes	No
	Number & Percentage	
Are you aware of pesticide exposure level?	50 (30.3)	115 (69.7)
Did you read information written on pesticide packages	57 (34.5)	108 (65.5)
Could not understand	88 (81.5)	20 (18.5)
Did not give attention	20 (18.5)	88 (81.5)
Have you been instructed about safe pesticide handling methods?	114 (69.1)	51 (30.9)

One hundred fourteen (69.1%) pesticide handlers suggested proper use of PPE, 110 (66.7%) suggested medical check-up and training, 74 (44.8%) suggested to avoid windy and sunny weather, see table 5.

**Table 5: Safe Pesticide Use Suggested by Pesticide Handlers**

	Yes	No
	Number & Percentage	
Proper use of PPE	114 (69.1)	51 (30.9)
Avoid windy and sunny weather	74 (44.8)	91 (55.2)
Medical check-up, training	110 (66.7)	55 (33.3)
Leave the job, no solution	26 (15.8)	139 (84.2)

One hundred forty-six (88.5%) handlers reported washing their hands before eating or drinking. However, 98 (59.4%) reported eating and drinking during work with pesticides. Six (3.6%) handlers take shower after pesticide use, 158 (95.8%) handlers did not change their clothes before and after pesticide handling, see table 6.

**Table 6: Personal Hygiene and Sanitation Practices**

	Yes	No
Are your work clothes laundered at home?	151 (91.5)	14 (8.5)
Do you change clothing before and after pesticide exposure?	7 (4.2)	158 (95.8)
Do you shower after pesticide exposure?	6 (3.6)	159 (96.4)
Do you wash your hands after pesticide exposure?	145 (87.9)	20 (12.1)
Do you eat/ drink at the workplace?	98 (59.4)	67 (40.6)
Do you wash your hand before you eat or drink?	146 (88.5)	19 (11.5)

## DISCUSSION

Many pesticide handlers were not knowledgeable about the hazardous nature of these chemicals, and most of them could not read or understand the pesticide information because of different

language comprehension. The majority felt that medical check-up, training and proper use of PPE was important to promote safe pesticide use. It is well known that educational intervention among pesticide handlers can improve the knowledge, attitude and practice (KAP) score for safe pesticide handling<sup>18</sup>. It would be useful to implement continuous education and training programs for pesticides handlers in order to promote awareness and minimize the risk of occupational pesticide exposure<sup>19,20</sup>.

Sam et al reported that educational intervention among pesticide handlers improved the KAP score for safe pesticide handling. Many handlers considered windy and sunny weather as the major problem<sup>14</sup>.

Good proportion of handlers reported the use of PPE including gloves, respirators and goggles; however, some complained that they were not properly provided, the PPE were of poor quality and they were not instructed for the use of PPE. While the majority uses safety shoes, some handlers did not wear gloves, mask, aprons, safety goggles and respirators during summer time. Very few pesticide handlers use aprons. Similar results of unsafe practices among pesticide handlers were also reported in other studies<sup>19,21</sup>.

Most handlers ate or drank at workplace; similar behavior was reported by Gaber et al. Such behavior contributes to the handlers increased exposure to pesticides<sup>19</sup>. Most handlers did not take shower after pesticides exposure, many do not change clothing before and after pesticide exposure and 89% have their cloths laundered at home. To improve the attitude of the handlers towards personal hygiene and sanitation, there is a need for better sanitation facilities and hygiene.

## CONCLUSION

**The study revealed that pesticide handlers are unaware of the pesticide exposure level. Instructions on pesticide packets are not read because they could not understand them. The use of personal protective equipments is low. Negative attitude towards personal hygiene and sanitation was noted.**

**This study as well as other studies conducted on pesticide handling practices revealed the great need for pesticide safety education and training, which seems to be a universal problem.**

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