Journal of Tropical Resources and Sustainable Science

journal homepage: jtrss.org

The Need for Teaching Undergraduate Students the Pesticides Label Contents In Faculties of Agriculture

Marcela Pimid[1], Kumara Thevan Krishnan[2]

[1]School of Biological Sciences, Universiti Sains Malaysia, 11800 Penang, Malaysia.
[2]Faculty of Agro Based Industry, Universiti Malaysia Kelantan, Jeli Campus, Locked Bag No. 100, 17600 Jeli, Kelantan, Malaysia.

Received 16 July 2014
Accepted 18 September 2014
Available online 15 June 2015

Keywords:
Formulation, Malaysia, pesticide product label, students, training.

⊠*Corresponding author:
Marcela Pimid,
School of Biological Sciences,
Universiti Sains Malaysia, 11800 Minden, Penang, Malaysia

Email: marcela.fun@gmail.com

Abstract

Pesticides labels contain specific information that is of interest at various pesticide handling stages. In current study, 14 students from Faculty of Agro Based Industry, University Malaysia Kelantan, Malaysia were assessed on their ability to understand the content of 14 pesticides product labels. The results of this study indicate that students were able to retrieve information such as hazard class, manufacturer and signal word with accuracy of 97.5 %, 98.7 % and 86.2 % without any formal training, respectively. Meanwhile, the worst performances of students were in retrieving information of the type of formulation from the pesticide product label which, only 4 responses (5 %) were accurate.

1. Introduction

A label is a written, printed or graphic material firmly attached to a product container (FAO, 1995). The information in a label can only be conveyed to users if the essential messages on the label are kept as simple and direct as possible. Therefore, manufacturers must provide labels with clear directions which can be easily understood by all potential users. In agrochemical use, pesticides labels provide in-depth information on the risks and hazard of the product and the safe handling of the pesticides. When buying pesticides products, labels are the most important source of information about pesticides (Grey *et al.*, 2005). The information on the product label is to guide the user for effective use of the product and prevent him from the exposure to a dose of pesticides and protect him from its negative impacts. The product label's main function is to explain how a product can be used most effectively, and the containers disposed of in a safe and efficient manner (Woods *et al.*, 2005). Pesticides labels are divided into two key sections, which are the main panel and the ancillary panel. The main panel includes of information such as signal heading, registered trade name, the active constituents, statement of claims for use, restricted chemical products, set contents and registrant contact details. Meanwhile, the ancillary panels contain information such as direction for use, restraints, table of directions, withholding period, re-entry period, general instructions, protection statements, storage and disposal, safety directions, first aid and individual pack identification.

If a product label is too complex, too technical, or badly laid out, the product may not be used correctly and the user may be exposed to unnecessary health risks (FAO, 1995). Studies conducted worldwide indicated that farmers do not

ISSN Number: 2289-3946

read labels due to several factors ranging from poor literacy skills, small font size, and too long instructions and overly technical (Waichman *et al.*, 2007; Shrestha *et al.*, 2010). However, if the users have competent literacy skills perhaps they cannot understand the information given in the product label. Therefore, the main objective of this study was to investigate the ability of students (users) to understand the information displayed on pesticide product labels.

2. Materials and Methods

Fourteen students from Faculty of Agro Based Industry, University Malaysia Kelantan, Malaysia were randomly chosen to participate in this survey. These students were pursuing their tertiary education in agriculture technology program (mean age of 20±2 years). The students were divided into 7 groups (each group consisted of 2 persons). Then, 14 pesticides (5 insecticides, 6 fungicides, 3 herbicides) of various types were randomly place on tables (2 pesticides/table). The students were given 5 minutes time to spend on each table, and upon 5 minutes they were requested to change the tables (clockwise). All groups were exposed to all the 14 types of pesticides in 35 minutes. The study was completely randomised, with the student's choosing the type of pesticides, retrieving the information from the label within specific time.

For each pesticide, the students were requested to extract the following information from the main panel of the pesticides labels; manufacturers, active ingredients, formulation, signal word and hazard class. After 35 minutes, the answer sheets were collected. The students were given a brief lecture on the pesticides product labels and types of formulations for 30 minutes. Upon completion of training, the students were requested to regroup and repeat the whole process of retrieving pesticides products information again. After another 35 minutes, their answers were collected. Data collected were analysed to test whether there was any significant difference on responses of the students before and after the training. The data subjected to statistical analysis (Chi-square) by using SPSS version 16 (IBM Corp.) as suggested by Field (2005).

3. Results and Discussion

Total of 400 responses were retrieved from the students. The least pesticide product label extracted by students was Agus 24 SC that represent 3.8 % and Topsin M, Dual G 960 and Kencis that represent 10 % for each type of three pesticides (Table 1). The students were able to retrieve information without any training, such as hazard class, manufacturer and signal word with accuracy of 97.5 %, 98.7 % and 86.2 %, respectively (Table 2). Only 71.2 % of the students were able to identify the active ingredient of the pesticide products accurately. Meanwhile, the worst performances of the students were in retrieving information of the type of formulation from the pesticide product label which, only 4 responses (5%) were accurate.

Table 1: Frequency of pesticides randomly chosen by students to retrieve information from product labels.

Pesticides	Type	Frequency	
		Number	(%)
Topsin M	Fungicide	40	10
Dual G 960	Herbicide	40	10
Kencis	Insecticide	40	10
Garlon 250	Herbicide	35	8.8
Press	Insecticide	35	8.8
BM Mancozeb	Fungicide	30	7.5
Nativo	Fungicide	30	7.5
Paranox	Herbicide	25	6.2
ImasThiram 80	Fungicide	25	6.2
Padam	Insecticide	25	6.2
Citrin 55	Insecticide	20	5.0
Polyram	Fungicide	20	5.0
Pevicurn	Fungicide	20	5.0
Agus 24 SC	Insecticide	15	3.8
Total		**400**	**100**

ISSN Number: 2289-3946

Table 2: The number (n) and percentage (%) of correct and wrong answers retrieved from pesticides labels before and after the briefing.

Label components	Before						After					
	Correct		No answer		Wrong		Correct		No answer		Wrong	
	n	%	n	%	n	%	n	%	n	%	n	%
Active Ingredient	57	71.2	3	3.8	20	25.0	80	100	0	0	0	0
Formulation	4	5.0	34	42.5	42	52.5	80	100	0	0	0	0
Hazard Class	78	97.5	1	1.3	1	1.3	78	97.5	2	2.5	0	0
Manufacturer	79	98.7	0	0	1	0	80	100	0	0	0	0
Signal Word	69	86.2	2	2.5	9	11.3	80	100	0	0	0	0

There was a statistically significant difference in information extracted from the pesticides labels before and after the training ($\chi^2_{(2)} = 9.579$, $p < 0.05$). Intriguingly, the current study found the students were not able to retrieve the information on the type of formulation of the pesticide products given. The active ingredient in a pesticide is the chemical that controls the target pest. Most of the pesticide product is made up of active ingredients and inert ingredients. The mixture of both ingredients is called a formulation. Users need to know the features of pesticides formulations so they can choose the appropriate spray and timing of their spraying operations (Dugje *et al*., 2008). The type of formulation provides insight into the type of application equipment that will be needed and any hazards associated with the product handling (Lekei *et al*., 2004).

It is a public health concern that the instructions on the labels of products may not always be understood or followed and further understanding of user behaviours is needed (Grey *et al*., 2005). In a study done in UK for the household pesticides, a third of 147 parents said they would not follow the product label exactly when using a product, under half felt labels were both inadequate and difficult to understand and about 10% of parents would not take notice of warnings on the pesticides labels (Grey *et al*., 2005). Meanwhile, if the users were literate, only 38% of them admitted they read all of manufacturers label when using a product for the first time (Avory and Coggon, 1994). Whereas, in Brazil, farmers do not read the labels, as they claimed that the fonts used are too small and the instructions are too long and overly technical (Waichman *et al*., 2007).

In many cases, the inability to understand the information displayed led to the adoption of practices which actually increased exposure, risk to human health and environmental contamination (Waichman *et al*., 2007; Shrestha *et al.,* 2010). The main determinant of a safe behaviour is the person's approaches to safety in other situations, but formal training in the use of pesticides was also associated with more frequent use of personal protective equipments (Avory and Coggon, 1994; Owombo *et al.,* 2014). Thus, regardless of the academic background whether the user were literate or illiterate, there would be a need for a formal briefing to be provided to the potential users if the pesticide product labels were designed to convey the information to the users.

4. Conclusion

Providing complete and detailed pesticide product label do not guarantee that the information on the labels will be comprehended by the users. Though it is the responsibility of the users to understand the information stated in the pesticide product labels, the manufacturer should also be held responsible on briefing and training on proper use of their pesticide product as a part of their cooperate social responsibilities.

Acknowledgements

We would like to thank University Malaysia Kelantan for providing the financial support under the grant R/SGJP/A 07.00/00760A/001/2012/000083.

References

Avory, G., Coggon, D. (1994). Determinants of safe behaviour in farmers when working with pesticides. Occupational Medicine, 44(5), 236-238.

Dugje, I.Y., Ekeleme, F., Kamara, A.Y., Omoigui, L.O., Tegbaru, A., Teli, I.A., Onyibe, J.E. (2008). Guide to safe and effective use of pesticides for crop production in Borno State, Nigeria, 23.

FAO (1995). Guidelines on Good Labelling Practice for Pesticides. Food and Agriculture Organization of the United Nations, 59.

ISSN Number: 2289-3946

Field, A. (2005). Discovering statistics using SPSS. 2nd ed. SAGE Publication, London. Pp 681-720.

Grey, C.N.B., Nieuwenhuijsen, M.J., Golding, J. (2005). The use and disposal of household pesticides. Environmental Research, 97(1), 109-115.

Lekei, E.E., Mununa, F.T., Uronu, A.B. (2004). Pesticide labels and risk reduction in developing countries. African Newsletter on Occupational Health and Safety, 14, 57-60.

Owombo, P.T., Idumah, F.O., Afolayan, A. F. (2014). Assessing factors affecting adherence to safety precautions in pesticides use among cocoa farmers in Nigeria. Ethiopian Journal of Environmental Studies and Management, 7, 810-820.

Shrestha, P., Koirala, P., Tamrakar, A.S. (2010). Knowledge, practice and use of pesticides among commercial vegetable growers of Dhading district, Nepal. The Journal of Agriculture and Environment, 11,95-100.

Waichman, A.V., Eve, E., Nina, N.C.S. (2007). Do farmers understand the information displayed on pesticide product labels? A key question to reduce pesticide exposure and risk of poisoning in the Brazilian Amazon. Crop Protection, 26(4), 576-583.

Woods, N., Cowles, G., Crome, J., Lambourne, R., Simpson, P., Webster, R. (2005). Agricultural chemical user's manual: guidelines and principles for responsible agricultural chemical use. Queensland: The State of Queensland, Department of Primary Industries and Fisheries, 139.

ISSN Number: 2289-3946