



Impact of Pesticide Awareness module (PAM) in Improving the knowledge of Farmers Community about Pesticide Poisoning: A Pre- and Post-Intervention Study in Wardha District in Maharashtra, India

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/JPRI/2021/v33i38B32111

Editor(s):

(1) Dr. Mohamed Fawzy Ramadan Hassanien, Zagazig University, Egypt.

Reviewers:

(1) Muhammad Indar Pramudi, Lambung Mangkurat University, Indonesia.

(2) Godwin Michael Ubi, University of Calabar, Nigeria.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/71195>

Original Research Article

Received 10 May 2021
Accepted 16 July 2021
Published 27 July 2021

ABSTRACT

Background: Pesticide poisoning is a major concern in developing countries like India due to a lack of knowledge about its hazardous effect. It can be minimised by creating awareness among the farmers. This study was conducted to assess the impact of pesticide awareness module in improving the awareness among the farmers' community about pesticide poisoning.

Methodology: This was a pre and Post-intervention study in six villages in the Wardha district in

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Maharashtra. Forty farmers from six villages were interviewed regarding the knowledge, about pesticide poisoning before and after the sensitization with pesticide awareness module with the predesigned questionnaire.

Result: Statistically high significant difference is detected in pre and post-test. It was found that average Pre-test score was 1.84 (out of 10) which was increased in post-test score to 6.52(out of 10). The observed change was 46.79%.

Conclusion: The intervention of PAM was highly effective in knowledge gaining of farmer community

Keywords: Pesticide poisoning; Awareness; Community.

1. INTRODUCTION

Pesticides are chemical compounds mainly used in agriculture for killing the pests, including insects, rodents, fungi, and unwanted plants [1]. Pesticides are an integral part of present-day farming and play a major role in increasing agriculture productivity. The majority of population in India depends on agriculture and hence use of pesticides is extensive to increase agricultural production [2]. As these are environmentally most stable and ability to bioaccumulate it deposit in the human body at a greater risk of disease and poisoning [3]. Farmers are at a high risk of exposure to pesticides through contact with pesticide residue, unsafe handling, and storage and disposal practice. The World Health Organization (WHO) and the United Nations Environmental Program estimated that one to five million cases of pesticide poisoning occur among agricultural workers each year with about 20000 fatalities [4]. The community is not given adequate training and is not aware about pesticide toxicity. They handle toxic chemicals thinking them to be safe which results in increasing the frequency of health risk episodes [5]. In the present days, several instances of chronic toxicity of pesticides have been reported among the exposed farm population due to occupational and accidental poisoning. Recent incidences occur in Maharashtra [6]. Illiteracy and lack of knowledge about hazardous effect of pesticides have been considered the most important barriers to preventing poisoning. Hence comprehensive intervention measures are needed to reduce the health risks of pesticides. This study is a small attempt to assess the farmer's knowledge about pesticide poisoning & create awareness among them by designing modules regarding the appropriate use of pesticides and their harmful effect.

2. METHODOLOG

Study design: This was pre and post-intervention study.

Study setting: A study was undertaken at six nearby villages of Wardha district in Maharashtra.

Six villages were conveniently selected as they were adopted villages by Mahatma Gandhi Ayurved Medical College, Salod, Wardha under the ambit of Datta Meghe Institute of Medical Science, Sawangi, Wardha. 40 farmers from each village were enrolled after taking consent from them. The pesticide awareness module (PAM) was designed and pre-validated by the school of health professional education, of concerned Institute also the Pre- test and Post-test on the module were prepared and validated. PAM includes the different classification of pesticides, route of exposure, mechanism of action, list of banned pesticides in India, acute and chronic effects of pesticides, first aid, preventive measure and different laws governing pesticides in India. Before implementation of the module pre-test of farmers was conducted. The module was implemented in a community in the Marathi language in the form of chart & postures. After implementation of module post-test of farmers was taken. As most of the farmers were illiterate answers were recorded by volunteers.

2.1 Variables Included in Questionnaire

- Socio-demographic variable: Age, Education, Experience
- Need of awareness about pesticides poisoning
- Awareness regarding pesticides poisoning
 - i. What is the Classification of pesticides
 - ii. What is the route of administration of pesticides

- iii. What are the symptoms of acute pesticide poisoning
- iv. What are the preventive measure
- v. What are the laws governing pesticides

statistically not significant except in between V4 and V6. There is equal distribution of obtained results which represent equilibrium of effectiveness of pesticide awareness module.

2.2 Statistical Analysis

The data collected were entered in MS Excel and analysis was done using statistical software IBM SPSS version.

3. OBSERVATION AND RESULT

Comparative statistical analysis of observation of pre and post test scores among studied villagers is depicted in Table 2. The statistically high significant difference is observed in pre and post-test among the samples which indicates that the module has resulted in creating significant changes in the knowledge. In another world these observations represent the high effectiveness of pesticide awareness module.

Table 1. Characteristics of the study population

Characteristics	Frequency
Age	
21-30	20
31-40	72
41-50	113
51-60	35
Education	
Nil	30
Primary	56
Middle	64
High-school	52
Senior secondary	38
Graduation	00
Working on the farm (years)	
0-5	16
5-10	65
10-15	128
15-20	20
20-25	11

Data related to comparative analysis of observation of Pre and Post-test scores in studied six villagers by Pairwise Multiple Comparison Procedures (Tukey Test) is given in Table 3. The statistical analysis indicates that there was a difference in pre-test score of between studied villagers. However, after the study, the difference is not seen in the comparison between all villager's scores which is

4. DISCUSSION

Pesticides consumption in India grew by 13.07% between 2014-15 and 2017-18. Maharashtra consumed the most chemical pesticides in India in the past 5 years at 61,138 tonnes according to non-profit pesticide action network (PAN) [7]. Pesticides poisoning is a major health problem in Maharashtra in the Vidarbh region. The state has reported 272 death in last four years. Yavtamal District has reported a maximum number of 21 deaths and 42 deaths are from the remaining 14 districts in Maharashtra during 2017-18 [8]. Many of the pesticides have been associated with health issues [9,10]. Exposure to pesticides is through contact with skin, ingestion or inhalation. The type of pesticides, the duration and route of exposure and individual health status is the responsible factor for its hazardous effect [11]. The numerous hazardous effects associated with chemical pesticides include among other effects, dermatological, gastrointestinal, neurological, carcinogenic, respiratory, reproductive and endocrine effects [12-15]. Few of the related studies were reviewed [16-20].

Hence awareness regarding knowledge about pesticides and their hazardous effect is an essential for avoiding the danger of it. This study was conducted to create awareness in farmer's community by structured module. 240 male participants were selected for the study who directly involved in the application of pesticides. All farmers included in the study were male as farming activities especially related to pesticides were performed exclusively by the male. The majority of farmers in the study were in the age group of 31-50 years (77.08%). 27.08% farmers were above 50 years and 8.33% farmers were below 30. Considerable numbers of farmers were illiterate or had not completed elementary education (62.5%) and most of the farmers are having 10-15 years of experience of farming [21-22].

In pre and post-test farmer's levels of knowledge of pesticides were assessed based on classification of pesticides, route of exposure, hazardous effects on health, protective measures and pesticides governing laws. Average pre-test score was 1.84 (out of 10) which was increased

in post-test score 6.52 (out of 10). The observed change which is 46.79% is because of effect of PAM. This observation represent that PAM has significant impact in increasing awareness in just one attempt. The change (46.79%) is less than 50% or not nearer to 100% because of limit of grouping new knowledge after single exposure with new facts in other word it can be said that repetition of awareness programme with PAM is requires for obtaining complete awareness.

Separate statistical analysis of Pre and Post-test score of six villages indicates that significant difference ($P < 0.001$) has been achieved by PAM which represents high effectiveness as per the need of society (Table 2). Comparative analysis of observation of Pre and Post-test score in studied six villages was done to find out different level of Pre-test and Post-test score in comparison among villages. (Table 3) It is seen that V1 has shown a minimum pre-test score

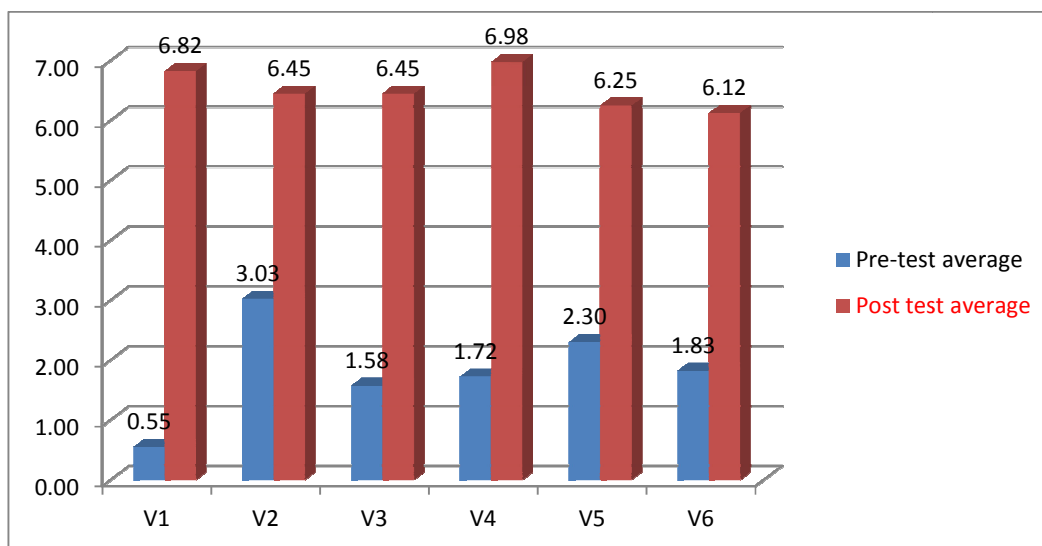


Fig. 1. Average pre and post-test score among studied six villagers

Table 2. Analysis of observation of Pre and Post-test scores in studied six villagers (paired t-test)

Village code	Treatment Name	N	Mean	Std Dev	SEM	t Value	P value
V1	Pre-test	40	0.55	1.339	0.212	-29.214	<0.001***
	Post-test	40	6.825	0.903	0.143		
	Difference	40	-6.275	1.358	0.215		
V2	Pre-test	40	3.025	1.79	0.283	-10.702	<0.001***
	Post-test	40	6.45	1.339	0.212		
	Difference	40	-3.425	2.024	0.32		
V3	Pre-test	40	1.575	1.357	0.214	-19.613	<0.001***
	Post-test	40	6.45	0.783	0.124		
	Difference	40	-4.875	1.572	0.249		
V4	Pre-test	40	1.725	1.519	0.24	-18.659	<0.001***
	Post-test	40	6.975	1.05	0.166		
	Difference	40	-5.25	1.78	0.281		
V5	Pre-test	40	2.3	1.265	0.2	-13.795	<0.001***
	Post-test	40	6.25	1.171	0.185		
	Difference	40	-3.95	1.811	0.286		
V6	Pre-test	40	1.825	1.299	0.205	-17.668	<0.001***
	Post-test	40	6.125	0.883	0.14		
	Difference	40	-4.3	1.539	0.243		

***Highly Significant

Table 3. Comparative analysis of observation of Pre and Post-test scores in studied six villagers [Pairwise Multiple Comparison Procedures (Tukey Test)]

Pre Test				Post Test			
Comparison	Diff of Ranks	Q	P<0.05	Comparison	Diff of Ranks	Q	P<0.05
V2 vs V1	4101.5	9.341	Yes	V4 vs V6	2051.5	4.672	Yes
V2 vs V3	2184	4.974	Yes	V4 vs V5	1691.5	3.852	No
V2 vs V4	1984.5	4.52	Yes	V4 vs V3	1318	3.002	No
V2 vs V6	1732.5	3.946	No	V4 vs V2	1254.5	2.857	No
V2 vs V5	902.5	2.055	No	V4 vs V1	341.5	0.778	No
V5 vs V1	3199	7.286	Yes	V1 vs V6	1710	3.894	No
V5 vs V3	1281.5	2.919	No	V1 vs V5	1350	3.075	No
V5 vs V4	1082	2.464	No	V1 vs V3	976.5	2.224	No
V5 vs V6	830	1.89	No	V1 vs V2	913	2.079	No
V6 vs V1	2369	5.395	Yes	V2 vs V6	797	1.815	No
V6 vs V3	451.5	1.028	No	V2 vs V5	437	0.995	No
V6 vs V4	252	0.574	No	V2 vs V3	63.5	0.145	No
V4 vs V1	2117	4.821	Yes	V3 vs V6	733.5	1.671	No
V4 vs V3	199.5	0.454	No	V3 vs V5	373.5	0.851	No
V3 vs V1	1917.5	4.367	Yes	V5 vs V6	360	0.82	No

compared to other villages while V2 shows a maximum pre-test score. This observation represents that people of V1 were least aware of the hazardous effect of the pesticide. On the other hand people of V2 were better aware of this subject. However, still, the awareness level was far less than the expected level to avoid as well as deal with pesticide hazards. After implementation of PAM, all villages show non-significant difference in Post-test score except V1 in comparison with V2. The difference in Post-test score in these two villages is due to the existing significant difference before implementation of PAM, therefore it can be said that the significance in post-test score in between V1 and V2 is not because of PAM in other word PAM has no role there may be some other factor responsible for the difference. Overall observations show that PAM has played a significant role in community [23-24].

5. CONCLUSION

From the result, it can be concluded that most of the farmers are not aware of pesticides poisoning. The pesticides awareness module which was the intervention in this study was effective in increasing the awareness of the people about pesticide poisoning in the villages of Wardha from 1.84 to 6.52%.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our

area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:

*The peer review history for this paper can be accessed here:
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