Damak Campus Journal 2023, **11 (1): 95-101**
ISSN : 2565-4772 (Print)

AWARNESS ON PESTICIDE EXPOSURE AND SAFETY PRACTICES AT HIMALAYA TEA ESTATE DAMAK-4

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ABSTRACT

Pests control is one of the major problems in tea plantation and may exert harmful impact to the environment and health if unhealthy practice prevails. Himalaya Tea estate situated in Damak cover a huge area of about 500 hectors of land where agricultural activity is continuously performed over years. This study was done to examine awareness on safety practices and use of Personal Protection Equipment (PPE) while handling pesticides by the workers in the Himalaya tea estate. For this a structured closed ended questionnaire survey was conducted among 30 respondents who were randomly sampled and an unstructured open ended key informant survey was conducted among the parties concerned with the subject from administrative level. This was supported by field observation.

From the study it was found that among many Integrated Pest Management (IPM) techniques of pest control chemical method was being practiced in the study area. Similarly during the survey safety and awareness it was revealed that despite of the availability PPE, none were found using a full set of it. Similarly majority of field workers i.e. nearly 99% were found unaware about IPM, Good Agricultural Practice (GAP), toxicity, banned pesticides, classes of pesticides etc. and had never taken any training related to the subject. During key informant survey it was revealed that the workers of administrative level had taken a few training programs. This highlights the gap in communication between them and suggests the need of awareness raising training programs regarding IPM and related topics among all level of workers.

Keywords: Pesticide safety; Pesticide exposure; pesticides awareness; PPE

INTRODUCTION

Tea is one of the best significant exportable cash crops among all cash crops, a major source of foreign currency and mostly produced in the eastern section of the country. (Khanal, 2013) Pests are one of the most serious issues in every agricultural practice. Pesticides are frequently employed to overcome this problem. (Thapa *et al*., 2021) Properly applied, a pesticide contribute to higher yields, improves product quality and meet the demand of agriculture by controlling weeds, domestic pests, disease bug vectors, and home gardening. (Rani & *et al*., 2020; PPC, 2020)

However, they are extremely poisonous causing serious health and environmental dangers. Important factors of concern that determine health risks associated with pesticide exposure are pesticide's toxicity, the amount of pesticide a person is exposed to, the duration of exposure, and the method of exposure. (Carson, 1962) These chemicals when used widely and without safeguards may have a severe impact especially on agricultural workers who are frequently exposed to it on the job. (Rani, *et al*., 2020; Damalas & Eleftherohorinos, 2011) Such exposure to toxic toxins, directly and indirectly, due to leaking and floating pesticides poses major health risks such as diabetes, reproductive diseases, neurological dysfunction, cancer, and respiratory illnesses. (Rani, *et al*., 2020) It poses major health hazard to agriculture communities, particularly children because of their hand-to-mouth habits, than for children in general in low-income countries. (Dawson, 2015; Alfaris, 2007) It was reported that to the exposure of Ops, the most common insecticides since 1940s, alters neurobehavioral performance in children as well as adults and in some countries it was causing factor of developing cancer at an alarming rate. (Rasoul, 2008; Costa, 2006; Richardson *et al*., 1998) Many countries have banned the use of certain pesticides as a result of the Rotterdam Convention, noting health and environmental concerns. (CIBRC, 2014)

Thus, when it comes to pesticides, safety is always a concern. The use of pesticides in a safe method decreases the risk of harm to applicators, the general population, and the environment. (Gupta, 2004) General principles and safety standards for various application techniques, as well as medical measures of prevention, are all included in the safe use of pesticides. (ILO, 1991) The safety process begins with selecting the appropriate product, the storage, transportation, mixing, and loading of the pesticides respectively. To minimize exposure related threats, use of PPE during work, cleaning and maintaining equipment must be done in a safe manner. (Fitz & Andreasen, 2002) Safety precautions should be reviewed on a regular basis by pesticide handlers which also include reviewing pesticide label or a leaflet attached to the packaging or container with specific PPE required for application. (Salameh *et al*., 2004; Sumner, 2010; Waichman *et al.*, 2007) Moreover, to reduce the detrimental impacts of pesticides on the environment and public health, their manufacture, use, storage, and disposal of pesticides that are no longer in use and empty pesticide container should be strictly regulated in environment friendly manner. (Gyawali, 2018; Fitz & Andreasen, 2002) In addition, another important aspect in reducing the potential health hazard is by training people who work with pesticides in how to use them safely. (Sumner, 2010)

Our country Nepal is an agro based country where large portion of population relay on agricultural activity and its yield. Pesticide on the other hand helps to increase the yield by excluding the factors that hampers the yield. But excess use of it has degraded the land and has caused threat to human health. Himalaya Tea estate situated in Damak cover a huge area of about 500 hectors of land where agricultural activity is continuously performed over years. But only few researches have been done in this topic in the study area. The need of monitoring awarness on pesticide safety practices, availability of safety equipment and its proper implementation practically in the study area was critical to be studied. Thus, this study aimed to examine the level of awareness on safety practices and use of Personal Protection Equipment (PPE) while handling pesticides by the workers in the study area.

MATERIAL AND METHODS

Study Area and Data Collection

Himalaya Tea estate is located at Damak municipality in Jhapa districts in Province No. 1 the Mechi Zone of Eastern Nepal. It covers around 500 hectare of total land and was established in 2018 B.S. (Khawas, 2022) It has employed total 301 workers at different post, primarily for field based labor work. Among them 268 are female workers and 33 are male workers. It is located between 98 meters - 232 meters above sea level at 26°6569°N and 87°6655°E. In Damak the climate is warm and temperate in winter. Rainfall is much less in winter than in summer with an average rainfall of 2391mm recorded at Damak. (Pokhrel, 2019)

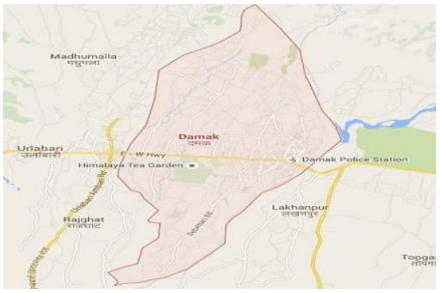

Figure 1: Map of Himalaya Tea Estate (Source: Google Map)

Data were collected from several sources depending on their avalability. For this study primary and sacondary data were alluded. Primary data, both qualitative and quantitative, were collected through questionnaire survey and key informant interview with manager, accountant and workers of tea estate to collect information regarding pest control practices and pesticides safety measures supported by field observation. In questionnaire survey among the field workers, semi- structured closed ended questionnaire was prepared to obtain maximum information that supports the objectives. Unstructured open ended interview was performed among the workers of administrative level including manager, accountant, office head, supervisor, assistant supervisor and factory incharge. While direct field observation of the storage of pesticide, preparation of mixture, application of pesticide, PPE application etc. were observed visiting the site. The sample size was determined using a formula devised by Arkin and Colton (1963), whose confidence and error are 95 percent and 5 percent respectively. Similarly, literature review method was used for the collection of information related to the topic of interest as secondary data source. For these reliable science journals, different books, articles, internet, previous research, published and unpublished journal and publication from relevant sources were reviewed.

Data Analysis

All the crucial qualitative data were interpreted into quantitative data. So collected quantitative data were further analyzed and interpreted with the help of MS-excel 2007. For the interpretation, appropriate analytical tools like charts, graphs, figures, tables and bar diagram were generated with the help of Ms-excel.

RESULTS AND DISCUSSION

Awareness on Pesticide

On the concept that safe use of pesticides starts with the basic level of knowlegde on pesticide, this study was done for understanding the level of basic knowledge on pesticide and its potential harm. To determine this, a survey on classes of pesticide (types), its impact on health, banned pesticides, toxicity, and participation on pesticide related trainning were conducted among the respondents, basically working on field. During the survey 80% respondents stated that they knew about classes of pesticides and its impact on health while 20% respondents stated that they did not know about it which signifies majority of respondent were aware about classes of pesticides i.e insecticides, herbicides, fungicides, etc and its impact on health. They were aware about the possible health issue due to direct and indirect exposure of chemicals.

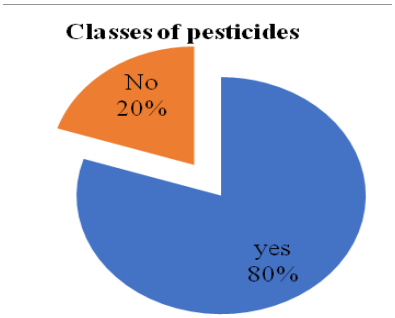

Figure 2: Knowledge on class of pesticides

Similarly, on questionnaire regarding banned pesticides, only 27% respondents said that they knew about banned pesticides while majority of respondents about 73% respondents said that they did not know about banned pesticides. They claimed the use of available chemicals provided by the administration and management team.

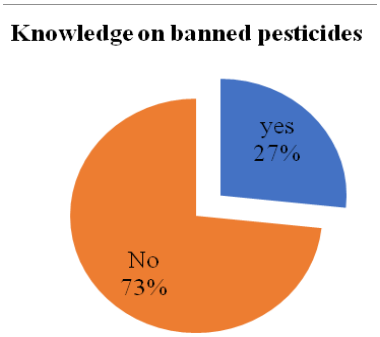

Figure 3: Knowledge on banned pesticides

During the questionnaire concerning about understanding on toxicity of pesticides in use, about 37% respondents stated that they had understanding on the subject whereas 63% stated that they did not have understanding on it. On contradict to the result where majority of respondent stated about their knowledge on the probable impact of pesticides, it was noted that

majotiry of respondents did not have knowledge and understanding about toxicity of pesticides in use. This could be due to lack of concern or negligence prevailing among the group regarding health or chemicals they are using. Similar result was reported in a case study by Rijal *et al.* conducted in Chitwan in 2006 where most of the farmers had limited awareness on health impact of pesticide, very less aware of the banned pesticides and rely on Agro-vets who have no technical experience as the key sources of information regarding pesticides.

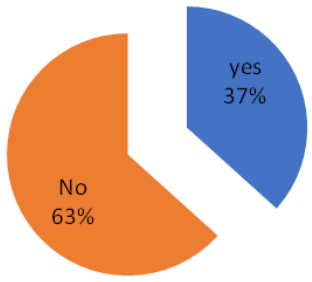

Figure 4: Understanding on Toxicity

It was found that cent percent numbers of respondents were unaware of GAP and had never taken any training regarding pesticide, use and safety measures. While during key informant survey, it was noted that few of the workers from administrative and management level have taken training about pesticide, IPM and safety measures from India. This suggests there is communication gap among the administrative and field workers. Also, overall result depict due to lack of training majority of the respondent though having knowledge on possible impact of pesticide exposure are not concerned about the harmful or banned pesticides and toxicity of pesticides.

Availability and Use of PPE

When the question regarding Personal Protective Equipment (PPE) availability in the tea farming was asked, 100% respondents stated that PPE was available in the farm. However, in the questionnaire survey conducted concerning about the use of protective equipment among workers of tea estate , 93% respondents said that they used boots only while 7% respondents said that they used mask only. Despite of availability of PPE none of respondents use all protective gears (Gloves, hats, goggles, long sleeve clothes).

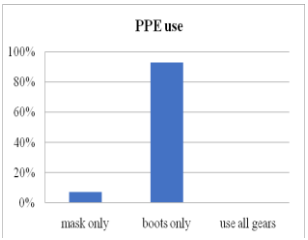

Figure 5: PPE Use

According to survey regardless of the availability of PPE, not a single respondent mentioned the use of whole set of gadget for checking the exposure to chemical. This advocates higher health hazard risk among the workers. Despite knowing about the pesticides' negative health effects, the usage of preventative measures were found inadequate in the similar study of Bhaktapur (Thapa *et al*., 2021) and of Gaza (Yassin M *et al*., 2002). Poor pesticide safety and use situation in the study area is attributed to weak safety enforcement system in the study area. This also supports the finding that lack of training on pesticide use, risk and safety measure might be the driving factor that has created negligence among the workers regarding health and use of PPE.

CONCLUSION

Current study was conducted to assess level of awareness on safety practices and use of PPE while handling pesticides by the workers in the study area. The study reveals lack of adequate knowledge or awareness resulted ignorance among the workers. Insufficient use of available PPE for saving time can increase health related risk among them. Thus, it illustrates the importance of effective regularity and enforcement system on pesticide use and safety practices in the study area. The study found that most of the workers knowledge on pesticide use, risk and safety measure is limited. It emphasizes the need of regular awareness raising programs and training related to the use and importance of PPE to minimize health hazard among the users. This information will guide Municipality to prioritize developing and implementing educational pesticide safety and certification programs for farmers and agriculture workers. Also, put focus on tightening the enforcement mechanism to regular surveillance and monitoring pesticide safety conformity to minimize the potential risk on environment and public health at both retailer and farm levels.

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