

Conference Paper

Occupational Safety and Health Hazards and Musculoskeletal Disorders (MSDs) at Sprayed Work Farmer in Sumber Mufakat Village Kabanjahe 2016

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Abstract

Pesticide using is a problem concern especially in safety and health aspect. They are missing at work method and posture increasing of musculoskeletal disorders at workers and impact to the occupational accident and occupational disease. The primary goals were to analyze the occupational safety and health hazard and musculoskeletal disorders (MSDs) based on pesticide use methods. The locus of this research was sprayer work farmer at Sumber Mufakat village Karo District which population amount are 125 farmers. With a qualitative design this research using snowball sampling and found in 15 head of sprayed farmers. Data were collected by observation and in-depth interview which the object are all process of pesticide used and analyzed by domain analysis. The farmer still used manual in spraying the land. The spray period is a 6-7 hour with three times as a significant frequency in a week. The spraying method was using spray pump, and the work farmers weren't using the self-equipment in complete and adjust. Musculoskeletal disorders found higher at neck, shoulder, hand, wrist, and leg. Recommended working farmer to use spraying machine to spraying at 3 hectares of land. Stretching activities in five minutes for part of the body that feel sick during spraying was a point to recommend for spraying work farmers, create the organization to control spraying pesticide used and collaboration with Health Department to check the cholinesterase enzyme as a preventive program.

Keywords: Spraying work farmer; pesticide; musculoskeletal disorders

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1. Introduction

The use of pesticides is a problem that needs to be considered, especially on safety and health aspects. Starting from the exposed directly or indirectly like spattered, spill, swallowing even cause food poisoning that can impact chronic or acute and bring to death. The high-risk groups are exposed to pesticides, sprayed work farmer of pesticides (Md. Wasim 2009).

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When using pesticides, the sprayed farmers never using safety equipment such as masks, hats, apron, and others. The scattered farmers generally assumed that using personal protective equipment when handling pesticides is impractical and considered inconvenient. If the tool is not used, then these pesticides could be into the body through the skin and the respiratory tract (Siwiendrayanti 2011).

Based on the original survey, the sprayed farmers do their activities in the early morning and at noon. On weeding or mixing of pesticides, the farmer shows not ergonomic posture. In another hand, the farmers never using the personal equipment and sometimes the pesticide could exposure and contact with their body. They are missing at work method and posture increasing of musculoskeletal disorders at workers and impact to an occupational accident and occupational disease. Based on that survey, the purpose of this research was to analyze the occupational safety and health hazard and musculoskeletal disorders based on pesticide use methods.

2. Methods

The study was conducted in Sumber Mufakat Kabanjahe District of Karo. The study was survey research using qualitative methods. The design used a snowball sampling approach to find out the occupational safety, and health hazards from pesticides sprayed work farmers method and musculoskeletal disorders experienced by pesticides sprayed work farmers. Occupational safety and health were collected by in-depth interview and observation the hazard potential from all separate way. Musculoskeletal disorders are collect by observation and using Nordic Body Map Questionnaire. This research is using analysis of domain where categorized in the use of pesticides which analyzed based on occupational hazard and the risk of musculoskeletal disorders.

3. Results

3.1. The domain of occupational safety and health hazards and musculoskeletal disorders

The sprayed work farmer still doing manual in spraying the land. The scattered period is a 6-7 hour with three times as a high frequency in a week. The spraying method was using spray pump, and the work farmers weren't using the self-equipment in complete and adjust. The majority of the plants are maintained in Sumber Mufakat village is the type of horticulture crops such as cabbage, mustard bottles, peppers, tomatoes, eggplants, potatoes, soup leaves, leaf leek, green beans, carrots, and flowers. The pattern of work

and working methods in the homogeneous work process of pesticides at sprayed work farmers. Starting from weeding plants, mixing pesticides, until spraying of pesticides. Work farmers undertake the work process without using Personal Protective Equipment (PPE).

During spraying the work farmer does not follow the direction of the wind. Parts of the body often affected are the eyes, hands, and feet. It is shown from complaints from farmers spraying pesticides is red and painful eyes, nausea, dizziness, headache, squash and weak in the knees. Musculoskeletal disorders found higher at neck, shoulder, hand, wrist, and leg.

Domain 1. Weeding plants before spraying pesticides and musculoskeletal disorder of pesticides sprayed work farmers

Weeding is done which, not ergonomic postures like squatting, bending, relying on both knees and feet. The method is still manually done, with an area of land and low crop species make work farmers feel pain in the knees (35%), legs (22%), feet (33%), waist (6%) and neck (4%). This squat work posture has the same effect as the impact is not ergonomic posture and happened for most of the sprayed farmers. Weeding is the outdoor activities, and most of the farmers feel tired in natural cause the sunny.

Domain 2. Pesticides mixing method and musculoskeletal disorder of pesticides sprayed work farmers

To mixing of pesticide was done at home or farmland. Farmers always use their hand to open the pesticide's packaging and sometimes bite it if it is difficult. The dose used to be mixed as well not use the measuring spoon but poured granted by habit and some time to mixing the pesticide using the hand.

Musculoskeletal disorders of perceived farmers during the mixing process is not much even almost non-existent, because the mixing is done approximately 5-15 minutes by opening pesticide containers, taking water, then mix the pesticide and water and stirring the mixture.

Domain 3. Method of displacement and removal of spray pumps and musculoskeletal disorder of pesticides sprayed work farmers

Judging from the ergonomic aspect, this process shows the dangers of manual handling risks are quite high. Working posture formed when the mixing pesticides turn into the

pump average doing with the bent position while lifting a bucket or barrel containing a pesticide mixture. The risk of accidents and spillage of pesticides are quite common due to the width of the container which is not by the magnitude of the width of the mouth of the spray pump.

Besides spattered or spilled of pesticides, work farmers also feel that musculoskeletal disorders of pain in their arm (40%), shoulder (47%), and finger (13%). This complaint is felt for raising mix and hold the outskirts of the container when poured pesticide into the pump.

Domain 4. Spraying pesticide method and musculoskeletal disorder of pesticides sprayed work farmers

The problem in sprayed activities is the farmers not attention to the wind direction. Therefore frequent complaint splashed into the eyes or pesticides evaporate and make eyesore into a claim that is often felt by sprayed work farmers in this village. At the time of this spraying, all work farmers still use a pump carrying, causing pain in their neck, shoulders, and hands, especially the right side (100%). Both of these body parts are often used in the spraying process and become ill because of land to be sprayed started from 2 ha to 5 ha. Work farmers will continue to run until the spraying is completed.

4. Discussion

The pain that feels by the sprayed farmers can escalate and get worse as expressed that the effects of pesticide residues on human health could interfere with the metabolism of steroids, impair thyroid function, impact on spermatogenesis; disruption of the endocrine hormone system (reproductive hormones) or better known as EDS (Endocrine Disrupting Pesticides), in addition to stimulating the onset of cancer.

Research conducted Prasetya et al. (2010) stated that the selection of the wrong wind direction could affect the levels of cholinesterase enzyme when spraying with a downwind or any direction then the pesticides will be carried by the wind and inhaled especially if PPE is incomplete.

Poor posture while working and lasts longer can cause muscle burden and adverse effects on health (Sundari 2010). Working position is one of the causes of fatigue and muscle pain complaints which are often unrecognized by sufferers. Especially working attitude has become one's habits such as sitting, standing and bending could cause the fatigue, muscle tension and eventually pain. Besides the bones become misaligned, the muscles, and the segment will be interested harder of the ligament (Widyastoeti 2009).

Research on the agricultural sector in 2007 by the American Kotowski shows that farmers and agricultural workers are at risk of fatigue in the neck and shoulders that comes from the types of activities undertaken such as lifting, nodded and spraying. In line with research in the agricultural sector in the United Kingdom that during the spraying activities with the manual handling of spray pump and manual handling activities of other non-fatal injuries can cause the most.

5. Conclusions

Based on the research results could be summarized that occupational safety and health hazards happen at all process of pesticides using and dominant at weeding plants process, mixing the pesticides especially of excessive dosage and spraying of pesticides method. The work farmers complaint of irritation from their eyes, rash and dizzies when they were exposed by pesticides in direct contact Then actually the musculoskeletal disorder happens caused the not ergonomic posture that cause of most manual handling activities are not ergonomic. From NBM mapping the most sickness is mostly at neck, shoulder, hands, waist, knee, and feet.

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References

- [1] Kotowski S.E. 2007. Understanding the Ergonomic Risk for Musculoskeletal Disorders in the United States Agricultural Sector. *Am J Ind Med* 50: 501-511.
- [2] Md. Wasim Akhtar et al. 2009. Impact of Pesticides Use in Agriculture: Their Benefits and Hazards. *Interdisciplinary Toxicology Journal*, vol 2 (1): 1-12.
- [3] Prasetya E, Wibawa A, A, Enggarwati. 2010. Hubungan Faktor-faktor paparan Pestisida terhadap kadar Cholinesterase pada Petani Penyemprot Tembakau di desa Karangjati, Kabupaten Ngawi. *Jurnal Fakultas Ilmu Kesehatan*, Universitas Setiabudi, Surakarta.

- [4] Siwiendrayanti, Arum. 2011. Keterlibatan dalam Aktivitas Pertanian dan Keluhan Kesehatan Wanita Usia Subur. *Jurnal KEMAS*, 7 (1): 73-82.
- [5] Sundari, K.N. 2010. Tinjauan Ergonomi terhadap Sikap Kerja Petani di Banjar Tengah, Desa Peguyangan, Denpasar Utara. *Metris: Jurnal Mesin, Elektro, Industri, dan Sains*, II(2): 71-76.
- [6] Widyastoeti, R.D. 2009. *Analisa Pengaruh Aktivitas Kerja dan Beban Angkat terhadap Kelelahan Muskuloskeletal*. *Gema Teknik* vol 2: 28-29.