

The Implementation of GEMPAR as Farmer's Character Building in Pesticide Toxicity Prevention

Eka Lestari Mahyuni¹, R. Hamdani Harahap², Urip Harahap³ and Nurmaini¹

¹Faculty of Public Health, Universitas Sumatera Utara, Medan, Indonesia

²Faculty of Social and Political Science, Universitas Sumatera Utara, Medan, Indonesia

³Faculty of Pharmacy, Universitas Sumatera Utara, Medan, Indonesia

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Abstract: Pesticide toxicity was the problem that difficult to solve cause the improper habit of farmers in pesticide use. This study aimed to analyze the implementation of GEMPAR as character building of farmers in pesticide toxicity. This is the participatory action research based on qualitative approaches. The study conducted in Karo's farmer of Sumber Mufakat village. The sample taken by purposive technique sampling resulting in 20 farmers that distribute on 9 hamlets. All process gathering with in depth interview and FGD. Data were analyzed using realist evaluation to create the social change into farmer's character building. The results found that GEMPAR has eight step to change the farmer's character when using the pesticide. The steps are recognize the hazard of pesticide, using the appropriate PPE, paying attention to the wind direction, storing pesticides in safe place, safe disposal of pesticide package, personal hygiene, reporting in immediately and use the natural pesticides. All steps are designed to be comprehensive and meet the level of health services. Therefore, GEMPAR as sustainable action could be expected as character building of farmers while using pesticides. The obstacle of GEMPAR lies in the appropriate assistance process which needs to be considered as support of local government.

1 INTRODUCTION

The pesticide use in Indonesia as an agricultural country is quite high and widespread. Thousands of farmers are poisoned by pesticide in daily and every year estimated in million people suffer of pesticide toxicity. This phenomena was a serious problem in agricultural communities in poor and developing countries (Achmadi, 2005; World Health Organization, 2017). Pesticide toxicity is a condition that could be occur due to exposure to chemical used. Besides it is giving positive impacts such as increasing agricultural production and decreasing food borne disease and vector borne disease, pesticides also have negative impacts, namely toxicity which could be in systemic or non-systemic effect, acute, and chronic symptom (Lu, 2006; Aktar, Sengupta and Chowdhury, 2009; Yuantari, 2011; Mahyuni, 2015).

WHO states acute toxicity of pesticides never goes away as a record. The prevalence of acute toxicity due to pesticides in several countries such as Nicaragua, Indonesia, Vietnam, Brazil, China,

Bangladesh, Cambodia, and India reaches 8.8% to 88%. Even pesticide toxicity giving the harmful effects such as cancer, disability, infertility and hepatitis each year (Purwati., 2010; Zhang *et al.*, 2011; Fikri, Setiani and Nurjazuli, 2012; World Health Organization, 2017). The toxicity incident caused by pesticides use occurred in North Sumatra with 120 victims and in Central Java two people died due to the pesticide with active ingredients of *diazinon* (Sentra Informasi Keracunan Nasional, 2017). Pesticide toxicity is also experienced by Karo farmers ranging from 55.26% to 91.25% (Dinas Kesehatan Kabupaten Karo, 2008).

Chronic toxicity is more difficult to detect because it is not immediately felt and does not cause specific symptoms and signs. However, chronic toxicity in a long time caused the health problems. Some health problems that are often associated with the pesticides use include eye and skin irritation, cancer, miscarriage, defects in infants, nerve, liver, kidney and respiratory disorders, multiple myeloma, sarcoma, prostate and pancreatic cancer, uterine cancer, breast cancer, neurobehavioral, as well as

Hodgkin (Arcury and Quandt, 2003; Alavanja, Hoppin and Kamel, 2004; Engel et al., 2005; Deborah, 2006).

Various efforts have been made to reduce the use of chemicals in agricultural sector. Starting from the IPM program, the 6T principle, biopesticides, to the organic farming system. But there are no farmers who have a concern in reducing the risk of poisoning. The cause refer to un-comprehensive programs running which top-down system. Various methods are carried out such as eco-farming, urban farming and even the United Nations directing the family farming program for sustainable farming systems (Sumarti *et al.*, 2007; Kurniasari, Hartati and Riwayati, 2009; Moekasan and Prabaningrum, 2011; Tanziha, 2011; Syahyuti, 2016; Setiawan, Redjeki and Nasution, 2017; Arfan and Araswaty, 2018).

Community development is an effort to help community groups to have a voice and influence on life-related issues that can accommodate the interests of the community (Pitchford and Henderson, 2008). GEMPAR is a social movement as an effort to develop the community in preventing pesticide toxicity. GEMPAR is an acronym for *Gerakan Masyarakat Petani Atasi Racun* which is a movement carried out by farmers to overcome all phenomena of pesticide problems. GEMPAR consists of eight steps arranged to overcome the risk of toxicity as primary, secondary, and tertiary prevention. The GEMPAR movement carried out easily and simply with the aim of being able to play a role in character building of farmers who are health and safety while using pesticides as their daily needs (Mahyuni, 2019).

This study aimed to analyze the implementation of GEMPAR as character building of farmers in pesticide toxicity.

2 MATERIAL AND METHOD

This study is an applied study with Participatory Action Research (PAR) based on qualitative approach. Participatory action doing by the farmers in eight movement of GEMPAR. Participation of community showed in how to implement of GEMPAR as action of characteristic building in pesticide toxicity prevention. All action step taken on subjects and carried out by involving the active participation of the community in health and safe of pesticide usage. GEMPAR as community development that the farmer will be change and

create the farmer's character building (Stringer, 1999; Koch and Kralik, 2009; Mardikanto, 2010).

The research was conducted on farmers at Sumber Mufakat, Kabanjahe as a pilot project of GEMPAR. This village has 9 hamlets with horticultural farming communities in Sumber Mufakat Village, Kabanjahe, Karo. The sample taken by purposive technique sampling resulting in 20 farmers that distribute on 9 hamlets.that selected as agent of change for 9 hamlets with criteria committed, healthy, communicated, and able to work together. Data collected by using in-depth interviews and Focus Group Discussion (FGD), self-report and participatory observation. Data were analyzed using realist evaluation to create the social change into farmer's character building. The analysis divided into conceptual text, how the mechanism and the evaluation of intervention. Ethical clearance has been proposed and used by researchers by giving freedom to participants (autonomy), doing good (beneficence), not harming (non-maleficence or do not harm), and confidentiality (confidentiality) of the ethical institutions.

3 RESULT AND DISCUSSION

Karo Regency is an area with a majority of people engaged in agriculture. Plant species are dominated by horticultural crops which are prone to disturbance so it required the intensive attention and frequent of pesticides use. Intercropping planting patterns tend to make farmers use many types of pesticides in a day. The pesticides use is also inappropriate and not according to procedure. Farmers always increase the dose of pesticides used by themselves. Farmers often mix 3 or even 5 types of pesticides at once for spraying. Direct contact often occurs because personal protection is not used. As a result, resistance to pesticides can be assumed to increase in Karo farmers. Organochlorin type pesticides such as Gramaxon and Roundup are still used as the cause of 21 poisoning cases in January-October 2017 period (Mahyuni, 2015; Mahyuni, Yustina and Sudaryati, 2017; Rumah Sakit Umum Kabanjahe, 2018).

Pesticide toxicity was the problem that difficult to solve cause the improper habit of farmers in pesticide use. Based on the results of previous studies, several risk factors contribute to triggering poisoning due to the pesticides use including type of pesticide use, health status, frequency of spraying, length of service and wind direction, pesticide

dosage, duration of spraying and spraying time, level of knowledge, farmer's working attitude including storage method, mixing place, method handling pesticides after spraying, use of Personal Protective Equipment, eating and drinking behavior during breaks and direction of spraying; last history of spraying, bathing well, smoking while spraying, history of training or counseling, position of spraying on wind direction and age, carrying, storing, transferring concentrate, mixing, spraying and cleaning the spray equipment used (Budiyono and Prastowo, 2005; Ruhendi, 2008; Prijanto, Nurjazuli and Sulistiyani, 2009; Budiawan, 2014; Rahmawati and Martiana, 2014; Mahyuni, 2015; Yuantari, Widianarko and Sunoko, 2015; Ipmawati, Setiani and Danudianti, 2016; Osang, Lampus and Wuntu, 2016; Suparti, Anies and Setiani, 2016).

These various risk factors contribute to increasing the health symptoms. The effect of pesticide residues could disrupt steroid metabolism, impair thyroid function, affect spermatogenesis; and disruption of the endocrine hormone system (Suhartono, 2014). Symptoms of poisoning experienced include paraesthesia, tremors, headaches, fatigue, vomiting, pupils or iris slits narrowed so that vision becomes blurred, watery eyes, foaming mouth, lots of saliva, dizziness, heavy sweating, rapid heartbeat, nausea, stomach cramps, diarrhea, difficulty breathing, paralysis, and fainting (Yuantari, 2011).

Pesticides toxicity allows the risk of hypothyroidism (Suhartono, 2014). Pesticide exposure in pregnant women reduce the quality of growth and development of children and trigger an increase in the incidence of stunting (Suhartono and Dharminto, 2010). Exposure to pesticides can affect the state of hemoglobin which causes anemia (Kurniasih, Setiani and Nugraheni (2013) and there is a significant relationship between the dose of pesticides with blood sedimentation rate (LED) in farmers using pesticides (Utami, Dangiran and Darundiati, 2017). Pesticide poisoning can also cause skin sensitivity disorders (Dini, Nurjazuli and Dewanti, 2016).

Based on the concept of poisoning, we need a mechanism to reduce the risk of pesticide poisoning. One step is to control the risk of pesticide poisoning and the achievement of health independence that is integrated with all parties involved through empowering the farming community in an effort to protect and care for farmers while using pesticides. Community empowerment in the health sector is the main target of health promotion. Society or community is one of the global strategies for

promoting health empowerment as a primary target that has the will and ability to maintain and improve their health (Kementerian Kesehatan Republik Indonesia, 2010).

Empowerment as a step to move the masses have an impact on changes in the behavior and culture of a person or community. This change is done through education that can support the development of the character of healthy farmers in using pesticides. Education was the determinnat of character formation, personality and the facilitator is the key factor of the succesfull implementation of character building (Fatoni, 2017). Empowerment will create renewal agents that are able to turn a wrong concept into a true concept through socialization, training and assistance. To remind, the lack of funding and lack of training surfaced as key barrier to implementing of character building (Witherspoon, 2007). GEMPAR was created to solve the risk factor of pesticide toxicity related into primary, secondary and tertier prevention of health.

Gerakan Masyarakat Petani Atasi Racun abbreviated as GEMPAR is formulated to be solution of the risk factors problem or determinant phenomena for pesticide toxicity. GEMPAR also adapted to the culture of local farmers who have kinship each other.

Agent of change is an important part of the community movement. An intervention will be easier to implement and more effective with the influence of agent of change, those limiting the human toxicity and accesibility of the pesticide, quality, affordability and accesibility a healthcare in the community (Eddleston *et al.*, 2006).

In this study the agents of change chosen had the commitment to overcome the poison and distributed in nine hamlets at Sumber Mufakat village that collected into 20 people. All agents of change are educated and conduct GEMPAR actions which participate in ongoing analysis of each GEMPAR steps. The education provided also increased the active participation of the community and directly assessed the toxicity prevention program conducted through GEMPAR. The community involvement is very effective in supporting wider promotion of GEMPAR. Education is often proposed to promote the safer practice in pesticide use. There is no policy able to trigger a self sustaining behavioral change. But the the approaches could be implement based on constant social control and participation that would lead farmers to create new thinking and to be change as their decision (Feola, Gallati and Binder, 2012).

The results found that GEMPAR has eight steps to change the farmer's character when using pesticides. The steps are recognize the hazard of pesticide, using the appropriate PPE, paying attention to the wind direction, storing pesticides in safe place, safe disposal of pesticide package, personal hygiene, reporting immediately and use the natural pesticides. All steps are designed to be comprehensive and meet the level of health services. Therefore, GEMPAR as sustainable action could be expected as character building of farmers while using pesticides.

GEMPAR is carried out in such a way as to change the awareness of the farmers community that always use pesticides in appropriate and correct accompanied in slowly that will switch to using natural pesticides. The mechanism of community movements in GEMPAR is carried out by setting the indicators compiled through FGD with the community in three cycles of change. It means the interventions are made easier for farmers to implement social change so that healthy farmers are formed (See Table 1). At last, there are eight steps of GEMPAR could be carried out as follows:

1. Every farmer reads the packaging of pesticides used to recognize the dangers of pesticides and knows the early symptoms of poisoning before spraying,
2. Every farmer uses complete personal protection in the form of a ninja mask, anti-fog glasses, gloves, and protective waterproof clothing,
3. Every farmer pays attention to the direction of the wind during spraying pesticides that facilitated through the GEMPAR flag placed on the farmer's field,
4. Every farmer keeps pesticides in a closed container and placed in a safe place and out of reach of children,
5. After spraying, the farmer discards the remaining pesticide residue in a closed container,
6. After spraying, farmers clean themselves by bathing or washing their hands with the help of *acem acem* leaves,
7. If the farmer experiences complaints related to the pesticides used, he can report the complaint by fill in the SEDARA (Sehat Dari Racun) Card to be forwarded to the village office,
8. Every farmer can slowly switch to using natural pesticides and leave synthetic chemical pesticides to achieve healthy and natural agricultural products.

These eight GEMPAR have been carried out continuously and become accustomed to the community. It shows the formation of character

through GEMPAR has been well established and socialized. The manifestation of GEMPAR has been investigated includes the formation of GEMPAR Community which has characteristics as a community that cares about the farmer's health with mindset to prevent toxicity due to pesticides use. As the final destination, Sumber Mufakat farming community will move to an organic system where there is no any chemical using to increased farmer's agricultural productivity.

Based on the evaluation results, the form of acceptance from GEMPAR has expanded by itself not only in the research locations, but extends to other villages covering one district. This is supported by the community gathering habits where there are meetings from various regions and farmers share their experiences when they are met. Agents of change who gather in GEMPAR's community always share their experiences and promote the eight movements to reduce the risk of pesticides toxicity.

The implementation of GEMPAR is able to improve the behavior of pesticide use that is safe and in accordance with procedures, so that the incidence of poisoning due to pesticide use is reduced by around 70%. Farmers' understanding also increased to work safer and healthier about 93%. Farmers also use complete personal protection routinely at 100%, and farmers begin to think about avoiding use of chemical pesticides and switch to safer pesticides that are not even made of chemicals around 60%.

Social engineering through GEMPAR is able to stimulate farming communities to participate more and spread GEMPAR actions and become part of a community that has the aim of reducing the risk of pesticide poisoning. The challenge of GEMPAR will increase farmer awareness by itself because farmers will continually improve every process and change experienced while involved in GEMPAR action.

Issue of character building might be enhanced by promoting all aspects and identifying the meaning of character and virtue. Actually all of the individual factors were implied to (Gherardi and Nicolini, 2002; Bryan and Babelay, 2009). Study of personality related to situationist theory of human behavior in the organizational setting. Its variability looks that people's behavior is likely to be quite inconsistent with regard to the patterns of expected behavior (Alzola, 2008).

Table 1: Matrix of GEMPAR cycle in focus group discussion.

GEMPAR Cycle 1	GEMPAR Cycle 2	GEMPAR Cycle 3
Recognize the hazard of pesticide used	Recognize the hazard of pesticide used	Recognize the hazard of pesticide used
Use appropriate personal protection	Use complete personal protection	Use complete personal protection
The direction of the wind has no effect because it cannot be controlled	Note the direction of the wind when spraying is marked with a yellow GEMPAR flag in the field	Note the direction of the wind when spraying is marked with a green GEMPAR flag in the field
Keep pesticides in a safe place	Keep pesticides in a closed place	Keep pesticides in a safe place that is closed
Plant all remaining pesticides	Discard the remaining pesticides in their place	Discard the remaining pesticides in their place
Personal hygiene	Clean yourself after spraying with acem-acem leaves	Clean yourself after spraying with acem-acem leaves
Report toxicity complaints immediately	Report toxicity complaints immediately	Report toxicity complaints immediately
Use natural pesticides so that farmers are healthy	Use natural pesticides to make farmers healthy (organic systems)	Use natural pesticides to make farmers healthy (organic systems)

But the weakness of GEMPAR lies in the individual perception that characterizes the village community. Perception of rural character shows that density is less important in an individual's perception of rural character that are concepts of community, livelihood and signs of development and change. It needs to planner to factor in the perspectives of local players like stakeholders in the regency. In the other hand have to examine the stress use, psychological need satisfaction, goal setting and goal storming provide promising leads to explain how strength interventions work. Strengths interventions have been incorporated into broader programs aimed at enhancing well being and achievement.(Tilt, Kearney and Bradley, 2007; Quinlan, Swain and Vella-Brodrick, 2012). It shows that the obstacle of GEMPAR lies in the appropriate assistance process which needs to be considered as support of local government.

4 CONCLUSIONS

The formation of farmers' character in preventing pesticide toxicity due to inappropriate pesticides use could be realized in a community development program that is manifested in the action of GEMPAR (*Gerakan Masyarakat Petani Atasi Racun*). GEMPAR has the characteristics of preventing toxicity in pesticides use contained in 8 preventive steps are recognize the hazard of pesticide, using the appropriate PPE, paying attention to the wind direction, storing pesticides in safe place, safe disposal of pesticide package,

personal hygiene, reporting in immediately and use the natural pesticides. These movement as character building to reach the healthy farmer without pesticide to reduce the risk of pesticide toxicity.

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