The Behavior of People at Pekanbaru City Indonesia in the Use of Household Pesticides to Control Pest of Settlement

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Abstract. Most people in Pekanbaru City (92.86%) are involved in using pesticides to control household pests for over five years. Furthermore, the driving factors of this behavior include the availability of the market in the settlement vicinity and the lack of public knowledge, which leads to an improper utility that does not comply with the provision on the packaging label. This research is a descriptive study. The results showed the absence of compliance to stipulated provisions in the behavior of the Pekanbaru community regarding the use of household pesticides to control settlement pests. Hence, the reports show the daily use of pesticides, determined by pests’ appearance in certain places within the house, while the container management was properly carried out by storing it in a special place and out of children’s reach. Therefore, there is an enhanced desire to use non-pesticide pest control methods in community settlement.

Keywords: household pesticides, Household pest, people behavior, control pest

1. Introduction

The use of household pesticides has become a habit in the control of pest settlements in communities [1]. This technique has been adopted by most people in Pekanbaru City (92.86%) for over five years [2]. The accumulation of pesticides on the human body is known to cause several diseases, including congenital fetal disabilities, children defects, asthma, allergies, acceleration of the bone loss and hypertension, reproduction disease and carcinogenesis [3,4] and also Parkinson [5,6].

Yuliani et al. reported the improper use of many people in a study conducted in Jakarta, Indonesia, which was not following the provision on the packaging label [1]. Besides, the daily utility was recorded, as the product was considered practical, inexpensive, and useful for killing settlement pests [7,1]. Sutikno et al. acknowledged the lack of information about household pesticides in the community of Pekanbaru City, which was due to the limitation in a source, being mostly from television advertisements [8].

People’s necessary behavior using pesticide products in the UK was due to the ready availability in shops and supermarkets [9], as well as stalls around the settlement [2]. Moreover, the formulations present in the market are equipped for use, without the need for special knowledge in the aspect of application [8, 10, 11]. The selection and use of formulations/trademarks are often influenced by efficacy, respondents' experience in environmental exploration, knowledge about adverse effects on the individual, families, the environment, and information obtained from various sources. Therefore,
this study aims to examine the behavior of people in Pekanbaru City in using household pesticides as an urban pest control technique

2. Methodology
This research is a descriptive study aimed to explain and describe a phenomenon or object under investigation. Furthermore, information was collected based on real conditions concerning the independent variables of individual characteristics [12, 13].

The target population was household settlements in the Districts of Tenayan Raya, Sail, and Pekanbaru City, while sample determination required the use of purposive and multistage sampling. The research area used three categories, including clean, medium, and dirty, and the data obtained were nominal, ordinal and ratio, which were subsequently analyzed for the inter-data relationship, while chi-square was used to test the quantitative records.

3. Results and Discussion
This study describes the respondents' behavior towards the use of household pesticides, based on two aspects, including (1) How to use pesticides (read the rules, storage, place of use, frequency, and time), and (2) Non-chemical control.

A majority of the community in Pekanbaru City tend to use pesticides in daily life [2]. This is because of the fear of dengue disease (DHF), which is known to attack almost every year, with the status of an Extraordinary Case, as 516 were reported in 2015 alone, based on the data obtained from Pekanbaru City Health Office [14]. According to Kunda and Oleson, individual actions in various social situations are strongly influenced by personal thoughts, including the fear of contracting DHF disease [15].

In the aspect of household pesticide utility, it was established that 77.42% of the respondents read the rules that stated the information regarding the application (Figure 1). Meanwhile, 22.58% did not read because the instructions on the label were considered too small and the inability to understand the symbols.

![Figure 1. Percentage of respondents reading the rules of use before using pesticides](image)

A total of 56.04% of respondents improperly used the pesticide, and only 43.96% followed the instructions on the package (Figure 2). This was in line with the report by Gray et al. conducted on a community in Bristol, stipulating the inability of one-third of the population to follow the packaging label instruction [9]. This was because the labels were considered to be non-informative and challenging to understand. The majority of Tamil Nadu residents tend to use and handle household pesticides unsafely, and generally not following the recommended rules, similar to the communities of North Jakarta, Depok, and Bogor [16].
Figure 2. Respondents using pesticides according to instructions (b)

This proportion is suspected to be influenced by the ready to use nature of pesticide formulations, as a total of 35.07% of respondents rated the application as comfortable and practical, while 29.10% considered able to provide fast results [2]. Hence, household pesticide selection behaviors are centered on the considerations of factors related to the ease and speed of effect.

This situation is due to limitations in the respondents’ source of information to television advertisements only, which tends to demonstrate their independent superiority [8]. Hence, there is a higher tendency for deprivation of public knowledge regarding the use and ecological effects [17, 8]. Based on the regulation of the Directorate of Fertilizers and Pesticides at the Ministry of Agriculture, Republic of Indonesia, pesticide packaging labels are expected to include information on trade names, pesticide types, names and levels of active ingredients, contents or net weight, safety warnings, classification and hazard symbols. Besides, safety instructions, poisoning symptoms, first aid, medical care, storage instructions, and instructions for use are also essential. The producer needs to include the registration number, name, address and telephone number of the stakeholder, registration number, production number, month and year of production (batch number), expiry, and instructions for destruction [18].

The observations of several household pesticide products in the market used by respondents showed the absence of some mandatory information on the packaging label, including the classification and symbol for hazard. Also, the presence of small-sized text on the packaging label poses a significant challenge due to the occurrence of reading difficulty. About 41.41% of respondents tend to store the packaging containers in a special cupboard, and 27.28% placed them out of children’s reach. Furthermore, 12.12%, 4.04%, 6.06%, and 9.09% store them in the house, kitchen, outdoor space, and warehouse, respectively, while no respondents reported storage in the car garage (Figure 3).
Figure 3. Storage Place of pesticides by respondents

Figure 3 showed that most people practice proper storage in the special cupboard, out of reach of children and warehouses. However, containers are expected to be stored in a garage [19], using a special locked cupboard out of reach of children [20], far from cooking utensils or food ingredients, and not transferred to other containers especially those for food/beverage (i.e., in the original packaging) [21]. However, a study by Pentamwa et al. and Nafis stipulated people's habit of saving pesticides inside the house [7, 16].

A total of 97.70% of respondents throw used packages in the trash, while 2.30% use the container for a refill, and no one discarded into sewers around the house (Figure 4). Besides, it was considered as garbage, which cannot be reused, as pesticides are labeled toxic materials.

Figure 4. Behavior in the management of the used pesticide packaging by respondents

The most extensive area provided for the pesticides by respondents was within the house (79.46%), including the living room, family room, and bedroom, being the main area for daily activities (Figure 5). This is used mainly to control ants by a total of 6.25% and 8.04% in the kitchen and areas outside the house, respectively, while 6.25% apply the formulation on the body in combination with lotions.
The frequency of pesticide utility by residents in Figure 6 showed the practice of irregular utility by 62.50% of respondents, depending on the pests’ situation. Also, about 37.50% tend to use it in a daily routine.

Based on the time of use, 45.84% apply pesticides only when there are pests, while 38.54% only at night, 13.54% all day long and daytime, and 2.08% only in the daytime (Figure 7). This practice in the day is probably because respondents do not want to be disturbed by pests while at home, while nighttime avoids mosquito attacks, therefore ensuring a comfortable rest. According to Nafis, residents tend to use pesticides at nighttime because of the need for comfort and calm [16]. These results are in line with previous studies, which stipulated the general nocturnal use of pesticides [7, 9, 16, 21, 22, 23]. These results indicate that absence of considerations regarding the danger to the individual and families, as household pest disruption is prioritized. This is affiliated with a desire to control the speed, simplicity, price, and effectiveness.
A total of 67.74% of respondents use pesticides all year round, while 18.24% and 13.98% were limited to only the dry and rainy season, respectively (Figure 8). This data shows the low dependence of use on the seasons, but rather on pest appearance.

The use of other methods (non-pesticides) in controlling household pests by the community involves a lot. The survey results (Figure 9) showed the presence of installed gauze on the ventilation and doors or windows of the house by a total of 37.96% population. Also, 34.26% used electric rackets to control mosquitoes and flies, 13.89% used nets on beds, 8.34% employ traps in the control of mice, 3.70% used plant materials with the propensity to dispel flies, mosquitoes, ants, and cockroaches, while only 1.85% adopt glues in the control of flies.
Chi-square test results between the desire to use non-pesticide pest control with the non-chemical methods show the presence of a very close relationship at 0.00 level, with a coefficient of 223.45. This data shows the influence of a strong desire to use non-pesticides on the technique choice. These products are not widely available in the market, and there is also poor public awareness, despite the high extent of utility reported by previous studies. South African communities were reported to have used traps in the control of mice [24]. This was also the case in South India, including the adoption of mosquito nets [25]. Prasetyowati et al. reported on the need to control *Aedes aegypti* mosquitoes obtained by eradicating mosquito nests in a biological, mechanical, and integrated manner [26].

4. Conclusion

The behavior of people at Pekanbaru City towards the use of household pesticides in the control of settlement pests is not following the rules provides. Also, they are used every day, of which the application is determined by the appearance of pests in a certain place. The management of household pesticide containers was appropriately conducted in a particular place and out of children, reach although the community much desire the adoption of non-pesticide pest control methods.

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