

A Survey on the Insecticide Exposure and the Related Health Hazards in Kinakary, Kuttanad, India

Jacob Chandy

Department of Zoology, Bishop Moore College, Mavelikara

Abstract: *The present study has decided to conduct a survey in the Kinakary Grama Panchayat covering various aspects of insecticide pollution especially the prevalence of insecticide related issues and health problems in the area. The households were listed to find out the cultivators and the agricultural labourers of the ward. An awareness seminar was conducted for the students, teachers and farmers of the region regarding pesticide hazards and environment pollution. A questionnaire covering the possible issues regarding insecticide application, precautions, awareness, related health problems especially cancer and other allergic conditions and the attitude of people towards the use of pesticides was prepared in Malayalam. A total of 200 people participated in the study in which 115 were males and 84 were females, 85% resort to chemical methods for controlling harmful insects, only 3.5% tried organic options and 12.5% tried both organic and chemical methods. Out of the 200 people converse with 84% were resorting fully to the chemical methods of pest control. 65% experienced discomforts of various kinds during the spray. 35% (lower CI 28.38 and upper CI 41.61) were able to survive without any discomfort during the procedure. But 83.5% (lower CI 78.35 and upper CI 88.58) people suffered after the spray and only 16.5% (lower CI 11.35 and upper CI 21.64) escaped without facing any discomfort. Thus it can be assumed that out of the 35% escaped without any symptom during the spray, 18.5% faced health problems after the spray. This shows that 83.5% of the total people surveyed suffered a discomfort or a combination of them after the spray. 3.5% cancer cases were reported, this is a significantly alarming percentage.*

Keywords: Insecticide, Kinakary Grama panchayat, pesticide hazards, environment pollution

1. Introduction

Pesticide exposure can be divided into three major categories: occupational exposure, accidental exposure and pesticide residues in food and water. Labours and agriculturist with occupational exposure to pesticides have greater exposure than the rest of the population. The magnitude, severity of exposure and the inherent toxicity of chemicals applied together determine the hazards occurring from an exposure. Skin, lungs, mouth and eyes are the four routes of pesticide exposure. Symptoms can range from mild skin irritation to comma or even death. Individuals may vary in their sensitivity to different levels of these chemicals (Lorenz, 2009). Birth defects, nerve disorders, toxicity to foetus, benign or malignant tumours, genetic changes, blood disorders, endocrine disruption and reproductive defects are some of the chronic effects of pesticide exposure (Maroni *et al.*, 2000). Pesticide applicators are primarily at risk since they directly come in contact of pesticides and absorb them through intact skin and clothing (Hazarika, 2011). Three million workers in the developing world experience serious poisoning from pesticides every year and about 18,000 die (Miller, 2004). Developing countries experience majority of pesticide poisoning and death, although these countries use only 25% of global pesticide production. Kinakary is a village located about 15 km away from Alappuzha town. The Grama panchayat comprises of 9 wards with 5034 houses. Most of the people living in this region depend mainly on agriculture to make living. A survey conducted by the Department of Community Medicine, Medical College, Alappuzha, and the regional Prevention of Epidemic and Infectious diseases (PEID) and State Disease Control and Monitoring Cell (SDCMC) has reported an increased prevalence of cancer in the Kinakary Grama Panchayat of Kuttanad taluk than any other panchayat in the state of

Kerala. The same was reported in the daily The Hindu on 14/01/2010 also. Not much study has been conducted in this line after the submission of the above report to the Kerala Government. A preliminary investigation has proved that various types of allergic conditions are common among the people living in this region. The present study has decided to conduct a survey in the Kinakary Grama Panchayat covering various aspects of insecticide pollution especially the prevalence of insecticide related issues and health problems in the area.

2. Methodology

The detailed census document of Kinakary Grama Panchayat was collected from the state census department and planned a survey procedure accordingly. There are 5032 houses in the panchayat according to the census document of the State. Ward 9 of the Kinakary Grama panchayat was selected for the study. The households were listed to find out the cultivators and the agricultural labourers of the ward. There were six hundred houses involved in agriculture and among them 306 families were cultivators and 295 families were agricultural labourers. From this lot 200 houses were selected by random sampling. An awareness seminar was conducted for the students, teachers and farmers of the region regarding pesticide hazards and environment pollution. A questionnaire covering the possible issues regarding insecticide application, precautions, awareness, related health problems especially cancer and other allergic conditions and the attitude of people towards the use of pesticides was prepared in Malayalam. The volunteers visited houses and collected details as per the requirements of the questionnaire. Information was collected from the elders available during the visit. The information from the questionnaire were sorted scientifically and proper statistical

tool (95% confidence interval) employed to analyse the results and arrived at conclusions.

3. Results

The preliminary details of the survey conducted was depicted in Tables 1.1. The percentage and 95% confidence interval with lower and upper limits were illustrated in the Table 1.2.

A total of 200 people participated in the study in which 115 were males and 84 were females Table 1.1. People were asked regarding the procedure they resort to at the onset of a pest attack. 85% resort to chemical methods for controlling harm full insects, only 3.5% tried organic options and 12.5% tried both organic and chemical methods Table 1.2. Among the people participated in the survey 65% experienced discomforts of various types during application and 35% were immuned of such discomforts Table 1.2. But 83.5 % suffered various ailments after the spray Table 1.2. It affected them both physically and mentally (Table 1.2.). Abnormal body growths were found in 17.5% (Table 1.2.) and cancer was diagnosed in 3.5% people participated in the study.

4. Discussion

Gathering information directly from the people, involved and living in the real environment is a valuable tool in recognizing the factual issues and finding out the depth of impacts of such issues relating to human life.

Out of the 200 people converse with 84% were resorting fully to the chemical methods of pest control. The 95% confidence interval presented a lower CI of 78.9 and an upper CI of 89.08. This reveals steadfast reliance of people on chemical pesticides. People were asked regarding their discomfort during the spray and after the spray. 65% (lower CI 58.38 and upper CI 71.61) experienced discomforts of various kinds during the spray. Only 35% (lower CI 28.38 and upper CI 41.61) were able to survive without any discomfort during the procedure. But 83.5% (lower CI 78.35 and upper CI 88.58) people suffered after the spray and only 16.5% (lower CI 11.35 and upper CI 21.64) escaped without facing any discomfort. Thus it can be assumed that out of the 35% escaped without any symptom during the spray, 18.5% faced health problems after the spray. This shows that 83.5% of the total people surveyed suffered a discomfort or a combination of them after the spray. Out of the 83.5% in this category 49% suffered general weakness. The table 8.1.2.6 shows the scale of severity of each problem. Among them breathlessness, weakness to hands and legs and itchy and

watery eyes were commonly observed in more than 30% of the people participated in the study. Skin rashes and other allergic skin problems were observed in 25.74% individuals. Similar skin conditions were observed by Ejigu and Mekonnen (2005). According to them insecticides can be highly irritating to the skin and can induce irritant contact dermatitis. The mental status of some people was disrupted after spraying pesticides. Behavioural changes like depression, fear and sudden arousal of anger were presented by some of the participants. Hazarika (2011) also agrees with the above observation. According to Hazarika and Hazarika (2013) smoking during insecticide application was strongly associated with throat cancer, lung cancer, liver cancer and oral cancer. Cancer is spreading like any other common ailment in Kerala, especially in Kuttanad. A study conducted by the Department of Community Medicine, Medical College Alappuzha in 2009 has revealed high incidence of cancer at Kinakary of Kuttanad taluk. The survey has found an overall prevalence, including both probable and confirmed remained at 6.3 per 1000 persons as reported by the daily the Hindu on 14th January 2010. The present survey conducted in ward no: 9 of Kinakary Grama panchayat showed that 17.5% of the participants had unnecessary growths, swellings and spreading birth marks which need further investigations to rule out any kind of malignancy. But the fact remains, that among the 200 people interviewed, 3.5% cancer cases were reported. This is a significantly alarming percentage than any other regions in Kerala.

Numerous studies suggested strong relationship between pesticide use and cancer (Fleming *et al.*, 1999; Riley and Newman, 2003 and Hazarika and Hazarika, 2013). Smoking and eating during pesticide application were identified as modifying factors increasing the risk of cancers (Hazarika and Hazarika, 2013). Their studies strongly suggests a significant link between pesticide exposure and cancer. Organophosphates and organochlorine pesticides are identified as carcinogenic pesticides by Waddela *et al.*, (2001), US- EPA (2002) and US Publications on Service (2002). Both these pesticide groups are currently employed in Kinakary rice fields. (Riley and Newman, 2003) pointed out that majority of pesticides are carcinogenic in nature and it may result in kidney damage, asthma, bronchitis and even heart trouble.

Table 1.1 Discomfort during spraying

Do you experience any kind of discomfort during pesticide use	Percentage	95% Confidence Interval	
		Lower CI	Upper CI
Yes	65	58.38953859	71.61046141
No	35	28.38953859	41.61046141

Table 1.2: Discomfort after spraying

Do you experience any of the following symptoms after spraying	Percentage	95% Confidence Interval	
		Lower CI	Upper CI
Yes	83.5	78.35570005	88.64429995
No	16.5	11.35570005	21.64429995
Symptoms			
Total discomfort	49	41.41804917	56.58195083
Weakening of hands and legs	32	24.92498636	39.07501364
Itching or watery eyes	30.53	23.54510491	37.51489509
Dimming of vision	22.15	15.85183536	28.44816464
Reduced appetite	16.16	10.57730182	21.74269818
Fear	7.78	3.717436211	11.84256379
Depression	7.18	3.264557596	11.0954424
Sudden arousal of anger	16.76	11.09498742	22.42501258
Permanent elevated heart rate	18.56	12.6633452	24.4566548
Breathlessness	40.71	33.25857882	48.16142118
Redness of skin or skin problems	25.74	19.10899158	32.37100842

Table 1.3: Body abnormalities if any?

Do you have any of the following symptoms in your body	Percentage	95% Confidence Interval	
		Lower CI	Upper CI
Yes	17.5	12.23392461	22.76607539
No	82.5	77.23392461	87.76607539
Symptoms			
Growth of any kind	42.8	26.40762245	59.19237755
Swelling	37.14	21.1322539	53.1477461
Spreading of birth mark	20	6.747981286	33.25201871

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Author Profile

Jacob Chandy is in Department of Zoology, Bishop Moore College, Mavelikara