

SURVEILLANCE OF FOOD POISONING OUTBREAKS IN THAILAND 1981-1986

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INTRODUCTION

The surveillance of food poisoning outbreaks has traditionally aimed at disease control through (1) identification and removal of contaminated products from the commercial market, (2) identification and correction of improper food handling practices both in commercial establishments and in the home, and (3) the identification and treatment of food poisoning cases and carriers (Werner, 1980). Surveillance also contributes to our knowledge of disease causation, the types of etiologic agents, and the foods involved.

In Thailand, food poisoning cases are being reported under the National Surveillance Network since 1970. Reports are submitted to the Division of Epidemiology through surveillance network by all health centers and hospitals in each province. They report on a standardized reporting form which include data on age, sex, place of residence, date of onset and place of treatment of patients as well as the laboratory findings.

Laboratory services for food poisoning cases and outbreak investigations are performed in provincial hospital laboratories or at regional laboratories as well as the central laboratory of the Department of Medical

Sciences. The latter two laboratories are capable of identifying poisonous and toxic substances.

Insecticides and pesticides are unique among the many chemicals that man relates daily both in the households or agriculture for the purpose of killing and preventing insects. Most insecticides are not highly specific but are generally toxic to many species, including man (Murphy, 1975). Occasionally, because of improper application or spillage of insecticides during storage or transport, food products become contaminated with insecticides to the extent that outbreak of food poisoning may occur if the products are eaten (Diggory *et al.*, 1977; Davidson *et al.*, 1977; and Goes *et al.*, 1980).

Thailand is an agriculture country where insecticides/herbicides are widely used in controlling insects and weeds. The surveillance of contaminated food poisoning outbreaks due to insecticides is essential. This paper reports the food poisoning outbreaks caused by ingestion of insecticide contaminated food during 1981-1986.

MATERIALS AND METHODS

In the present study, cases and deaths reported under food poisoning include mush-

room and cassava poisoning as well as poisoning by other noxious foodstuffs. Food poisoning also incorporates reports of outbreaks of disease where food and water were identified as the sources of outbreaks. Food poisoning is defined as illness acquired through the consumption of contaminated food or water; the term covers contamination by microorganisms and their toxins, and by chemicals and substances present in, for example, poisonous mushrooms and fish. As the reports depend on the previous history of food consumption, it is possible that a proportion of cases who did not give history of food consumed before illness might be reported as other manifestations such as diarrhea.

Nevertheless, the clinical symptoms of insecticide contaminated food poisoning cases are usually sudden and severe, then the food poisoning outbreaks caused by insecticides are likely to be reported and investigated (Division of Epidemiology, 1984 a, b).

Reports of food poisoning outbreaks that occurred between January 1, 1981 and December 31, 1986 were reviewed and all outbreaks with confirmation of insecticide etiology were summarized. An outbreak was investigated and confirmed when the insecticide was identified in the food, water and/or in clinical specimens obtained from sick individuals.

RESULTS

During 1981-1986, the total reported cases of food poisoning to the Division of Epidemiology were 207, 580, of which 678 (0.33%) were caused by insecticides (Table 1). The overall deaths from food poisoning were 188, and 9 (4.8%) were from insecticides. During the same period of time, 18 confirmed food poisoning outbreaks caused

by insecticides were reported, in which 16 (89%) outbreaks involving 615 cases resulted from carbamate (Methomyl and Propoxur) intoxications (Table 2). The remaining two outbreaks, one was caused by organophosphate (Coumaphos) and the other due to organochlorine (DDT.) contamination.

Eventhough all cases were received medical treatment, some died. The insecticide causing the highest case fatality rate of 30.8% was Coumaphos while the case fatality rate due to Methomyl was 1.3%. No death was reported among Propoxur and DDT cases.

Insecticide contaminated desserts and beverages were found to be the main vehicles of the food poisoning outbreaks (Table 3). The other vehicles were drinking water, foodstuffs and fruits. On investigation the place where the incriminated food was eaten, it was found that out of total 18 outbreaks, 7 (39%) were in the private home, 6 (33%) in the delicatessen and 5 (28%) in the school (Table 4). However, the insecticide contamination in the private home was caused only by Methomyl.

DISCUSSION

It is apparent that insecticide contaminated food poisoning outbreaks contributed to a small percentage in morbidity (0.3%) and mortality (4.8%) in the overall food poisoning reports with a case fatality of 1.3%. During this 6 year period (1981-1986), reported cases of food poisoning from overall causes as well as from insecticide etiology have been steadily increasing. The main reason for this increase might be due to a better surveillance. The increasing usage of insecticide particularly Methomyl would be another factor for the increase of insecticide contaminated food poisoning cases. For

FOOD POISONING OUTBREAKS IN THAILAND

Table 1
Reported cases and deaths of food poisoning outbreaks by overall causes and insecticide etiology in Thailand, 1981-1986.

Year	Cases		Deaths	
	Overall	Insecticide (%)	Overall	Insecticide (%)
1981	22,008	223 (1.01)	19	2 (10.5)
1982	28,120	10 (0.04)	38	0
1983	35,358	8 (0.02)	20	1 (5.0)
1984	37,104	64 (0.17)	33	2 (6.1)
1985	40,053	122 (0.30)	44	0
1986	44,937	251 (0.56)	34	4 (11.8)
Total	207,580	678 (0.33)	188	9 (4.8)

Table 2
Etiological agents of reported insecticide contaminated food poisoning outbreaks, Thailand, 1981-1986.

Insecticides	No. outbreaks (%)	No. cases (%)	No. deaths (%)	Case fatality (%)
Carbamate group				
Methomyl	15 (83.3)	392 (57.8)	5 (55.6)	1.3
Propoxur	1 (5.6)	223 (32.9)	0	0
Organophosphate group				
Coumaphos	1 (5.6)	13 (1.9)	4 (44.4)	30.8
Organochlorinated group				
DDT	1 (5.6)	50 (7.4)	0	0
Total	18	678	9	1.3

example the usage of Methomyl had increased from 223 tons in 1985 to 426 tons in 1986.

It seems that Methomyl was the major etiological agent of insecticide contaminated food poisoning outbreaks in Thailand. This is because Methomyl is a white, fine powder with less odour, looks like sugar and flour

and a small amount of contamination would be very difficult to detect. From the investigations, the sources of contamination could be identified in 4 out of the 15 food poisoning outbreaks caused by Methomyl. It was detected in a sugar bag in 3 outbreaks, and in a flour bag for one outbreak.

Unlike the carbamate group, the organo-

phosphate such as Coumaphos, and organochlorine such as DDT are usually coloured and have an odour. Thus, contamination with Coumaphos or DDT in food is easier to detect than Methomyl and may be the reason for less food poisoning outbreaks.

Since the contamination with Methomyl is very difficult to detect due to its appearance, a formal meeting on the prevention of food poisoning outbreak caused by Methomyl was held at Ministry of Public Health in 1981.

Representatives from various governmental departments as well as private sectors attended this meeting. The meeting suggested that Methomyl sold in the markets should have colour and odorous smell, so that it can be easily detected when there is contamination of Methomyl in the foodstuffs such as sugar or flour.

The Committee of Toxic Substances Control, Ministry of Public Health responded to this recommendation and resolved that

Table 3
Vehicles of 18 food poisoning outbreaks caused by insecticides.

Vehicles	Total outbreaks	Insecticides			
		Methomyl	Propoxur	Coumaphos	DDT
Desserts	5	3		1	1
Beverages	4	4			
Drinking water	3	3			
Foodstuffs	3	2	1		
Fruits	1	1			
Plastic bag	1*	1			
Unknown	1	1			
Total	18	15	1	1	1

* The boys found a plastic bag in the school and tasted the contents which looked like sugar granules.

Table 4
Places where insecticide contaminated food were eaten.

Insecticides	No. outbreaks	Private home	Delicatessen	School
Methomyl	15	7*	5	3
Propoxur	1	0	0	1
Coumaphos	1	0	1	0
DDT	1	0	0	1
Total	18	7	6	5

* include one outbreak in which food vehicle could not be identified.

Methomyl should have a coloured appearance. Since April 1, 1987 Methomyl in the market has blue colour appearance.

Eventhough it is anticipated that this measure will prevent or decrease the food poisoning outbreaks due to Methomyl, health education to the public, on awareness of insecticide hazards, proper handling and storage of insecticides, prevention of food contamination from insecticides is very important and has to be carried out vigorously.

While the present data reflect trends in the occurrence of foodborne outbreaks of insecticide etiology, they certainly do not reflect the total magnitude of the problem. Each year, numerous outbreaks with characteristic clinical features and incubation periods are reported in which no etiology could be identified and some outbreaks undoubtedly go unrecognized and unreported. Therefore, appropriate methods as well as better surveillance and more effort in disease investigations are needed.

SUMMARY

In the period of 1981-1986, eighteen outbreaks of food poisoning following ingestion of insecticide contaminated food were reported to the Division of Epidemiology, Ministry of Public Health. There were 678 individuals experiencing illness, of which 9 cases died. Out of 18 outbreaks, 16 involving 615 cases resulted from carbamate (Methomyl and Propoxur) intoxications. The remaining two outbreaks were caused by organophosphate (Coumaphos) and organochlorine (DDT). The case fatality rate was much higher with Coumaphos than Methomyl; and no death was reported among Propoxur and DDT victims. Desserts and beverages were found to be the main vehicles, and private home was the most common place for the outbreaks of food poison-

ing caused by ingestion of insecticide contaminated food.

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