Policy Forum

Acute Pesticide Poisoning in Jiangsu Province, China, from 2006 to 2015*

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This study aimed to investigate the characteristics of pesticide poisoning in Jiangsu Province, China, and to provide a scientific basis for developing effective interventional measures and preventive strategies. From 2006 to 2015, a total of 35,308 cases of pesticide poisoning were reported in Jiangsu Province. Non-occupational poisoning accounted for 73.79% of all poisoning cases. A comparison of the data collected before (2006) and after (2015) this study showed a decrease in non-occupational pesticide poisoning. Pesticide poisoning showed an age central tendency of 30 to 44 years, area central tendency for northern Jiangsu, and seasonal central tendency of occupational pesticide poisoning in autumn. Pesticide poisoning remains a major health concern in China. Government agencies together with scientists should focus their efforts on the prevention of potential threats to vulnerable groups such as the elderly, women, and children.

Pesticide poisoning is increasingly becoming a public health concern worldwide, and greatly affects the safety and health of people[1-3]. It has also become a hotly debated topic among different global organizations, including the World Health Organization (WHO) and the International Program on Chemical Safety (IPCS)[4]. Acute organic pesticide poisoning has been recognized as a critical problem in many agricultural communities, especially in developing countries, such as China, India, and Morocco[5-9].

Chinese rural economic reformation happened in the late 1970s. The control methods used for managing crop pests have changed from centralized control to self-storage of pesticides[10]. The unavailability of advanced pesticide management technologies and consumer-safety training resulted in numerous pesticide poisoning cases in as early as the 1980s[10]. To improve and strengthen the management and supervision of pesticides in rural areas, the Chinese Ministry of Health issued 'Pesticide Poisoning and Health Management Approach (Trial)' in 1988. Additionally, the Chinese Ministry of Health required that all the pesticide poisoning cases be officially reported. In 1990, the Ministry of Health revised the occupational amendments, resulting in the inclusion of reports of occupational categories in rural areas. However, in 2006, the Chinese Disease Control and Prevention (CDC) reporting system started using a unified method known as 'the Occupational Disease Surveillance and Reporting Systems (ODSRS)' for directly reporting pesticide poisoning cases[12]. Furthermore, the CDC also established four levels of direct network reporting systems for occupational diseases, which included township systems, city systems, provincial systems, and country systems[13]. The aim of the established disease surveillance systems was to monitor pesticide poisoning reports and manage the Chinese disease control system in a standardized manner.

Until 2016, Jiangsu Province had a recorded usage of an average of 80,000 tons of pesticides annually, and was regarded as being among the top five provinces with high pesticide poisoning incidence rates[14]. Therefore, we aimed to explore the characteristics of pesticide poisoning in Jiangsu Province, China, and offer a scientific basis for developing effective interventional measures as well as prevention strategies.

Data Source The reporting system database contains data from health institutions, such as

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hospitals, clinics, and healthcare centers, in both urban and rural areas. The pesticide poisoning data were acquired by means of a routine surveillance system by the Jiangsu CDC. The database is an important resource of health policies, and is hence necessary for promoting health and medical research. The use of the database was approved by the Jiangsu CDC. The diagnosis in all the cases (35,308) was made by specialists in different levels of hospitals, per the correlated national diagnostic criteria[5].

Case Definition The pesticide poisoning report cards contain information, including patient age, sex, and region, as well as diagnostic test results. The aims of the present study were to examine pesticide poisoning data of agriculture and forestry workers who were previously identified as having occupational poisoning (both during employment and domestic use) and those with non-occupational poisoning (including accidental and suicidal) with pesticides. 'Employment' means that hired farmers used pesticides, which lead to poisoning. 'Domestic' means that farmers used pesticides for personal purposes.

Data Analysis Data obtained from the pesticide poisoning report cards in Jiangsu Province between 2006 and 2015 were organized and analyzed using EXCEL. SAS 9.4 was used to analyze epidemiological data. Further, qualitative data were evaluated using Pearson's χ^2 contingency tables. A correlation analysis was performed to determine the association between continuous and qualitative data; P values < 0.05 represented statistical significance.

Ethics The present study considered the use of secondary data analysis. The patients' private, pesticide-associated information was encrypted by the Jiangsu Provincial Center for Disease Control and Prevention (CDC). With regard to ethical requirements, the study conformed to the Declaration of Helsinki and was nominated to be exempted from the institutional ethics review by the Research Ethics Board of Jiangsu Provincial CDC.

Non-occupational Pesticide Poisoning Accounts for most of the Poisoning Cases and Deaths Between the years 2006 and 2015, a total of 35,308 cases of pesticide poisoning were identified in Jiangsu Province. Of these cases, individuals died in 1,909 cases; the fatality rate was 5.4%. The number of occupational pesticide poisoning cases was 9,255, whereas the number of deaths due to occupational poisoning was 43, with a fatality rate of 0.46%. During the same period, the number of non-occupational pesticide poisoning cases was recorded to be 26,053, and death was reported in 1,866 of these cases. Consequently, the non-occupational pesticide poisoning fatality rate was significantly higher (P < 0.05) than the occupational pesticide poisoning fatality rate.

Figure 1 shows poisoning cases and deaths one year. The figure show a general trend of a decrease in the number of poisoning cases and deaths, specifically suicide cases.

In the occupational pesticide poisoning group, a total of 527 cases related to employment and seven deaths were reported. The fatality rate was 1.33%. The estimated number of pesticide poisonings due to domestic use was 8,728. Among them, 36 deaths were reported. The number of suicide cases associated with drinking pesticides was 22,043, accounting for 62.43% of all the reported cases. Of all the reported suicide cases, death occurred in 1,783. Approximately 4,010 accidental pesticide poisoning cases were reported, and death occurred in 83 of these cases; the fatality rate was 2.07%. The suicide mortality rate (2.27 per million people) was significantly higher than the accidental mortality rate (0.11 per million populations) (P < 0.05).

Age Groups with Acute Pesticide Poisoning Cases A large proportion of acute pesticide poisoning cases (29.02%) was identifiable in the age range of 30-44 years. Occupational pesticide poisoning was reported

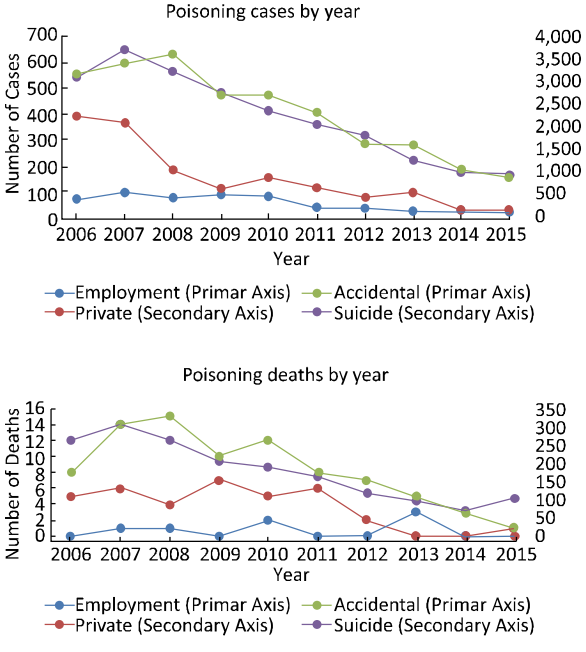

Figure 1. Distribution of cases and deaths due to pesticide poisoning by year.