

Epidemiology Bulletin

- 99 Investigation of Skin Disorders in Homei Township, Changhua County
107 Cases of Notifiable and Reportable Diseases, Taiwan-Fukien Area
-

Investigation of Skin Disorders in Homei Township, Changhua County

1. Introduction

An increase in skin disorders among residents of Homei area in Changhua County was reported on September 6, 1993. To understand the etiology of the skin disorders, an investigation was conducted.

A case in the investigation was defined as an individual with skin rash or itching since July 1, 1992. Most of them were dermatitis patients resulting from contact with external allergens, including dermatitis resulting from contact with external irritants (for instance, dermatoses resulting from contact with chemical substances such as suspending particles of chromium, nickel, formaldehyde, resin, lead and arsenic).

There are several thousands of chemical substances such as chromium, nickel, formaldehyde, resin, lead, arsenic, pollen etc. could induce dermatoses⁽¹⁾. The incinerator in Homei Township is of the mixed type requiring no prior classification of refuse and is similar to the regular garbage disposals. Ordinary garbage disposals discharge ozone and methane⁽²⁻³⁾, both are not major allergens of dermatosis⁽⁴⁻⁷⁾.

2. Background Information

Dermatoses in the present investigation occurred in Lisheng Li of Homei Township. Lisheng Li has 21 lins (neighborhoods) with a population of 2,962. Most patients were residents of the 11th, 12th, 14th and 19th lins covering a population of 500. Local people are primarily in agriculture and processing (see Figure 1 for map).

A newly built incinerator (in operation since July 1, 1993) is located in the north-eastern part of Lisheng Li. The incinerator is of the mixed type requiring no prior classification of refuse, and is similar to any regular garbage disposals. The incinerator is equipped with facilities for waste water disposal, sewage disposal, smoke control chimney and electrostatic dust collector. The maximum capacity of disposal per day

is 30 tons. The air quality in terms of suspending particles is 176 mg/m³ by national standards.

According to the statements of the residents that the symptoms are more severe when it becomes windy, particularly when one stays outdoors. By the way most patients are residents of southern area when it blows a north wind, and vice versa. Symptoms are improved after showering and after October.

3. Materials and Methods

All the residents living in Lisheng Li were our study group for the investigation of dermatoses. Tiehshan Li, a neighboring Li of similar social-economic conditions, geographic position and at similar distance to the incinerator as Lisheng Li, was selected as the reference group for comparative study. Of the 2,914 residents of Tiehshan Li, 650 persons from the 15th, 16th, 17th, 19th and 20th lins were selected for questionnaire interview. All residents in both groups, regardless of their household registrations, were interviewed. The questionnaire included items on the background information, educational status, occupation, working place, use of pesticide, symptoms, drinking water and environmental sanitation in the neighborhood.

Interview of 417 out of the 500 residents in Lisheng Li, giving a response rate of 83.4%, was conducted by the personnel of Changhua County Health Bureau.

Interview of 535 out of the 650 residents of Tiehshan Li, giving a response rate of 82.3%, was conducted by the personnel of Homei Health Station.

Any resident of both groups reported to have either skin rash or itching in the periods between July 1, 1993 and the day of interview (the first interview on October 2, 1993; the second interview on November 5, 1993) was defined as a case.

The personnel of Vector and Insect Division, National Institute of Preventive Medicine, DOH conducted vector density surveys on September 14 and October 4, 1993 respectively. The author conducted interviews of 19 households around Tungping Road of Lisheng Li on November 5 (see Figure 2 for map).

4. Findings

The first interview (October 2-10, 1993) interviewed 952 persons (417 in Lisheng Li and 535 in Tiehshan Li). Of them, 109 in Lisheng and 10 in Tiehshan met the criteria of a case, giving prevalence rates of 26.14% and 1.87% for the two Lis respectively (Table 1).

In the study group (Lisheng Li), the highest prevalence rate was 46.87% which is of the 46-60 age group (Table 2). The male/female ratio was 55:54 ($p=0.616$). There was no significant statistical difference (Table 3). Dates of onset concentrated in July,

August and September, with most in August (Figure 3).

By spot map method, the intersection of Lane 232 of Tungping Road and Lane 81, Section 3 of Changhsin Road as the center point, 73 out of the total 109 patients, or 67%, clustered within a radius of 200 meters (Figure 2).

Family aggregation was defined as a household with two or more cases. Of the 79 households interviewed in Lisheng Li, 38 (30.4% of 79 households) had cases, and 24 (63.2% of 38 households) showed family aggregation (Table 4). In the 200-meter radius circle around Tungping Road and Changhsin Road, there were 19 households with cases. Of them, 17 (89.47%) households showed family aggregation (70.83% of 24 households) (Table 5). The difference between infection rate within circle ($73/144=50.7\%$) and infection rate outside the circle ($36/273=13.2\%$) was statistically significant ($p<0.001$) (Table 6).

The 73 patients in the 19 households within the 200-meter radius circle were re-interviewed on November 5, 1993. No one met the criteria of a case.

The reports of vector density survey from the Vector and Insect Division, National Institute of Preventive Medicine, DOH, was that the trap lights caught many *Culicoides arakawai*, insects of *Forcipomyia* sp., and a few *Psychoda alternata*, *Drosophila* sp., *Chironomus* sp. and *Culex tritaeniorhynchus*; the flypapers caught only spiders, ants and cockroaches but no other vector insects. Since only a pair of rats was caught, there was no way to know the species of fleas and acarinas in the neighborhood.

The incinerator is not overloaded, operates six hours and disposes six tons of garbage each day. In the 28 days of operation, the air quality in terms of suspending particles was 30-40 mg/m³, much lower than the national standards.

5. Discussion

Infection rates of Lisheng Li and Tiehshan Li, both Lis though are at similar distance to the incinerator, were significantly different (26.14:1.87). Patients also clustered in certain areas and in households. Those all indicate that the dermatoses of this investigation were not directly related to the incinerator in Homei Township.

On September 9, the Taiwan Provincial Health Department, the Changhua Health Bureau, Professor Wang of the National Taiwan University and some dermatologists examined and treated the suspected patients and interviewed them as well. The findings were: (1) Of the 78 questionnaires collected, diagnoses of 26 could not be confirmed. Of the 52 valid questionnaires, 44% were insect bites, 19% eczema, and 12% scabies; (2) dates of onset concentrated in July, August and September of 1993, with most in August; (3) the odd ratio of individuals from households with family aggregation becoming dermatoses was 17.1 times higher than individuals from households without family aggregation, indicating the significance of family aggregation. These findings were in accordance with findings of the present investigation.

At the intersection of Tungping and Changhsin roads, there is a spot with overgrown weeds. Locals said that the trees carry many unknown insect eggs. When they hatched, they produced some whitish discharges hanging from the trees and floating around.

Studies of these eggs by the Vector and Insect Division, National Institute of Preventive Medicine, DOH, show that they are *Saisretica coffeae*. Their life cycle is: one generation each year, the female adult reproduces larvae in late June through early August next year; larvae live on the fluids of trees, whitish secretion is discharged from back ducts which is light and floats with wind; larvae become adults in September and October; the adults copulate, after copulation the male dies and the female survives through the winter⁽⁸⁾.

The present investigation found more *Saisretica coffeae* in where the cases clustered. Locals further reported that symptoms became more severe when it was windy, and that more became sick in the households in the south when the north wind blew and vice versa. This fact corresponded to the location of the *Saisretica coffeae* found. In the 200-meter radius circle where *Saisretica coffeae* was found, the prevalence rate (50.7%) was significantly higher than the prevalence rate outside the circle (13.2%) ($p < 0.001$).

When households within the 200-meter radius circle in which *Saisretica coffeae* was found were re-interviewed on November 5, 1993, no more new cases were identified. This could be due to the fact that the health authorities disinfected the area and treated patients on September 9, and also that the residents removed the trees with *Saisretica coffeae* on October 2. *Saisretica coffeae* though may not be directly related to the dermatoses of this investigation, it could still be a major factor. Future studies could take this fact into consideration.

6. Recommendations

The present investigation though concluded that the incinerator was not related to the skin disorders, with increasing consensus for better environmental protection, future public projects should better be carried out with prior communication with the local residents to solicit their support and understanding.

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Figure 1. Map of Homei Township, Changhua County

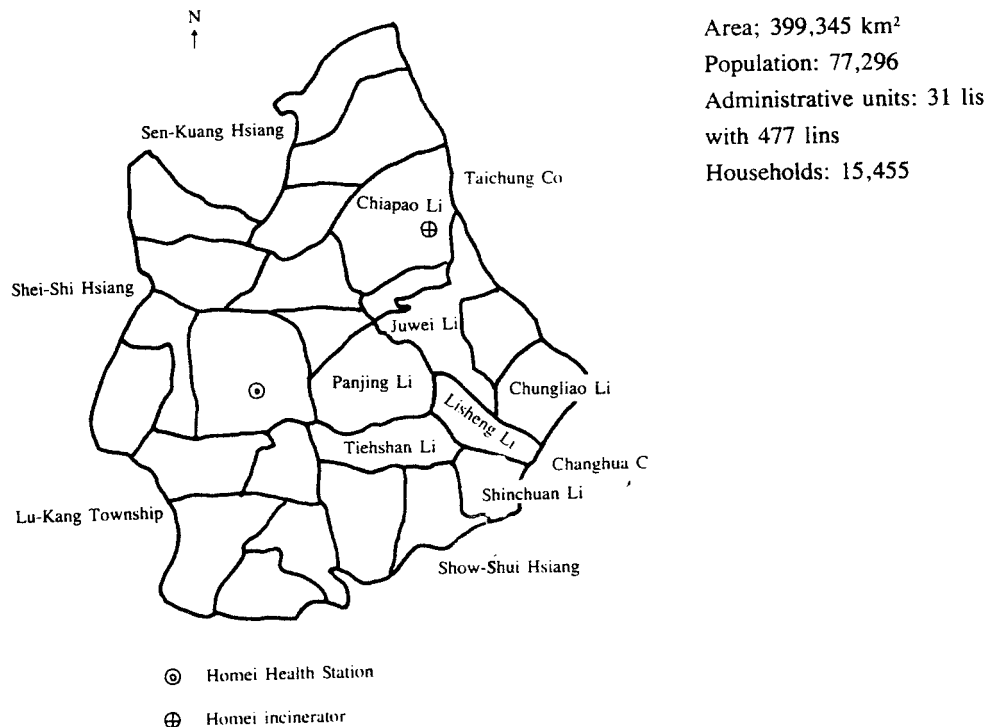


Figure 2. Spot Map of Cases in Homei Township

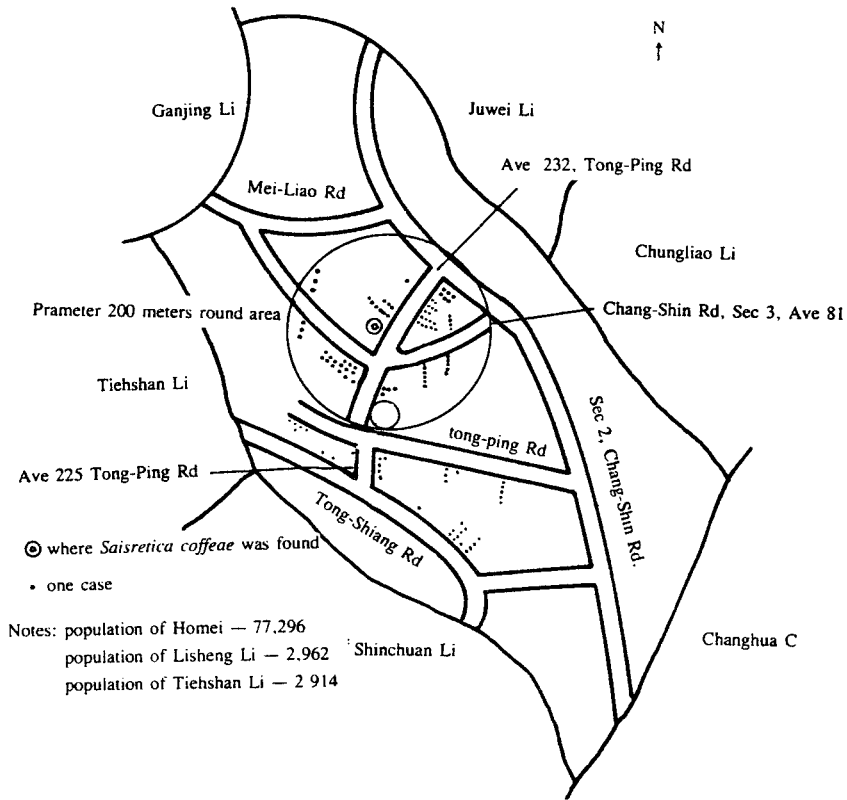


Figure 3. Distribution of Cases by Month, Lisheng Li, Homei Township

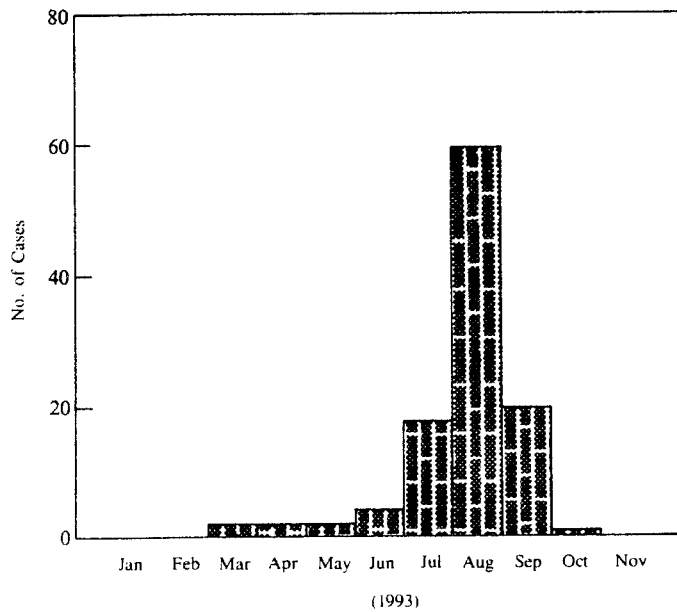


Table 1. Prevalence Rate of Skin Disorders, Homei Township, Changhua County, October 2, 1993

Locality	Lins	Population	No. Interviewed	No. of Case	Prevalence Rate (%)
Lisheng	11,12,14,19	500	417	109	26.1
Tiehshan	15,16,17,19,20	650	535	10	1.9

Tale 2. Prevalence Rate by Age, October 2, 1993

Age	No. Sick	No. Not Sick	Total	Prevalence Rate (%)
1-15	24	78	102	23.5
16-30	31	88	119	26.0
31-45	17	70	87	19.5
46-60	30	34	64	46.9
61+	7	38	45	15.5
Total	109	308	417	26.1

Table 3. Skin Disorders by Sex, Lisheng Li, October 2, 1993

Sex	No. Sick	No. Not Sick	Total
Male	55	164	219
Female	54	144	198
Total	109	308	417

Table 4. Household Clustering of Cases, Lisheng Li, October 2, 1993

Item	Total	Non-case	Case	One Case	Two Cases	> Two Cases
Household	79	41	38	14	4	20
No.	417	308	109	14	8	87

Table 5. Infection Rates Within and Outside 200-meter Radius, Homei Township

Item	Total	Within	Cases Within	Outside	Cases Outside
Household	79	28	19	51	19
No.	417	144	73	273	36

Table 6. Infection Rates Within and Outside 200-meter Radius, Homei Township

200-meter	Sick	Not Sick	Total
Within	73	71	144
Outside	36	237	273
Total	109	308	417

$\chi^2 = 68.69$
 $p < 0.00001$