DISEASE STATE OF INHABITANTS LIVING NEAR HOTSPOTS, VIET NAM

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Abstract
The study on diseases state of inhabitants have been conducted in Bien Hoa, Da Nang and Phu Cat provinces, where have been identified as high contaminated dioxin areas, called "hotspots", during 1990 -2000 years. The aim of the study is as following: 1) Identify dioxin levels in human in dioxin high contaminated areas, "hotspots" 2) Survey on disease state of inhabitants living near hotspots. The obtained data have been compared with Ha Dong province, non-dioxin effected area, it is found that dioxin level at adipose tissues greater than 10pg/g raises concern for human health are seen in inhabitants living in "hotspots". Also, disorders of cardiovascular, nervous, digestive, respiratory systems and abnormal changes in immune system and enzyme activity in the exposed residential communities occur in high frequencies.

Introduction
During the war in Viet Nam, the US army sprayed herbicides consisting of 170-600 kg dioxin over the South of Viet Nam[5,6,9], which caused serious consequences on human health and environment. Many researches have indicated that dioxin has relations to some diseases of respiratory system, immune system, cutaneous, genetic,….[1,2,3,4,7,8]. The aim of the study is as following: 1) Identify dioxin levels in human in dioxin high contaminated areas, "hotspots" 2) Survey on disease state of inhabitants living near hotspots.

Materials and methods
1. Subject:
- Exposed to AO/dioxin and living near Bien Hoa (2370 persons), Da Nang (1044 persons) and Phu cat (2007 persons)
- Control group consist of the inhabitants living in Ha Dong provincial town (2376 persons)
- Children with congenital deformities living in adjacent areas of airbases of Bien Hoa, Da Nang, Phu cat and Ha Dong provincial town.
- Obstetrical records kept in study areas.

2. Study methodology:
- Cross-sectional study
- Individual interviews with a set of questionnaire
- Clinical examinations and preclinical examinations
- Data processing with EPI-INFOR 6.0

Results and discussion
1. Measurements of dioxin levels in humans:
Extent of the investigation:
- 12 subjects data of participants at Bien Hoa in 1996.
- 10 subjects data at Da Nang in 2000.

Results:
- In Bien Hoa, 11 out of 12 samples of adipose tissue have rather high amount of dioxin (>10pg/g sample), 3 out of that is very high (173,1 – 244,6 pg/g sample)
- In Da Nang, out of 10 samples, 3 samples ranging from 10 to 12,8 pg/g at Da Nang.

It is reported that dioxin level at adipose tissue greater than 10pg/g raises concern for human health[3].

2. By clinical morbidity, the percentage of people having irregular cardiac graph and slow pulse rate is clearly higher in hotspot than that in Ha Dong.

3. Other bio-medical study results supporting harmful effects from dioxin exposure in the hot-spot areas:
Disorders of cardiovascular, nervous, digestive, respiratory systems in the exposed residential communities occur in high frequencies.

Rate of abnormal changes in immune system and enzyme activity were found higher in residential communities living in Bien Hoa, Da Nang and Phu Cat than in Ha Dong.

4. Congenital deformities
Table 1. Rate of congenital deformity in the residential communities of the research sites over population and alive children

Research Index	**Sites**			
	Bien Hoa	**Da Nang**	**Phu Cat**	**Ha Dong**
Number of congenital deformity	383	377	296	212
Population area	419673	172877	220895	255422
Number of alive children (within 22 years)	178032	70040	89425	46207
Rate of congenital deformity per 1000 population	0.91 ± 0.08	2.18 ± 0.32	1.34 ± 0.21	0.83±0.24
Rate of congenital deformity per 1000 alive children	2.15 ± 0.83	5.38 ± 0.79	3.31±0.57	1.45±0.53

Table 1 shows clearly that the rate of congenital deformity at Bien Hoa, Da Nang and Phu Cat is higher than Ha Dong where no herbicide exposure occurred.

Regardless of factors affecting the reasons causing congenital deformity in mothers or the periods of their living in the study areas, the percentage of congenital deformity in the "hot spot" areas of dioxin is higher in comparison with unaffected area. Among congenital deformities, cerebral paralysis accounts for the biggest percentage followed by facial deformities. The higher than expected percentage of celebral paralysis and facial deformities cases may be attributed to dioxin effects on the neural system.

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