

DIOXIN – HEALTH OF CHILDREN WHO WERE BORN AFTER CHEMICAL WAR IN THE SOUTH OF VIETNAM

Nguyen Ngoc Hung ⁽¹⁾, Nguyen Van Tuong ⁽¹⁾, Susumo Iwamoto ⁽²⁾, Isao Iwamoto ⁽²⁾, Takao Iida ⁽³⁾

⁽¹⁾Hanoi Medical University - Vietnam; ⁽²⁾IMAYA – Japan;

⁽³⁾Fukuoka Institute of Health and Environment Sciences - Japan

Abstract

The chemical war in the South of Vietnam has ended over 30 year but it has still left severe effect on people's health, especially on children born after the war. Our objective was evaluating the existing dioxin and children health in Danang, Vietnam. The results of the research on 8 684 mothers aged from 18 to 49 with total 16.443 times giving birth show: The rate of premature birth was 1.86%, birth defects: 1.68%; neonatal death: 0.59%. The results of dioxin analysis on children' blood show: In 14 pool samples (4 – 9 children/a sample), the correlative amount of dioxin: 0.016 – 0.084 pg/g blood; 6.65 – 21.71 pg/g lipid. In 31 individual samples of children with birth defects, levelt of TCDD: 2.06 – 352.99 pg/g lipid. In which, one case have levels of dioxin at 353 pg/g lipid and total rate PCDDs-TEQ/total TEQ get 94.22%; The results of 19 children with birth defect shown that some figures on immunity such as CD₃ is lower but CD₈ is much higher than normal figures. In short, the war although finished over 30 years but it has still serious effect on children who are living around of Danang airport.

Introduction

The huge amount of dioxin that American army used in the chemical war in the South of Vietnam over 30 years ago still left severe consequence in this area. With the solid characteristics in the environment and in the biological cycle, dioxin is the danger to the health and disease burden for many generations, especially for children born after the war. Da Nang is a city in the Central of Vietnam and Da Nang airport is located in the city. It was not only the place to store weapon but also to store toxic chemical. These storage deports are still the danger for people living around and their living environment is at high risk to be exposed. In order to contribute to prove the effect of dioxin on people health, we implement this research with the following objectives:

- to find out some factor relating to children's health
- to evaluate the dioxin exists in children who were born after the war in Danang

Subjects

- Materials: Women aged from 18 – 49 living in this area: to access parturition situation, parturition accident, premature birth, neonatal death and birth defects.
- 130 children and 31 birth defect children born after the War which aged under 15 years old.

Methods

- Epidemiology description method: find out the rate of premature birth, neonatal death and birth defect according to the composed questionnaire.
- Analyzing method:
 - + Analyze dioxin levels in pool and in individual blood samples: find out dioxin levels in children.

- + Analyze some biological and immunity figures in children with high lead levels of dioxin in blood.
- Using Epi-Info to process the data, compare the results with the analyzed results of children in comparing area (children living Cat Bi precinct, Hai Phong City)

Results and Discussion

- The general situation of maternity.

Among 8648 women in Da Nang, there are 8349 mothers had been pregnant with total 17029 times and given birth with total 16,443 times, the pregnant rate per mother is 2.03.

Sexual rate: 51.761: son; 48.233%: girl and 0.006%: not clear

- Rate of abnormal pregnancy types (n = 1,137 cases): Miscarry: 29.46%; premature birth: 26.61%; birth defects: 24.37%; still birth: 17.94%; vesicular mole: 0.97%; extrauterine pregnant: 0.35%.

Miscarry, birth defect, premature birth and still birth are the most common types of abnormal pregnancy. This situation not only affects to mother's health but also affects to the children.

Birth defect:

Birth defect consists of unusualness at birth and at the growth of the children. This unusualness is shown in children's appearance or in children's body function.

When doing the research in the community, most of defected fetus or disease relating transformation disorder cases have not been evaluated carefully because of lacking professional testing equipments. Therefore, the following statistics are given mainly based on the appearance defects and functional disorder which appears clearly.

Most of the children with birth defect have unusual growth, they died at birth or before 1 year old but in some cases they grow normally without functional disorder. Conversely, some children were born with normal appearance but they get disorder in growing.

The birth defects rate (1.68 %) consists innate deformity (1.2%) and growth disorder (0.48%).

In the group with disorder growth, mentally retarded and diseases on muscle, bone and join get high rate. These figures are lower than the figures from research on veteran who was exposed to dioxin (2.95%) but much higher than figures on veteran who was not exposed to dioxin⁴.

The sex of birth defect children: In 277 birth defect children, there are 152 sons (54.9%) and 124 girls (44.8%), there is one case with unclear sex (0.4%)

Distribution of birth defect children in birth times

The same as the miscarry and still birth, the rate of birth defect children at the first birth giving is highest with 118 cases (42.6%) and then this rate decrease at the later birth giving: at the second time, there are 97 cases (35%), at the third, there are 38 cases (13.7%), at the fourth, there are 15 cases (5.4%), at the fifth there were 6 cases (2.2%) and at the sixth there are 3 cases (1.1%). We can see that, the trend is decrease with the times of giving birth. This result is not the same as the situation on mothers who have given birth defect children due to high age.

The rate of giving defect children according to the age of mothers

Birth defect children were born mainly by mothers at age from 21 to 35 (1.8%), group with high frequency of birth but the group of mothers with high rate of giving defect children belong to mothers under 20 years old (2.3%). The group of mothers over 35 years old giving defected children is 1.2%. Therefore, giving defect children does not obey to the rule that: the older the mother is, the higher the risk is^{1,3}.

The number of defect children in household: in 8,349 households, there are 8154 households do not have birth defect children (97.7%); 180 households with one defect child (2.2%), 14 households with 2 defect children (0.2%) and especially there is one household with 3 defect children. This rate is higher than the rate in Thai Binh with 1,2% households have 1 defect child and 0,1% have two defect child. ^{1,3}

Neonatal rate: There are 98 children died before 7 days after being born (0.59%) in which there are 7 defect children and 91 normal appearance children. This rate is higher than the rate in Thai Binh (0.56%) but there is no difference in statistics ($P > 0.05$). ^{1,2}

The results of dioxin analysis

Table 1: Pool blood dioxin analyzed resultd (4 – 9 children / sample) (pg/g)

A	1*	2*	3**	4**	5**	6**	7**	8**	9**	10**	11**	12**	13**	14**
B	0.14	0.11	0.063	0.069	0.03	0.016	0.014	0.029	0.031	0.024	0.021	0.046	0.03	0.07
C			15.2	16.0	12.54	10.39	6.65	13.39	11.97	11.95	8.84	21.71	10.6	19.23

A: order; B: pool blood sample; C: pool blood lipid sample; (*) analyzed in Vietnam; (**) analyzed in Japan

Table 2. The results of individual blood analyzing on children in Danang and Haiphong

Figures	n	Danang		n	Haiphong		P
		$\bar{X} \pm SD$	Min – Max		$\bar{X} \pm SD$	Min – Max	
TCDD	30*	10.13 ± 12.20	5.576 – 14.68	27	1.487 ± 1.467	0.5 – 6.7	> 0.05
PeCDD	31	22.63 ± 27.66	5.96 – 162.55	27	3.52 ± 2.85	0.50 – 12.76	< 0.01
PCDDs	31	2113.16 ± 1496.70	905.8 – 7720.5	27	141.13 ± 43.85	62.4 – 227.9	< 0.01
PCDF	31	240.07 ± 153.15	60.5 – 707.5	27	26.68 ± 11.04	12.5 – 55.9	< 0.01
TEQ1	31	54.85 ± 76.11	12.4 – 368.8	27	5.90 ± 4.67	1.4 – 21.6	< 0.01
TEQ2	31	24.184 ± 14.96	6.0 – 63.2	27	5.25 ± 2.85	2.0 – 13.3	< 0.01
TEQ3	31	79.63 ± 84.05	19.6 – 400.7	27	11.14 ± 7.39	3.4 – 32.7	< 0.01
TTEQ4	31	83.72 ± 85.44	21 – 410	27	13.33 ± 7.91	5 – 35	< 0.01
TTEQ %	31	58.34 ± 12.71	42.18 – 94.41	27	41.14 ± 8.22	23.40 – 61.02	< 0.01

* Special case due to extra high amount of TCDD (352.99 pg/g lipid)

The results from 31 children who have been analyzed dioxin in blood individually. there is one case with dioxin content (2.3.7.8-TCDD) reach 352.99pg/p lipid and total rate PCDDs-TEQ/total TEQ take 94.22%.

Some biological figures relating dioxin exposing

Table 3. Figures of Hb, GPx, GR, SOD, TAS, TSH, FT4, T3 in Da Nang relating dioxin exposing

DN	Dioxin Ppt	N	Hb $\bar{X} \pm SD$	GPx $\bar{X} \pm SD$	GR $\bar{X} \pm SD$	SOD $\bar{X} \pm SD$	TAS $\bar{X} \pm SD$	TSH $\bar{X} \pm SD$	FT ₄ $\bar{X} \pm SD$	T ₃ $\bar{X} \pm SD$
I	?	20	128.35 ± 7.45	71.58 ± 4.16	5.68 ± 0.49	1529.90 ± 104.35	1.05 ± 2.07	1.19 ± 0.15	20.19 ± 0.87	2.8 ± 0.10
II	4.90 - 352.99	19	127.95 ± 7.23	46.43 ± 2.74	8.12 ± 0.58	1495.10 ± 88.02	1.20 ± 0.11	1.80 ± 0.25	20.50 ± 1.37	2.44 ± 0.13

I: Group of mother with birth defect children; II: Group of birth defect children with dioxin in blood
There no difference between groups and with normal figures ($p > 0,05$).

Table 4: The results of figures on CD3, CD4, CD8, TCD4/TCD8, CD19 relating dioxin exposing.

Group	Dioxin ppt	CD3	CD4	CD8	TCD4/TCD8	CD 19
1	?	783.94 \pm 32.27	637.56 \pm 46.84	1466.31 \pm 76.44	1.33 \pm 0.10	269.15 \pm 16.38
2	4.90-352.99	958..26 \pm 92.47	974.36 \pm 88.57	2068.95 \pm 176.45	1.03 \pm 0.30	379.89 \pm 36.64

1. Group with dioxin exposing; 2: Group with dioxin in blood

The results on above immunity figures show that there is no difference between two groups and in comparison with the biological figures of Vietnamese people in 90 decade as well.

In summary, the war although ended over 30 years but it still has serious effect on people's health in general, and on children born after the war, in specific especially the birth defects with high lead levels of dioxin in blood. We think that people who are living around of Danang airport are still new-exposed to hot spot.

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