

Comparative Study on the Risk Assessment of Endocrine Disrupting Chemicals

- Awareness, knowledge, attitude, behavior regarding endocrine disrupting chemicals and their relations -

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Abstract

We researched the relationship between two groups (1998 and 2008) for the risk assessment of endocrine disrupting chemicals (E.D.C.) in university students. Research was performed by using 1895 students (1058 males and 837 females in 1998) and 406 students (298 males and 108 females in 2008), on the faculty of engineering and educational students at Tokyo and Hokkaido. Survey results are outlined below. In 1998, students were very interested in E.D.C. and had various views on this subject. However, they had based on inadequate knowledge about the source of E.D.C. and their effects on the human body. The attitudes and behavior of students were characterized by an emphasis on convenience and easy. Their attitudes and behavior were lacking a concern for safety. Results of this comparative study on both students (1998 and 2008) were equally characterized by an emphasis on convenient, their attitudes and behavior were lacking a concern for safety. The promotion of E.D.C. and environmental education requires a review of life and

lifelong education offered by communities and society.

Key word: endocrine disrupting chemicals, awareness, attitude, behavior, students.

Introduction

The problems of endocrine disrupting chemicals (E.D.C.) have known since Rachel Carson wrote "Silent Spring (1962)". In that book, environmental problems were discussed as a difficult problem in the worldwide¹⁾. From 1998, the problems of E.D.C. became noisy and in the last 5 years, there were very few took up the mass media in Japan. However, we are not able to find a way out of the difficulties. Terrifying this problem, there is serious affect to productive health in human future^{2 ~4)}. Then we conducted this comparative study, awareness, knowledge, attitudes and behavior toward the E.D.C. of students, and clarified their sense of risk assessment, and attempted to find a way out of problems.

Methods

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Research was carried out by questionnaires at Tokyo and Hokkaido on faculty of engineering and educational at 1998 and 2008. Questionnaires were categorized into properties (3 items), awareness (4 items, Table 1 and 2), knowledge (4 items, Table 3 and 4), attitude (15 items, Table 5), and behavior (11 items, Table 6)^{5, 6)}. Subjects were 1895 students (1058 males and 837 females) in 1998 and 406 students (298 males and 108 females) in 2008. Data was processing by computer and analyzed correlations between 1998 and 2008.

Results and Discussion

1) Total and percentage of awareness items toward E.D.C. (Table 1 and 2).

Image of E.D.C. was categorized into chemical substances, nature, foods, organisms, and mental states (Table 1). In every case, percentages of 2008 were

	students(18-22)		students(18-22)	
	1998	n=1895 (%)	2008	n=406 (%)
chemical substances	1,047	62.9	310	92
harmful substances	892	53.6	285	84.6
garbage	652	39.2	235	69.7
atmosphere	601	36.1	239	70.9
sea,river,lake	616	37	234	69.4
danger	868	52.2	266	78.9
vinyl	623	37.4	210	62.3
food	327	19.7	140	41.5
nature	627	37.7	250	74.2
anxiety	451	27.1	244	72.4
terribl	697	41.9	255	75.4
child	232	13.9	137	40.7
fear	574	34.5	251	74.5
soil	310	18.6	183	54.3
human	372	22.4	212	62.9
plant	231	13.9	172	51
animal	244	14.7	183	54.3
motor vehicle	177	10.6	107	31.8
convenience store	187	11.2	94	27.9
drink	88	5.3	97	28.8
man	259	15.6	87	25.8
family	78	4.7	96	28.5
woman	192	11.4	117	34.7
the others	241	14.5	184	45.3

Table 1. Image of E.D.C.

	students(18-22)		students(18-22)	
	1998	n=1895 (%)	2008	n=406 (%)
television broadcast	1,331	80	258	76.6
newspaper	654	39.3	227	67.4
magazine	185	11.1	81	24
radio broadcast	66	4	50	14.8
symposium	67	4	118	35
family	111	6.7	69	20.5
friend	81	4.9	45	13.6
internet	7	0.4	83	24.6
the others	340	20.4	69	17

Table 2. News source of E.D.C.

grater than those of 1998. We next showed news source of E.D.C. at Table 2. The press, lecture, and inter net were increased. These came from overflow and change of information technology.

2) Total and percentage of knowledge items toward E.D.C. (Table 3 and 4).

The items of source of E.D.C. were categorized into chemical substances,

	students(18-22)		students(18-22)	
	1998	n=1895 (%)	2008	n=406 (%)
container	1,311	69.1	318	77.8
burned ash	1058	55.7	267	65.8
exhaust gas	838	44.2	276	68
toy	34	1.8	77	19
packing materials	306	16.1	256	63.1
soot & smoke	354	18.7	231	56.9
industrial wash lotion	623	32.8	304	77.3
insecticide	481	25.3	310	76.4
detergent	415	21.9	276	68
preservative	364	19.2	284	70
dyes	171	9	245	60.3
aromatic	96	5.1	206	50.7
dental filler	69	3.6	163	40.1
agricultural chemical	797	42	326	80.3
weed killer	546	28.8	331	81.5
synthetic hormone	490	25.8	314	77.3
germicides	369	19.4	306	75.4
antifeulant	227	12	303	74.6
pill	125	6.6	155	38.2
sleeping pill	46	2.4	142	35
food	259	13.6	140	34.6
mother's milk	193	10.2	92	22.7
baby bottle	179	9.4	108	26.8
well water	136	7.2	108	26.6
city water	114	6	97	23.9
sea, river, lake	313	16.5	153	37.7
the others	119	6.3	21	5.2

Table 3. Source of E.D.C.

	students (%) 1998 n=1895	students (%) 2008 n=406
low sperm	1371 (72.2)	317 (78.1)
disorder of gene	868 (45.7)	312 (76.8)
cancer-causing	837 (44.1)	344 (84.7)
contamination of mother's milk	627 (33.0)	312 (76.8)
deformity of sexual organs	609 (32.1)	331 (81.5)
affect of female hormone	884 (36.0)	324 (79.8)
disorder of hormone receptor	597 (31.5)	337 (83.0)
affect of male hormone	606 (31.9)	270 (66.5)
sterility	531 (28.0)	299 (73.6)
lesion of behavior and neural system	317 (16.7)	302 (74.4)
mentally disabled	321 (16.9)	269 (66.3)
trouble of exercise ability	214 (11.3)	271 (66.7)
endometriosis	266 (14.0)	269 (66.3)
learning disability	124 (6.5)	225 (55.4)
increase of disordered sperm	81 (4.3)	248 (61.1)
the others	31 (1.6)	2 (0.5)

Table 4. Influence of E.D.C.

	Answered YES (%)		Answered NO (%)	
	1998	2008	1998	2008
1:Food that "color, smell, and taste" good is delicious.	67.2	57.6	31.5	27.8
2:I do not care about agricultural chemicals, when eating food.	36.2	21.7	63.1	67.5
3:Water should be just cold and clear.	32.8	20	66.3	66.7
4:Food should be just fresh and delicious.	72.6	53	26.6	35.7
5:Various plastics containers and table wares are good because they are convenient.	55.2	44.3	43.9	39.4
6:Plastic wraps are good because they are convenient to heat food.	65.7	49.3	33.4	36.5
7:I do not care much about the exhaust or the cigarette smoke.	16.2	13.8	83.1	77.1
8:Garbage should be burned because it is troublesome to separate.	19.1	21.7	80.1	66.5
9:Recycling of resources is troublesome.	27.4	25.6	71.8	65.3
10:Some agricultural chemicals and insecticides can be used.	53.6	44.3	45.4	41.9
11:I don't care about a expiration date or a list of indication, the processed food is safe.	9.1	13.5	90.1	74.1
12:Convenience foods (pot noodle etc.) are good because they are cheap and convenient.	61.8	43.1	37.1	43.8
13:I like animal fat (meat and poultry).	75.8	60.1	23.2	29.1
14:The organically grown vegetables or fruits are preferable.	66.1	52.2	32.5	28.6
15:Even the thing is made of chemicals, it is good if only it is nice and convenient.	29.1	31.5	69.5	50

Table 5. Percentage of attitude items toward E.D.C.

	Answered YES %		Answered NO %	
	1998	2008	1998	2008
1:I do not use toy, container or table ware made of plastics.	18.9	18.5	80.1	69.2
2:I do not take synthetic hormone preparation (pill, steroid, etc.)	79.1	47.3	18.7	29.6
3:I keep off the places with an environmental pollution or smoke.	58.1	46.6	40.2	36
4:I do not pour hot water directly into convenience foods (pot noodles, etc.)	8.5	14.5	90.3	73.4
5:I do not cover with plastic wraps when I heat food with a microwave oven.	21.3	23.4	77.4	64.5
6:I separate the garbage to recycle it.	69.5	65.8	29.4	21.4
7:I do not eat fat of fish.	24.9	17.5	73.7	68
8:I do not drink water directly from a river or a lake.	92.6	71.2	6.2	15.3
9:I use the life machinery made from chemicals if it is cheap and convenient.	66.8	54.4	31.2	29.8
10:It is better to "charge" refuse disposal in the future.	38.2	39.7	59.7	40.4
11:I want to avoid breast-feeding in the future.	12.1	9.9	86.1	64.8

Table 6. Percentage of behaviors items toward E.D.C.

discarded lumber of life, medicines, everyday goods, and nature. In any cases, percentages of 2008 were grater than those of 1998 (Table 3). On the items of influence on a human body, percentages of 2008 were greater than those of 1998 (Table 4).

3) Percentage of attitudes and behavior items toward E.D.C. (Table 5 and Table 6).

On the desirable attitudes of E.D.C., there were various patterns in 15 items, but undesirable attitudes toward E.D.C. tend to decrease in percentages of 2008 (Table 5).

Regarding desirable behavior toward E.D.C., compared with two data, there were few difference between percentages of 1998 and of 2008, but undesirable behaviors tend to decrease slightly in 2008 (Table 6).

In every case, percentages of 2008 were greater than those of 1998 on awareness and knowledge, but desirable attitudes and behaviors were not increase in the last ten years, these were caused by the diversification of values and changes of life-style. These results indicate to change their attitudes and behavioral characteristics, the promotion of E.D.C. and environmental education are necessary to the more considerations.

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