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## A Survey on Cases of Serious and High-Risk Child Abuse with Trauma Using the Database of Health Insurance Claims

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### Abstract

In recent years, the annual number of child deaths due to child abuse has been around 50 per year in Japan. On the other hand, the actual situation of dangerous physical abuse cases such as abuse with residual has not been clarified. Therefore, this study investigated children with trauma suspected of being physically abused, using the health insurance claims data of Japan. There were cases with trauma which are likely to have sequelae. Since this study used the sampling data, there is a high possibility that there will be a considerable number of cases of high-risk abuse.

### Keywords:

Child abuse, Physical abuse, Real world data

### Introduction

The annual number of child deaths due to abuse has been around 50 per year in Japan [1]. On the other hand, although not fatal, there may be cases of high-risk abuse. In particular, cases in which severe sequelae remain and cases of continuous abuse of the same child are as cruel as or even more cruel to the abused child. Nowadays, there is scientific evidence that physical abuse of children causes atrophy of the prefrontal cortex of the cerebrum [2]. As for corporal punishment, it has been reported that the volume of the brain of children who received corporal punishment also decreased [3]. In this way, the evasion that physical abuse, including corporal punishment, is “a part of discipline” that is convenient for parents is not valid today. Therefore, even in the area of child abuse, it seems to be of social significance to grasp the actual situation of physical abuse cases that have not resulted in death but have a high risk.

As is well known, the social problem of child abuse is an extremely difficult task to study with the consent of parents and individuals. This time, in order to grasp the actual situation of abuse cases, we focused on data based on actual medical care or the real world data. At present, there are few studies in Japan investigating cases of child abuse using the real world data. Since not all abused children are treated at medical institutions, it can be said that the usefulness of the real world data is limited for the purpose of use such as surveying the number of patients. However, since there is a high possibility that children who are seriously injured due to physical abuse are receiving medical treatment at a medical institution, the real world data based on actual medical treatment is considered to be suitable for this study. Therefore, in this study, we conducted the survey on physical abuse using the health insurance claims database with the aim of obtaining findings that will contribute to the progress of child abuse prevention measures in the future.

### Methods

This study used the NDB (National Database of Health Insurance Claims and Specific Health Checkups of Japan) [4]. Since

the NDB contains data on most of the people of Japan and is extremely universal, many medical studies and surveys have been conducted so far. In this study, we use an NDB sampling dataset randomly sampled from the NDB. The NDB sampling data set includes medical outpatient (about 800,000 cases), medical inpatient (about 120,000 cases), and DPC (about 100,000 cases) (Diagnosis Procedure Combination) for health insurance claims data for October 2012 to 2015. In this study, we use the medical outpatients sampled at a rate of 1% from the data for October medical treatment, and the medical inpatient and the DPC claims data sampled at 10% in the same manner.

### Extraction condition

In this study, we define insured persons under the age of 18 who have been given “Child abuse” and “Battered Child Syndrome” as the disease name who are considered to be child abused.

### Investigation

In this study, we investigate the presence or absence of trauma related injuries and illnesses that are thought to directly reflect physical abuse. In the ICD10 code classification, the names of diseases related to trauma are considered to be related not only to trauma but also to various body parts and symptoms,

1. injury, poisoning, and other extrinsic effects (ICD10 code: S00-T98),
2. Nervous system diseases (ICD10 code: G00-G99),
3. Eye and appendage diseases (ICD10 code: H00-H59),
4. Musculoskeletal and connective tissue diseases (ICD10 code: M00-M99),
5. Skin and Extensive research on subcutaneous tissue diseases (ICD10 code: L00-L99).

In addition to the above items, we also focused on the extent to which there are cases of these traumatic disease names that are considered to be at high risk, especially from the perspective of child abuse. The criteria for risk in this study are “assuming that the disease is caused by physical abuse, it is judged that there is a possibility that the child may have a life-threatening or sequelae”. Specifically, we mainly selected head injuries [5], which are said to have a high mortality rate in child abuse during infancy, and multiple fractures. Moreover, the date of diagnosis of “Battered Child Syndrome” and the date of medical treatment of the health insurance claims were used to investigate cases of repeated abuse against the same child.

### Results

In this study, “Battered Child Syndrome” and “Child Abuse” were used as the disease name to identify cases of child abuse. As a result, only “Battered Child Syndrome” was included in the NDB sampling dataset. Table 1 shows the number of insurance claims given for both “Battered Child Syndrome” and the disease name related to trauma for each year. Table 2 shows the

number of insurance claims diagnosed as “Battered Child Syndrome” before the date of medical treatment among the cases in Table 1. Table 3 shows the number of insurance claims given the disease names defined as high risk in this study. Table 3 also shows estimated number of annual cases for each year. Since the Outpatient department is 1% sampling for one month from the NDB, it is calculated by multiplying by 100 x 12 (month). Similarly, for the DPC and Inpatient, the formula 10 x 12 is used. Finally, Table 4 shows the details of the disease names given to the insurance claims in Table 3. The number of insurance claims in Table 4 is the total value in each year from FY2012 to FY2015. For each disease name, it may be present in the same insurance claims shown in table 3.

**Limitations**

Since the sampled data used in this study is not suitable for detailed statistical analysis, it was not conducted. We hope you understand that it is not always necessary to perform detailed statistical analysis, but it depends on the time and the case.

Table 1 Number of claims with both “Battered Child Syndrome” and Trauma disease names

	2012	2013	2014	2015
<b>Outpatient</b>	5	5	7	1
<b>Inpatient</b>	4	5	4	6
<b>DPC</b>	0	1	0	1

Table 2 Number of claims for which the Battered Child Syndrome was granted before the medical treatment month of the claims

	2012	2013	2014	2015
<b>Outpatient</b>	4	4	6	0
<b>Inpatient</b>	4	4	4	6
<b>DPC</b>	0	0	0	0

Table 3 Number of claims with high-risk disease name

	2012	2013	2014	2015
<b>Outpatient</b>	1	0	1	0
<b>Inpatient</b>	1	2	2	2
<b>DPC</b>	0	0	0	1
<b>Estimated number of annual cases *</b>	1320	240	1440	360

Estimated number of annual cases \* are estimated by multiplying the number of claims in each month by 12 (months) and reciprocal sampling rate (Outpatient:100, DPC and Inpatient:10) .

Table 4 Details about high-risk disease name

	Out patient	In patient	DPC
<b>Multiple rib fractures</b>	1(s)	0	0
<b>Acute subdural hematoma</b>	1(s)	0	0
<b>Brain contusion</b>	1(s)	0	0
<b>Rib fracture</b>	1(s)	0	0
<b>Skull fracture</b>	1(s)	0	0
<b>Traumatic subdural edema</b>	0	1	0
<b>Subdural hematoma</b>	0	3	0
<b>Subdural hemorrhage</b>	0	1(s)	0
<b>Acute subdural hematoma</b>	0	2(s)	0
<b>Lateral skull fracture</b>	0	1(s)	0
<b>Acute Atresia Subdural Hematoma</b>	0	1(s)	0
<b>Neonatal intraventricular hemorrhage</b>	0	0	1(s)

\* The number with “(s)” on the right side of the number indicates that the disease name of trauma and the date of the Battered Child Syndrome are the same.

**Discussion**

From the results shown in Tables 1 and 2, more than 80% of the cases did not match the medical treatment month and the date when “Battered Child Syndrome” was granted. There is a possibility that the child visited a medical institution due to the trauma caused by the abuse by the guardian at the time of this medical examination. Therefore, it cannot be denied that the same guardian may have been repeatedly abused. Table 3 lists the disease names that are considered to be at high risk. It can be said that the case where the disease names trauma and Battered Child Syndrome are given on the same day is highly likely to be the trauma caused by physical abuse.

**Conclusion**

Recognizing the existence of high-risk cases of physical abuse will raise awareness of child abuse and deepening the discussions for the countermeasures. We believe that our findings has made it meaningful to carry out a more detailed survey using the original NDB in the future.

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