Establishment of indicator for screening of child abuse and neglect in primary school-age children



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Abstract

Aim In Japan, elementary schools are committed to early discovery of child abuse and neglect. Under Japanese law, dentists are required to be involved in child welfare and early detection of child abuse. However, the extent to which dental practitioners cooperate for prevention of child abuse with schools remains limited to date. Therefore, we undertook a community-based project that aimed to develop screening indicators to identify potentially abused children based on their oral health condition and behavioural characteristics in education settings. We have already reported on the relationship between oral health condition and child abuse. The present study established an indicator that can facilitate identification and prevention of child abuse/neglect.

Methods Study design: Cross-sectional study. Questionnaires were given to teachers at an elementary school to ascertain behavioural characteristics observed in children who experienced abuse.

Results Responses were obtained from 3,569 children. Eighty-nine students were found to be abused. Sixteen of the 23 items were chosen as significant explanatory variables. Subsequently, a multiple logistic regression analysis revealed that 4 of the 16 items were significant explanatory variables. Statistics: Univariate and multiple logistic regression analyses were performed.

Conclusions We developed a check sheet for proper assessment, which requires as little effort as possible, and an index for screening children in need based on teaching staff's observation of students' daily behaviour in school settings. Highly selected items are advantageous as they lead to a decrease in non-response or responses, which can help in improving the accuracy of the response to each question.

KEYWORDS Child abuse and neglect; Primary school; Early detection of abuse; Dentist.

Introduction

Child abuse and neglect, which heavily influences children's mental and physical growth and personality development, also raises concerns about nurturing the future generation. It is a serious infringement of human rights that is legally prohibited [Ministry of Health, Labor and Welfare, 2006]. However, currently, the number of consultations about child abuse has increased over the years and serious child abuse cases are still prevalent in Japan [Ministry of Health, Labor and Welfare, n.d.; Ministry of Education, Culture, Sports, Science and Technology, n.d.]. Prevention of child abuse is an urgent social issue that needs to be addressed immediately by establishing a support system through cooperation among relevant authorities (e.g., administration, education, and medical services) surrounding children [Ministry of Health, Labor and Welfare, n.d.; Ministry of Education, Culture, Sports, Science and Technology, n.d.].

Under this situation, according to the Revised Child Abuse Prevention Law [Ministry of Health, Labor and Welfare, 2006], schools and teaching staff are required to fulfil their responsibility (e.g., the obligation to make efforts for early detection and the responsibility to inform the relevant authorities) to play their roles appropriately in order to prevent and avoid child abuse, from the viewpoints of educational facilities to usually be involved in and provide educational advice to children [Ministry of Health, Labor and Welfare, n.d.; Ministry of Education, Culture, Sports, Science and Technology, n.d.]. In addition, the roles and functions of the municipalities regarding child guidance are prescribed by the Revised Children's Welfare Act [Ministry of Health, Labor and Welfare, 2006]; the schools and boards of education are required to address prevention of abuse, cooperating with relevant authorities.

Meanwhile, under Japanese law, dentists have duties involved in child welfare and must make efforts for early detection of child abuse. Considering that a situation of oral disease is more likely to reflect an inappropriate living environment, including parent's lack of ability to bring up children [Ministry of Health, Labor and Welfare, n.d.; Ministry of Education, Culture, Sports, Science and Technology, n.d.], dental professionals are expected to contribute to early detection of abuse. In fact, there are various reports on the association between intraoral situation and child abuse [Bhatia et al., 2014; Greene et al., 1994; Harris, 2014; Japanese Society of Pediatric Dentistry; n.d.; Kaihara et al., 2016, 2018a, 2018b; Keene et al., 2015; Kilpatrick et al., 2012; Montecchi et al., 2009; Nizato et al., 2012, 2018; Sano-Asahito et al., 2015; Sarkar et al., 2015]. A previous study concluded that children with child protection plans access dental care less and are more at risk of dental cavities. Consequently, it would be beneficial if their protection plans include access to

dental care. Motoyama et al. [2017] surveyed the oral condition in children who were in a temporary shelter and concluded that support by taking account of the possibility of abuse was required for children in elementary school who have many teeth with cavities, as well as those with a lot of plaque and calculus. Moreover, the items like "The child does not have enough school materials" and "Absence without notice" are a problem in fostering or a sign of maladaptive behaviour [Armsden et al., 2000; Board of Education of Hiroshima Prefecture, n.d.; Board of Education of Osaka Prefecture, n.d.; Board of Education of Kyoto Prefecture, n.d.; Board of Education of Saitama Prefecture, n.d.; Board of Education of Nara Prefecture, n.d.; Japanese Society of Pediatric Dentistry, n.d.; Kato et al., 2014; Ministry of Education, Culture, Sports, Science and Technology, n.d.; Motoyama and Noguchi, 2017; Nagatomo et al., 2007; Suzue et al., 2015; Tsuboi, 2005].

Based on the background mentioned above, in cooperation with the dentists and the teachers in school, the local municipality in Hiroshima Prefecture decided to implement "The Dental Screening Research of the Aid-requiring Child". This aimed at developing screening indicators for the prediction of potentially abused children based on their oral health condition and behavioural characteristics in education settings [Kaihara et al., 2018a; 2018b].

Regarding oral condition of children, the use of school dental examination data as a screening parameter for early discovery of child abuse has been previously investigated [Kaihara et al., 2018a]. However, no differences were found between abused and non-abused children in terms of the condition of the oral cavity. Therefore, it was concluded that an environment in which dental practitioners spend time not just observing the oral cavity but also the behaviour of children and attitudes of the guardians, needs to be created for an early discovery and prevention of child abuse [Kaihara et al., 2018a].

Thus, in this study, we reported on the children's behavioural characteristics in educational settings. There are many behavioural characteristics to be noted for early detection of child abuse, which are presented by the Ministry of Education, Culture, Sports, Science and Technology, the board of education, and other organisations [Ministry of Education, Culture, Sports, Science and Technology, n.d.; Board of Education of Hiroshima Prefecture, n.d.; Board of Education of Osaka Prefecture, n.d.; Board of Education of Kyoto Prefecture, n.d.; Board of Education of Saitama Prefecture, n.d.; Board of Education of Nara Prefecture, n.d.]. Although all the items included in these characteristics are surely found in abused children and their families [Armsden et al., 2000; Board of Education of Hiroshima Prefecture, n.d.; Board of Education of Osaka Prefecture, n.d.; Board of Education of Kyoto Prefecture, n.d.; Board of Education of Saitama Prefecture, n.d.; Board of Education of Nara Prefecture, n.d.; Kato et al., 2014; Ministry of Education, Culture, Sports, Science and Technology, n.d.; Nagatomo et al., 2007; Suzue et al., 2015; Tsuboi, 2005], it has never been examined whether the teaching staff can judge each item in school settings. In addition, checking the items requires too much effort, because there are many detailed items, which could hardly be described as versatile. These are not feasible for using in educational institutions, as abuse should be recognised by people surrounding the child for an early detection or prevention. Therefore, the check sheet must help to understand the details accurately and allow the respondents to provide correct responses.

From previous studies, the question items, which were easy to judge for teaching staff in elementary schools, were carefully selected [Kaihara et al., 2018a]. Hence, we developed a check sheet with questionnaire survey available for proper judgment, which requires as little effort as possible, as an index for screening of aid-requiring children based on teaching staff's observation of student's daily behaviour in school settings.

	Item	Yes	Maybe yes	Maybe no	No
1.	Generally, the child does not look well	1	2	3	4
2.	Sometimes, the child reports poor a physical condition	1	2	3	4
3.	The child frequently has injuries or wounds	1	2	3	4
4.	The child's body and clothes are not clean	1	2	3	4
5.	The child's nails are not cared for	1	2	3	4
6.	The child is restless	1	2	3	4
7.	The child shows a blank facial expression	1	2	3	4
8.	The child frequently forgets something	1	2	3	4
9.	The child repeatedly overeats at school lunch, additional portions	1	2	3	4
10.	The child behaves like a baby in front of teaching staff	1	2	3	4
11.	The child excessively watches how teaching staff is feeling, or he/she avoids contact with teaching staff	1	2	3	4
12.	The child uses verbal aggression	1	2	3	4
13.	The child often is not on time	1	2	3	4
14.	The child often hates going home	1	2	3	4
15.	The child does not have enough school materials	1	2	3	4
16.	Absence without notice	1	2	3	4
17.	No message or response to the notebook between teachers and parents	1	2	3	4
18.	The parent tends not to participate in meetings or the parent-teacher association	1	2	3	4
19.	Parents do not respond quickly when the child is sick or has an accident	1	2	3	4
20.	Late child support payment (e.g., textbook fee, school lunch fee)	1	2	3	4
21.	Assignments and preparations for class are not done	1	2	3	4
22.	The child has a habit of licking fingers or biting nails	1	2	3	4
23.	The child's grades have suddenly dropped	1	2	3	4

TABLE 1 Child abuse screening questionnaire based on a prior research study.

Materials and methods

This study was entrusted to the local health and educational institutions. The study was approved by the Ethical Committee for Epidemiology of Hiroshima University (Eki-1149). and it followed the ethical principles laid down

	Boys				Girls				Total			
School year	N	Non-abused group	Abused group	Percentage of child abuse	N	Non-abused group	Abused group	Percentage of child abuse	N	Non-abused group	Abused group	Percentage of child abuse
First	300	291	9	3.00	321	311	10	3.12	621	602	19	3.06
Second	347	338	9	2.59	310	302	8	2.58	657	640	17	2.59
Third	320	309	11	3.44	264	260	4	1.52	584	569	15	2.57
Fourth	294	289	5	1.70	288	280	8	2.78	582	569	13	2.23
Fifth	303	299	4	1.32	300	289	11	3.67	603	588	15	2.49
Sixth	279	274	5	1.79	243	238	5	2.06	522	512	10	1.92
Total	1,843	1,800	43	2.33	1,726	1,680	46	2.67	3,569	3,480	89	2.49

TABLE 2 Characteristics of the subjects.

by the WMA declaration of Helsinki.

Human subjects

A total of 3,569 children attending some elementary schools in Hiroshima Prefecture were randomly chosen for the study.

Questionnaires and recordings

The questionnaire, aimed at helping teaching staff rapidly screen for and detect possible child abuse, consisted of 23 question items (Table 1).

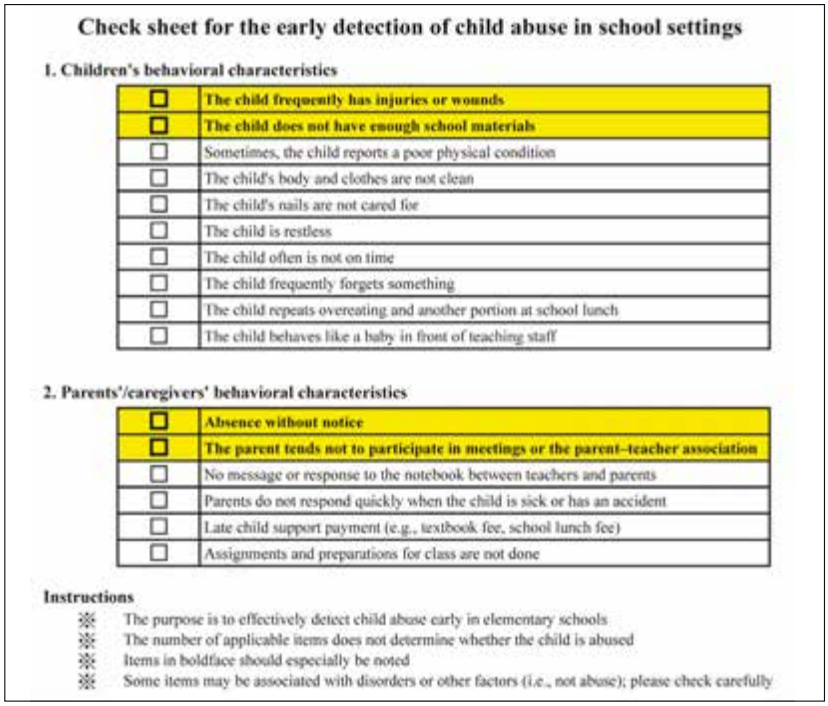
A 4-point scale (Yes = 1; Maybe yes = 2; Maybe no = 3; No = 4) was used for all the question items. The questionnaire was developed in a reverse-scale format. Hence, the lower the score, the higher the likelihood of abuse.

The survey period was determined to be favourable for the teaching staff to understand the state of children [Kaihara et al., 2018a]. Therefore, between mid-December 2016 and mid- January 2017, the teachers in charge of the class in the elementary schools were asked to complete the questionnaire to describe the children in their class.

As survey participants, all the children were classified according to gender and school year. Thereafter, the children were classified into the following two groups: the abused group, which included the children in whom the fact of abuse was confirmed, and non-abused group, which included the rest of the children.

Statistical analyses

A univariate logistic regression analysis was performed with presence or absence of abuse as criterion variable and 23 question items, school years, gender, regular class/special needs classes as explanatory variable. Thereafter, a multiple logistic regression analysis was conducted with "presence or absence of abuse" as criterion variable and with the significant item in univariate logistic regression analysis, as explanatory variable (variable selection was based on the forward selection



Check sheet for the early detection of child abuse in school settings

1. Children's behavioral characteristics

☐	**The child frequently has injuries or wounds**
☐	**The child does not have enough school materials**
☐	Sometimes, the child reports a poor physical condition
☐	The child's body and clothes are not clean
☐	The child's nails are not cared for
☐	The child is restless
☐	The child often is not on time
☐	The child frequently forgets something
☐	The child repeats overeating and another portion at school lunch
☐	The child behaves like a baby in front of teaching staff

2. Parents'/caregivers' behavioral characteristics

☐	**Absence without notice**
☐	**The parent tends not to participate in meetings or the parent–teacher association**
☐	No message or response to the notebook between teachers and parents
☐	Parents do not respond quickly when the child is sick or has an accident
☐	Late child support payment (e.g., textbook fee, school lunch fee)
☐	Assignments and preparations for class are not done

Instructions

※ The purpose is to effectively detect child abuse early in elementary schools
※ The number of applicable items does not determine whether the child is abused
※ Items in boldface should especially be noted
※ Some items may be associated with disorders or other factors (i.e., not abuse); please check carefully

FIG. 1 Check sheet based on our questionnaire survey.

	Item	Regression coefficient	Standard error	Wald test statistics	p	Odds ratios (crude)	
						OR	95% CI
1.	Generally, the child does not look well	-0.209	0.173	1.468	0.226	0.811	(0.579-1.138)
2.	Sometimes, the child reports poor a physical condition	-0.319	0.122	6.802	0.009**	0.727	(0.572-0.924)
3.	The child frequently has injuries or wounds	-0.910	0.177	26.433	> .001***	0.402	(0.284-0.569)
4.	The child's body and clothes are not clean	-0.885	0.125	50.438	> .001***	0.413	(0.323-0.527)
5.	The child's nails are not cared for	-0.763	0.133	33.115	> .001***	0.466	(0.360-0.605)
6.	The child is restless	-0.296	0.092	10.227	> .001***	0.744	(0.621-0.892)
7.	The child shows a blank expression	-0.193	0.136	2.017	0.156	0.824	(0.631-1.076)
8.	The child frequently forgets something	-0.469	0.089	27.914	> .001***	0.625	(0.525-0.744)
9.	The child repeatedly overeats at school lunch, additional portions	-0.465	0.126	13.647	> .001***	0.628	(0.490-0.804)
10.	The child behaves like a baby in front of teaching staff	-0.480	0.111	18.791	> .001***	0.619	(0.498-0.769)
11.	The child excessively watches how teaching staff is feeling, or he/she avoids contact with teaching staff	-0.247	0.189	1.709	0.191	0.781	(0.539-1.131)
12.	The child uses verbal aggression	-0.148	0.134	1.214	0.270	0.863	(0.663-1.122)
13.	The child often is not on time	-0.545	0.114	22.693	> .001***	0.580	(0.463-0.725)
14.	The child often hates going home	-0.518	0.473	1.200	0.273	0.596	(0.236-1.505)
15.	The child does not have enough school materials	-0.796	0.101	61.570	> .001***	0.451	(0.370-0.550)
16.	Absence without notice	-1.009	0.158	40.622	> .001***	0.365	(0.267-0.497)
17.	No message or response to the notebook between teachers and parents	-0.788	0.129	37.160	> .001***	0.455	(0.353-0.586)
18.	The parent tends not to participate in meetings or the parent-teacher association	-0.700	0.096	53.066	> .001***	0.496	(0.411-0.599)
19.	Parents do not respond quickly when the child is sick or has an accident	-1.156	0.206	31.584	> .001***	0.315	(0.210-0.471)
20.	Late child support payment (e.g., textbook fee, school lunch fee)	-0.561	0.133	17.949	> .001***	0.570	(0.440-0.740)
21.	Assignments and preparations for class are not done	-0.749	0.097	59.554	> .001***	0.473	(0.391-0.572)
22.	The child has a habit of licking fingers or biting nails	-0.238	0.179	1.767	0.184	0.788	(0.555-1.119)
23.	The child's grades have suddenly dropped	-0.108	0.478	0.051	0.821	0.898	(0.352-2.291)
	School year	-0.074	0.064	1.338	0.247	0.929	(0.819-1.053)
	Sex	-0.136	0.215	0.403	0.525	0.872	(0.573-1.329)
	Regular class/special needs classes	0.757	0.603	1.580	0.209	2.133	(0.655-6.948)

TABLE 3 Results of the univariate logistic regression analyses.

by likelihood ratio test).

The above-mentioned statistical analyses were performed using IBM SPSS Statistics for Windows (version 22; SPSS, Inc.). Statistical significance was set at a $p < .05$.

Results

We obtained the responses for a total of 3,569 children. The abused children (43 boys; 46 girls; 89 in total) accounted for 2.49% of all the subjects (Table 2). Univariate logistic regression analyses revealed that 16 of 23 items were chosen as significant explanatory variables (Table 3). Subsequently, a multiple logistic regression analysis was performed with presence, or absence, of abuse experience as criterion variable, and school year, gender, presence or absence of developmental disorder, and four items extracted as explanatory variables (Table 4). Model chi-square test statistics were significant ($p < .001$), and the model fit was adequate (Hosmer Lemeshow goodness-of-fit test, $p = .432$). As a result, "The child has frequently remarkable injury or wound", "The child does not have enough school materials", "Absence without notice", and "The parent tends not to participate in the meeting or the PTA" were shown to be statistically significant question items predicting child abuse.

	Item	Regression coefficient	Standard error	Wald test statistics	p	Odds ratios (adjusted)	
						OR	95% CI
3.	The child frequently has injuries or wounds	-0.518	0.215	5.792	0.016*	0.596	(0.391-0.908)
15.	The child does not have enough school materials	-0.373	0.139	7.240	0.007**	0.689	(0.525-0.904)
16.	Absence without notice	-0.474	0.193	6.026	0.014*	0.622	(0.426-0.909)
18.	The parent tends not to participate in meetings or the parent-teacher association	-0.448	0.116	14.850	< 0.001***	0.639	(0.509-0.803)
	constant	3.141	0.966	10.572	0.001**	23.120	

*$p < .05$ **$p < .01$ ***$p < .001$

TABLE 4 Results of the multivariate logistic regression analysis.

The check sheet was completed based on the above mentioned results (Fig. 1). Significant items from the multivariate as well as univariate regressions were chosen. The check sheet was divided into two parts: characteristics of children and parents. This was done to enable a comprehensive evaluation of children at risk for abuse.

Discussion

In this study, 16 items resulted to be effective for prediction of child abuse in elementary schools; especially, four crucial items were chosen based on the multivariate regression analysis. In other words, behaviour pattern that should be preferentially focused for early detection of child abuse was found. A decrease of the number of the items is advantageous for reducing respondents' time and psychological burden. It also leads to a decrease of non-response or responses that were not carefully considered before responding. It can be expected to increase the predictive probability of abused children by improving the accuracy of response to each question. It is thought that this study has provided a useful check sheet available for effective prediction of abuse.

According to the Ministry of Health, Labor and Welfare [n.d.] and the organisations involved in child abuse prevention, school has the following advantages [Ministry of Education, Culture, Sports, Science and Technology, n.d.]:

First, there are approximately 50,000 schools all over Japan and the quantitative scale of schools is overwhelmingly greater than other organisations.

Second, in schools there are teachers who are licensed and have been trained to properly work. The human scale of schools is predominant as compared with the number of the staff in other child welfare institutions, health care or medical institutions, or law enforcement authorities.

Third, schools are a place where children spend most of the day and teaching staff are more likely to find the changes in children by routinely contacting them for long time.

Fourth, teachers do not have to cope with children alone and can solve issues by working as a "team" comprising a group of staff who have various knowledge, experience, and ability.

Finally, they can actively approach children's family or guardians from the viewpoint of education. Thus, it is consequential to create a check sheet for early detection of child abuse/neglect that can be implemented in schools.

The question items without statistical significance should be interpreted as an item that is not easy to be noted by teaching staff when the child is in educational settings, not as an item that does not indicate characteristics of abused child. The items such as "The child does not have enough school materials" and "Absence without notice" are considered to be a problem in fostering or a sign of maladaptive behaviour in conventional studies [Armsden et al., 2000; Board of Education of Hiroshima Prefecture, n.d.; Board of Education of Nara Prefecture, n.d.; Board of Education of Kyoto Prefecture, n.d.; Board of Education of Osaka Prefecture, n.d.; Board of Education of Saitama Prefecture, n.d.; Japanese Society of Pediatric Dentistry, n.d.; Kato et al., 2014; Ministry of Education, Culture, Sports, Science and Technology, n.d.; Motoyama and Noguchi, 2017; Nagatomo et al., 2007; Suzue et al., 2015; Tsuboi, 2005]. The results of an investigation by after school care instructors, pointed the following characteristics of the abused child:

1 anxiety and tension (restlessness),
2 bodily cleanliness (long nails, unkempt appearance, etc.),
3 condition of the body (presence of wounds and scars due to beating),
4 condition and cleanliness of the clothing (dirty or not washed properly) [Suzue et al., 2015].

Previous research indicates that abused children may have behavioural (socialising) and emotional (concentration) issues [Nagatomo et al., 2007]. Given the above, discussion of each item was included in the check sheet, highlighting the importance of reviewing both child and parent behaviour to identify children at risk of abuse/neglect.For some question items selected carefully in this study, like "The body and clothes are not clean" and "The child is restless", the statements can be recognised by dental professionals in the dental clinic. Alternatively, truancy or discontinuation of visiting a dental clinic may indicate inappropriate nurturing attitude of the parents. In other words, for dentists who are familiar with behavioural characteristics of abused children, careful observation of children and their parents may lead to early detection and prevention of abuse.

The results of our previous survey published elsewhere performed in a temporary shelter also showed that aid-requiring children were affected by dental cavities [Niizato et al., 2012] and that poor nurturing attitude of parents led to its higher prevalence [Nizato et al., 2018]. Kato et al. [2014] reported that a clean appearance, face-washing, organising things, and toothbrushing in the morning are summarised as a single concept (factor of cleaning/arrangement), correlating with anxiety, relationships with family/friends, and irritability.

Toothbrushing in the morning is a lifestyle component and related to mental health.

In other words, observation can lead to an early detection and prevention of abuse when the dental professionals examine the oral cavity of the child in the dental practice and observe the speech and behaviour of children and their parents carefully.

Conclusion

In brief, a survey to establish the index for early detection of child abuse like this project is extremely rare and has considerable social significance. Based on the results of our study, it is important that dental professionals, who have a different viewpoint from people involved in education and have duties involved in child welfare, address the issues of child abuse via interprofessional work. Continuation of such activities greatly contributes to an early detection and prevention of child abuse. Furthermore, promoting healthy child development, supports the goals of Dentistry. We expect that the findings of this study may contribute to the early detection of child abuse/neglect and lead to many further social studies from the dentistry domain in the future. However, a limitation of this study is that the results were based on the research of only a few regional cities in Japan. If the same results could be obtained by applying the check sheet prepared in this study to a larger sample of children, its effectiveness as a screening index may be enhanced.

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