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A cross-sectional survey of schoolchildren and their parents concerning the risk of stranger danger to children on their way to and from school

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1. INTRODUCTION

Recently in Japan there has been an increase in incidents of child stalking and even the abduction of children from schoolyards[1), 2)]. Even in rural towns like Matsuyama, the capital of Ehime Prefecture, the prevailing perception of citizens is that the streets are no longer as safe for children as they once were.

The Ministry of Education and Science has announced that protecting children from stranger danger is a matter of urgency and that concrete measures need to be taken to counter this problem[3)]. Examples of measures currently being introduced include instruction in self-defense for teachers and evacuation drills incorporating simulated attacks by intruders.

Local community activity also plays an important role in reducing the risk of stranger danger to children, however until recently there have been few concrete strategies developed to deal with this issue. Now for example, in Ehime Prefecture a kind of neighborhood watch scheme called "Iyo-mamorukun-no-ie", has been put into operation by the prefectural police. In another case volunteer patrol groups called "Kodomo-mimamori-tai" keep an eye on playgrounds and the streets around schools as a deterrent against stranger danger.

Many researchers have pointed to the importance of a sense of community in encouraging the sharing of risk information between residences[4-7)]. Where communication flows freely through a community there is an overall increase of awareness of potential risks like stranger danger. Once parents and children have recognized the potential for, and serious consequences of stranger danger they are in a better position to alter their attitudes towards how they guard against such danger.

Avoiding risks like stranger danger depends largely on the three factors of risk perception, risk mitigation and social awareness[8)]. As such, the key to residents within a community being better able to deal with stranger danger is to increase their recognition of the importance of these factors.

In this study we used a cross sectional survey to

examine the attitudes of children and parents towards stranger danger. Firstly, we investigated the perceptions schoolchildren and parents have of the risk of stranger danger. Secondly, we looked at how perception might differ between the two groups based on the different degree to which each is affected by incidents of stranger danger. We further looked at the sense of community exhibited by children and their parents, in particular how children's positive attitudes towards community information may be well-related to their parents' participation in neighborhood watch schemes and patrol groups.

2. METHODS

(1)Study design, study population and procedure

This cross-sectional survey and field study was carried out in two public elementary schools located a kilometer apart the center of Matsuyama City. The purpose and contents of our anonymous questionnaires were explained to the subjects beforehand. Respondents all provided their consent to participate in the study.

(2)Self-administered Questionnaire

For primary analysis we distributed a one-page questionnaire (referred Appendix 1) to the children in grades one through six from the two elementary schools (10 questions), and their parents (17 questions). The questionnaires were taken home and filled out by both the children and their parents respectively. The questionnaires were returned in anonymous envelopes. There were 814 completed questionnaires received from children (426 boys and 388 girls) and 814 from the parents (where there were two or more children in one household, parents answered a separate questionnaire for each child) (Table 1).

The questionnaire was designed to assess potential dangers in school zones, measures which children themselves can adopt and other concrete measure of avoiding harms, all of which were rated on a two-point scale (1; "yes", and 2; "no" response) The questions asked of the children were different from those asked of the parents.

We defined the three categories of risk perception (stranger danger), risk mitigation and social awareness according to the contents of our questions to subjects (Table 2).

(3) Statistical analysis

We compared the answers given by the children and their parents. Categorical variable were assessed with the Chi-square test with Yates' correction or Fisher's exact test, as appropriate. We used STATISTICA 7.0 software (Stat Soft, Inc.) for all analyses, with significance being set at $p<0.05$. All P values are two-tailed.

To examine the associated factors with risk mitigation behavior of children, a multiple logistic regression analysis was used. A univariate analysis was performed to detect the association of risk mitigation behavior of children with each of the variable factors of their parents, and then the variables were analyzed using the forward

Table 1.Distribution of schoolchildren and parents by school grade and gender (number of subjects and responses, response rate)

Grade	subjects (boys)	responses	response rate	subjects (girls)	responses	response rate	subjects (parents)	responses	response rate
First	62	51	82%	79	71	90%	141	122	87%
Second	77	65	84%	66	62	94%	143	127	89%
Third	66	56	85%	73	59	81%	139	115	83%
Fourth	72	64	89%	52	38	73%	124	102	82%
Fifth	71	59	83%	57	53	93%	128	112	88%
Sixth	78	61	78%	61	60	98%	139	121	87%
Total	426	356	84%	388	343	88%	814	699	86%

selection stepwise procedure ($p \leqq 0.05$ as inclusion and $P \geqq 0.10$ as exclusion). Strong intercorrelations between variables were checked and excluded from a multiple logistic regression model.

Table 2.

Risk perception	
	Question to children
	Q8. Has your homeroom teacher explained to you where your local Neighborhood Watch houses are?
	Q9. Have your parents explained to you where your local Neighborhood Watch houses are?
	Q10. Have your neighbors explained to you where your local Neighborhood Watch houses are?
	Question to parents
	Q14. Do you know which routes your children take when traveling to and from school?
	Q17. Have you ever had an opportunity of talking to your children about 'stranger danger' and about people/places they can go to for help?
	Q18. Have you ever walked to or from school with your children?
	Q20. Do your children carry personal handheld alarms?
	Q22. Have your children ever sounded a personal handheld alarm by mistake?
Risk mitigation	
	Question to children
	Q2. Do you always walk home from school with your friends?
	Q3. Are you familiar with the houses in your area displaying Neighborhood Watch stickers?
	Q7. Do you talk to your parents about traveling to and from school safely?
	Question to parents
	Q11. Are you familiar with the Neighborhood Watch sticker? 1
	Q12. Do you know which houses in your area are Neighborhood Watch houses?
	Q15. Do you have any concerns about your children's safety when traveling to and from school?
	Q16. Do you know the parks, playgrounds etc where your children play outside of school time?
	Q24. Whilst inside your home, do you think you would notice the sound of a personal handheld alarm sounded outside?
Social awareness	
	Question to children
	Q4. Have you ever been approached by a stranger on your way to or from school?
	Q5. Have you ever sought refuge in a Neighborhood Watch house?
	Question to parents
	Q13. Have you talked to your children about how to keep safe when traveling to and from school?
	Q19. Are you familiar with the sound a personal handheld alarm makes?
	Q25. Are you concerned when you receive information from your child's school about suspicious characters seen in the area?
	Q26. Do you participate in or assist the volunteer patrol group run by the PTA in your local area?
	Q27. Would you like your children to be able to use a Neighborhood Watch house in the event of a natural disaster like an earthquake or flood?

Every question is answered with "Yes" or "No"

Multinomial logistic regression was used to assess relationships among the evaluation of awareness of potential risk factors and the attitude of individual questionnaire's answers of children and parents towards

Table 3.

	Children's responses			Parents' responses					
		number	response rate(%)		number	response rate(%)		number	response rate(%)
Q1	Boys	356	50.9	Q11 Yes	661	94.6	Q19 Yes	44	6.3
	Girls	343	49.1	No	26	3.7	No	654	93.6
	Total	699	100	No response	12	1.7	No response	1	0.1
				Total	699	100	Total	699	100
Q2	Yes	574	82.1	Q12 Yes	492	70.4	Q20 Yes	581	83.1
	No	78	11.2	No	122	17.5	No	101	14.4
	No response	47	6.7	No response	85	12.2	No response	17	2.4
	Total	699	100	Total	699	100	Total	699	100
Q3	Yes	476	68.1	Q13 Yes	617	88.3	Q21 Nothing	602	86.1
	No	212	30.3	No	59	8.4	Detailed response	97	13.9
	No response	11	1.6	No response	23	3.3	Total	699	100
	Total	699	100	Total	699	100			
Q4	Yes	50	7.2	Q14 Yes	692	99	Q22 Yes	63	9
	No	634	90.7	No	3	0.4	No	556	79.5
	No response	15	2.1	No response	4	0.6	No response	80	11.4
	Total	699	100	Total	699	100	Total	699	100
Q5	Yes	3	0.4	Q15 Yes	458	65.5	Q23 Neighbors ran to help	46	6.6
	No	692	99	No	199	28.5	Everyone ignored the alarm	1	0.1
	No response	4	0.6	No response	42	6	Detailed response	14	2
	Total	699	100	Total	699	100	No response	638	91.3
							Total	699	100
Q6	Nothing	697	99.7	Q16 Yes	650	93	Q24 Yes	152	21.7
	Detailed response	2	0.3	No	17	2.4	No	173	24.7
	Total	699	100	No response	32	4.6	No response	374	53.5
				Total	699	100	Total	699	100
Q7	Yes	332	47.5	Q17 Yes	347	49.6	Q25 Yes	689	98.6
	No	270	38.6	No	305	43.6	No	5	0.7
	No response	97	13.9	No response	47	6.7	No response	5	0.7
	Total	699	100	Total	699	100	Total	699	100
Q8	Yes	245	35.1	Q18 Yes	665	95.1	Q26 Yes	477	68.2
	No	336	48.1	No	32	4.6	No	25	3.6
	No response	118	16.9	No response	2	0.3	No response	197	28.2
	Total	699	100	Total	699	100	Total	699	100
Q9	Yes	314	44.9				Q27 Yes	580	83
	No	330	47.2				No	29	4.1
	No response	55	7.9				No response	90	12.9
	Total	699	100				Total	699	100
Q10	Yes	35	5						
	No	616	88.1						
	No response	48	6.9						
	Total	699	100						

the risk in three main categories (risk perception, risk mitigation and social awareness described above).

3. RESULTS

Table 1 shows the response rate to the questionnaires by the schoolchildren from the two elementary schools and their parents.

We classified our questions to the schoolchildren and parents into three categories: (1) stranger-danger risk perception, (2) risk mitigation, and (3) social awareness (Table 2).

Table 3 shows the response to the questionnaires given to children and parents.

There were three positive responses (0.7%) to Q5 (“Have you ever sought refuge in a Neighborhood Watch house?”). Two respondents provided details (Q6): “A man tried to get me to go with him”, and “A man was following me”.

Table 4 shows that the level of children's risk mitigation behavior (Q3) was significantly related to parents' risk perception (Q17), parents' risk mitigation (Q11, Q12, Q15)

Table 4.Comparison of children's responses to Q3 with parents' responses (to Q11-27)

		Q3: Are you familiar with the Neighborhood Watch houses in your area?		
		Yes (n=476)*	No (n=212)*	P value
Q11	Yes	457	193	0.004
	No	11	15	
Q12	Yes	388	99	<0.01
	No	49	71	
Q13	Yes	416	191	NS
	No	39	19	
Q14	Yes	472	209	NS
	No	2	1	
Q15	Yes	326	127	0.038
	No	123	71	
Q16	Yes	439	201	NS
	No	12	5	
Q17	Yes	274	69	<0.01
	No	178	120	
Q18	Yes	451	204	NS
	No	23	8	
Q19	Yes	438	205	0.04
	No	37	7	
Q20	Yes	394	177	NS
	No	67	33	
Q22	Yes	49	12	NS
	No	368	179	
Q24	Yes	107	65	NS
	No	107	42	
Q25	Yes	467	211	NS
	No	5	0	
Q26	Yes	315	154	NS
	No	19	6	
Q27	Yes	407	167	NS
	No	19	8	

*: Numbers may not add up to column totals because of non responses.

NS: not significant

Table 5.Comparison of children's responses to Q7 with parents' responses (to Q11-27)

		Q7: Do you talk to your parents about traveling to and from school safely?		
		Yes (n=332)*	No (n=270)*	P value
Q11	Yes	318	254	NS
	No	10	14	
Q12	Yes	238	188	NS
	No	54	52	
Q13	Yes	323	204	<0.01
	No	5	52	
Q14	Yes	329	269	NS
	No	1	1	
Q15	Yes	245	152	<0.01
	No	78	100	
Q16	Yes	319	242	NS
	No	6	10	
Q17	Yes	211	105	<0.01
	No	102	152	
Q18	Yes	321	252	NS
	No	10	17	
Q19	Yes	321	241	<0.01
	No	11	28	
Q20	Yes	305	200	<0.01
	No	23	58	
Q22	Yes	41	18	0.027
	No	256	223	
Q24	Yes	88	62	NS
	No	77	58	
Q25	Yes	329	264	NS
	No	3	2	
Q26	Yes	248	162	0.001
	No	6	18	
Q27	Yes	278	222	NS
	No	14	12	

*: Numbers may not add up to to column totals because of non responses.

NS: not significant

Table6. Statistical relevance of children's Q3 responses to parents' responses (Q11-27)
: Odds ratios and 95% CI calculated with conditional logistic regression method

	Odds ratio	95%CI	P value
Q11	1.45	0.53-3.97	NS
Q12	4.86	2.99-7.89	<0.01
Q15	1.49	0.97-2.31	NS
Q17	1.87	1.24-2.84	0.003
Q19	0.37	0.14-1.02	NS

NS: not significant

CI: confidence interval

Table 7.Statistical relevance of children's Q7 responses to parents' responses (Q11-27)
: Odds ratios and 95% CI calculated with conditional logistic regression method

	Odds ratio	95%CI	P value
Q13	13.2	2.86-60.7	<0.01
Q15	1.49	0.89-2.50	NS
Q17	2.15	1.52-3.96	<0.01
Q19	2.17	0.62-7.65	NS
Q20	2.21	1.05-4.65	0.03
Q22	1.84	0.84-4.02	NS
Q26	4.43	1.31-14.9	0.02

NS: not significant

CI: confidence interval

and parents' social awareness (Q19) based on univariate analysis ($p<0.05$ by Chi-square test). A logistic regression analysis showed that the answers to Q3 were significantly associated with Q12 and Q17 (Table 6).

Table 5 shows that the level of children's risk mitigation behavior (Q7) was significantly related to parents' risk perception (Q17, Q20), parents' risk mitigation (Q15) and parents' social awareness (Q13, Q19, Q22, Q26) based on univariate analysis ($p<0.05$ by Chi-square test). A logistic regression analysis showed that the answer of Q7 was significantly associated with Q13, Q17,Q20 and Q26 (Table 7).

Figure 1 shows the changes in ratio of parents concerns about their children's safety (Q15) by gender and grade. Parents who have boys and girls in the lower grades (1st to 3rd), or girls in the higher grades (4th and 5th) were very concerned about their children's safety in relation to attending school.

Figure 2 shows the changes in ratio of children carrying personal hand-held alarms, by gender and grade. There is

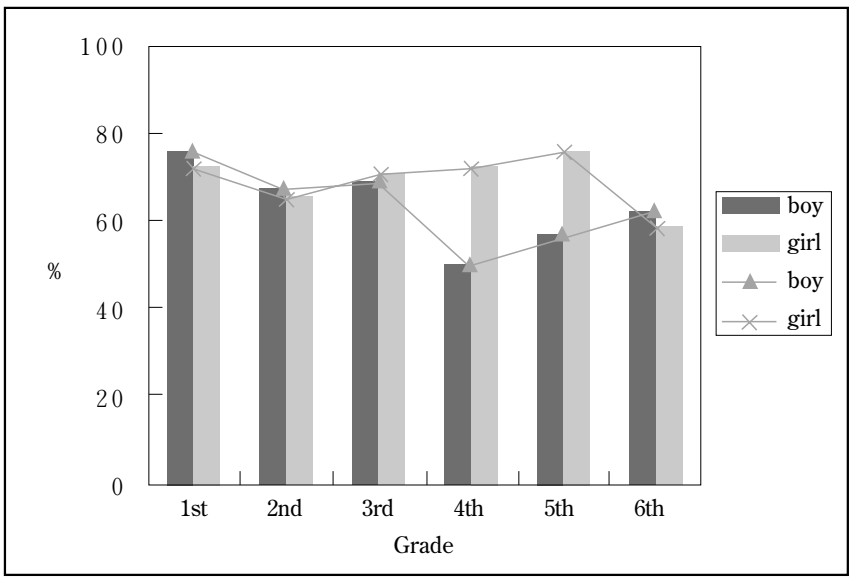

Figure 1.The changes in ratio of parents' concern over children's safety (Q15) (by gender and grade)

Q15 Do you have any concerns about your children's safety when traveling to and from school?

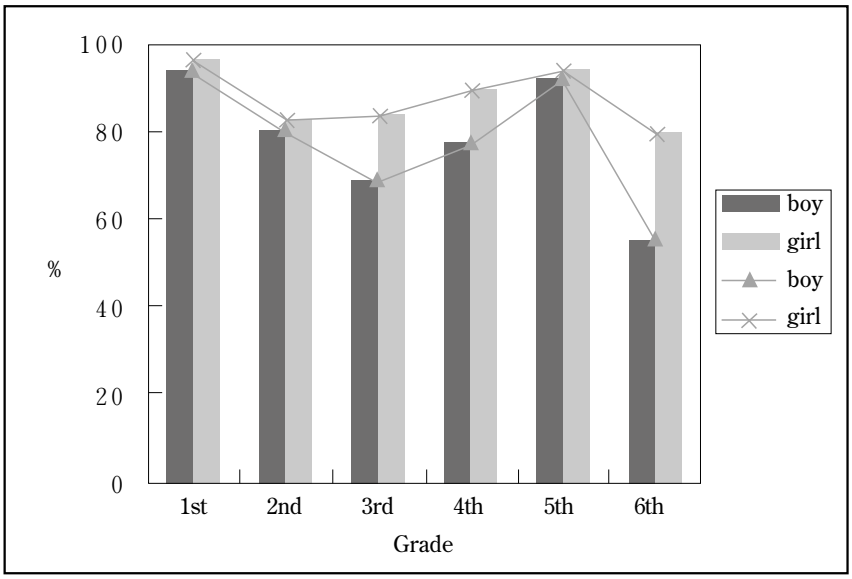

Figure2.Changes in ratio of children carrying personal hand-held alarms (by gender and grade)

a higher ratio of children in lower grades with hand-held alarms than in the higher grades. in every grade, girls possession of hand-held alarms was at a higher ratio than boys.

4. DISCUSSION

This study poses two questions. (1) How do parents most effectively protect their children against stranger danger? (2) What value do neighborhood watch schemes have in protecting children against stranger danger. Our results actually included the accounts of two children who experienced the threat of stranger danger and subsequently took refuge in a neighborhood watch houses. This demonstrates a concrete example of the important role the neighborhood watch scheme can play in protecting children from stranger danger.

Our one-page survey to children and parents study found that the level of children's risk mitigation behavior (Q3) was significantly related to parents' risk mitigation behavior (Q12) and risk perception(Q17). The results indicated that the question of whether children recognized the location of neighborhood watch houses on their way to school rested mainly on the following two points. One point was whether the parents themselves knew the location of neighborhood watch houses. The second point was whether or not there was discussion at home concerning where the children could take refuge in the event of apparent danger.

In a similar way, the children's risk mitigation (Q7) was significantly associated with the parents' risk perception (Q17 and Q20) and parents' risk mitigation (Q13). The results indicate that four factors are involved in children's risk mitigation: (1) Whether parents have frankly discussed how their children can avoid stranger danger. (2) Whether parents have discussed neighborhood watch homes in the context of stranger danger. (3) Whether children possess handheld alarms. (4) Whether parents take part in volunteer neighborhood patrol groups.

Our results indicated that children's risk mitigation behavior (Q3) was significantly related to parents' risk perception (Q17).

Recently there have been numerous incidents of children being approached while on their way to or from school[9]. Parents are concerned for their children's safety, and are conscious of the fact that their children need to be made aware of the dangers which they may face in the course of traveling to and from school, and of the ways to avoid them[10]. One means of risk mitigation is the neighborhood watch scheme. Our results on children's risk mitigation behaviors (Q3 and Q7) lead to the

conclusion that children in homes where parents always took concrete measures against stranger-danger comprehended the real significance of what role neighborhood watch schemes play, and may cultivate a greater ability to cope with incidents of stranger danger.

The homes in which parents had already taken measures to prevent stranger-danger incidents, such as providing the children with hand-held alarms, showed the same trend, that is the children of parents who more frequently provided opportunities to discuss concrete methods of avoiding stranger-danger showed a greater degree of risk mitigation behavior. Therefore, we consider that the level of children's risk mitigation can be associated with parents' level of risk perception or parents' social awareness and risk mitigation.

Our results show the change in ratio of parents' concerns about their children's safety (Q15) by gender and grade. Parents who have boys and girls in the lower grades (1st to 3rd), or girls in the higher grades (4th and 5th) were very concerned about their children's safety in relation to attending school.

We considered the reasons why, based on the results in Figure 1, parents seem less concerned for the safety of girls in 6th grade compared to girls in 4th and 5th grade. We believe that attendance at Juku (cram school) may provide one explanation. Juku's classes for 6th grade students finish at night, later than classes for younger children, and parents usually collect 6th graders rather than let them travel home alone at night11). We need to do further research on the study of Jukus and children's safety.

Our results show the change in ratio of children carrying personal hand-held alarms, by gender and grade. There is a higher ratio of children in lower grades with hand-held alarms than in the higher grades. In every grade, girls' possession of hand-held alarms was at a higher ratio than boys. However, Figure 2 shows a decrease in the ratio of possession for children in grade 6. We can only speculate as to the reasons, but perhaps, parental fears peak at grades 4 and 5, and for grade 6 the "juku" effect plays a role.

The ability of children to avoid harm is connected with parents' risk perception and community awareness. Further studies are in progress to investigate the factors involved in assessing the relationship between sense of community and children's risk mitigation behavior.

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Appendix 1

Questionnaire to Schoolchildren and Parents

Children's questionnaire

1.Circle your sex

①boy ②girl

2.Do you always walk home from school with your friends?

① Yes ②No

3. Are you familiar with the houses in your area displaying Neighborhood Watch stickers?

①Yes ②No

4.Have you ever been approached by a stranger on your way to or from school?

①Yes ②No

5.Have you ever sought refuge in a Neighborhood Watch house?

①Yes ②No

6. If you answered Yes to Question 5 please describe the situation in detail.

( )

7.Do you talk to your parents about traveling to and from school safely?

①Yes ②No

8. Has your homeroom teacher explained to you where your local Neighborhood Watch houses are?

①Yes ②No

9. Have your parents explained to you where your local Neighborhood Watch houses are?

①Yes ②No

10. Have your neighbors explained to you where your local Neighborhood Watch houses are?

①Yes ②No

Parent's Questionnaire

11. Are you familiar with the Neighborhood Watch sticker?

①Yes ②No

12. Do you know which houses in your area are Neighborhood Watch houses?

①Yes ②No

13.Have you talked to your children about how to keep safe when traveling to and from school?

①Yes ②No

14.Do you know which routes your children take when traveling to and from school?

①Yes ②No

15.Do you have any concerns about your children's safety when traveling to and from school?

①Yes ②No

16.Do you know the parks, playgrounds etc where your children play outside of school time?

①Yes ②No

17.Have you ever had an opportunity of talking to your children about 'stranger danger' and about people/places they can go to for help?

①Yes ②No

18. Have you ever walked to or from school with your children?

①Yes ②No

19. Are you familiar with the sound a personal handheld alarm makes?

①Yes ②No

20. Do your children carry personal handheld alarms?

①Yes ②No

21. If you answered "No" to question 20, please write down the reason in detail.

( )

22. Have your children ever sounded a personal handheld alarm by mistake?

①Yes ②No

23. If you answered "Yes" to Question 22 , please describe the response to the sounding of the alarm :

①Neighbors ran to help

②Everyone ignored the alarm

③(Other) :please write down the situation in detail

( )

24.Whilst inside your home, do you think you would notice the sound of a personal handheld alarm sounded outside?

①Yes ②No

25. Are you concerned when you receive information from your child's school about suspicious characters seen in the area?

①Yes ②No

26. Do you participate in or assist the volunteer patrol group run by the PTA in your local area?

①Yes ②No

27. Would you like your children to be able to use a Neighborhood Watch house in the event of a natural disaster like an earthquake or flood?

①Yes ②No