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ABSTRACT

The present study investigated the perceptions, knowledge and preparedness needed to cope in a range of natural hazard scenarios, with particular attention given to earthquakes and tsunami. The survey comprised 852 intermediate school children in the Wellington region. The children generally demonstrated a realistic understanding of the likelihood of earthquakes and tsunami occurring in the Wellington region at large, and the large majority of children surveyed understood the causes of earthquake and tsunami, and knew best practice in the event of these two hazards. However, about 20% of the children were 'often' fearful of earthquakes and tsunami. It appears that only a minority of children discuss with their parents what they learn about hazards at school, and family preparedness rates were low for dealing with an emergency event. Results suggest that future hazards programmes in schools include emotional-coping components to help reduce maladaptive fear, and also include hazards related homework exercises requiring interaction with the whole family to encourage the flow-on effect of school-learning to the home and wider community.

KEYWORDS

Hazards, children, school, preparedness, earthquake, tsunami.

1.0 INTRODUCTION

The complex landscape of New Zealand predisposes the country to a range of potential natural hazards including earthquake and tsunami, floods, storms, volcanic eruptions, and tornados, as well as fire and chemical or gas spills.

Wellington, the capital city, and its environs are situated on and around several fault lines. There is steep terrain in parts of the region, houses and schools are built along a major river towards the north, sea surrounds the region to the east, west and south, and the region experiences some extreme weather conditions due to its geographical position at the southern tip of the north island. These factors point to the need for people to be prepared to cope in the event of a significant natural hazard, particularly in an earthquake or tsunami.

Education concerning the nature of particular hazards, and preparedness to cope in a significant event, is most effective when it begins at school. Studies (e.g., Ronan & Johnston, 2003, 2005; Ronan, Johnston, Daly & Fairly, 2001) have demonstrated that hazards-education at school flows on to the home and wider community as children discuss what they have learnt with their families. The present study surveys a group of Wellington intermediate (Years 7 & 8) school children to investigate their perceptions, knowledge and preparedness to cope in a range of natural hazard scenarios. Because of the particular vulnerability to the potential hazards of earthquake and tsunami in the Wellington region, extra attention is given in this study to the children's understanding of, and preparedness to cope in, a significant earthquake or tsunami.

2.0 GEOGRAPHIC SETTING OF THE SURVEY AREA

The survey area ranged from a harbour school in the west, to a valley school in the east. Two schools situated near a major river in the north of the region are included, plus a fifth school situated in the inner west, just north of the Wellington central business district.

3.0 OVERVIEW AND OBJECTIVES

Children need to be prepared to cope both physically and mentally in a hazard event. To achieve this, it is first important that children understand the nature of particular hazards, and that they understand their vulnerability to specific hazards that may occur in the area in which they live or go to school. With this background knowledge, children need to have learnt some physical and emotional coping strategies that can be applied in a significant hazard event.

In the present study, questionnaire data is gathered to provide baseline information concerning children's current perceptions, knowledge, and preparedness to cope in a hazard event, with particular attention given to earthquake and tsunami preparedness. (Survey questions are shown in Tables 1-84.)

Baselines information generated from the present study will contribute to future hazards-education programmes in New Zealand schools.

4.0 METHOD

4.1 Participants

Five Intermediate schools participated in the study, with 852 children returning completed questionnaires. Ages ranged from 10-12 years (plus four 13 year-olds), comprising 436 males (51%) and 408 females (48%); gender unstated: 8 (1%). Participants identified their ethnicity as follows: NZ European 57%; Maori 23%; Pacific Island 7.5%; Asian 6%; other ethnicities 5%; and unstated 1.5%.

4.2 Measure

The self-administered questionnaire was a modified version of Ronan and Johnston's (2001) questionnaire, developed to investigate children's perceptions and understanding of eight environmental hazards (earthquake, tsunami, flood, storm with high winds, house fire, volcanic eruption, chemical spill or gas leak, and tornado) relevant to New Zealand. The questionnaire also assessed: children's emotional responses to hazards; discussion rates with parents, peers and teachers; children's exposure to hazards programmes; knowledge of facts and safety practices; and family preparedness for emergencies. Modifications to the questionnaire for the present study included additional questions on anxiety levels in respect of earthquakes and tsunamis, and a section on knowledge and best practice regarding tsunamis. Questions are provided as table headings for Tables 1-84.

4.3 Procedure

All 13 state-Intermediate schools in the Wellington region, from the southern coast of the North Island as far as Upper Hutt in the north, and from the west to east coasts were invited to take part in the survey. (Schools on the Kapiti coast were not included in the present study, as these schools have contributed to a considerable number of research surveys over the past few years. As well, it is important that regardless of where children live or go to school, that they are prepared to cope with hazards they may encounter anywhere in the region, or beyond.) Five schools agreed to take part in the study, and individual questionnaires were provided for all pupils in these schools. Response rate: 35/40 classes, averaging 24 students per class.

Intermediate school children were chosen for the present study as they are generally able to complete questionnaires independently following an initial explanation from a class teacher.

5.0 RESULTS

Tables 1-4 describe the demographics of the five schools. Tables 5-84 provide descriptive statistics for the questions (provided in the table headings) on the questionnaire.

Table 1 Geographical location of school and number of participants

School	Count	%
1 Inner West, N. of CBD	170	20.0
2 Western harbour	84	9.9
3 Eastern valley	200	23.5
4 Near river in North	124	14.6
5 Near river in North	274	32.2
Total	852	100.0

Table 2 Age of Participants

Age	Count	%
10	90	10.6
11	474	55.6
12	279	32.7
13	4	.5
Total	848	99.5
Missing	5	.5
Total	852	100.0

Table 3 Gender of Participants

Gender	Count	%
Male	436	51.2
Female	408	47.9
Total	844	99.1
Missing	8	.9
Total	852	100.0

Table 4 Ethnicity of Participants

Ethnicity	Count	%
Pakeha European	489	57.4
Maori	196	23.0
Pacific Islander	63	7.4
Asian	50	5.9
Other	41	4.8
Total	839	98.5
Missing	13	1.5
Total	852	100.0

Table 5 Q1. Which two hazards would be most likely to affect you at home?

Hazard	Count	%
Flood	173	10.2
Storm high winds	226	13.3
House fire	526	30.9
Earthquake	483	28.3
Volcanic eruption	21	1.2
Tsunami	49	2.9
Chemical spill/gas leak	68	4.0
Tornado	116	6.8
Total	1662	93.7
Missing	42	2.2
Total	1704	100.0

Table 6 Q2. Which two hazards would be most likely to affect you at school?

Hazard	Count	%
Flood	287	16.8
Storm high winds	226	13.3
House fire	198	11.6
Earthquake	613	36.0
Volcanic eruption	25	1.5
Tsunami	60	3.5
Chem spill/gas leak	111	6.5
Tornado	108	6.3
Total	1668	97.9
Missing	36	2.1
Total	1704	100.0

Table 7 Q3. How likely is it that these hazards will occur around your home or school in the future?

Rated likelihood	Flood		Storm with High Winds		House Fire		Earthquake		Volcanic Eruption		Tsunami		Chem Spill/ Gas Leak		Tornado	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Likely	142	16.7	365	42.8	220	25.8	462	54.2	28	3.3	29	3.4	97	11.4	48	5.6
A chance	497	58.3	421	49.4	510	59.9	341	40.0	76	8.9	194	22.8	431	50.6	315	37.0
Unlikely	208	24.4	56	6.6	112	13.1	41	4.8	743	87.2	616	72.3	316	37.1	478	56.1
Total	847	99.4	842	98.8	842	98.8	844	99.1	847	99.4	839	98.5	844	99.1	841	98.7
Missing	5	.6	10	1.2	10	1.2	8	.9	5	.6	13	1.5	8	.9	11	1.3
Total	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0

Table 8 Q4. If one of these hazards occurs around your home or school in the future, how likely is it that it could hurt you?

Rated likelihood	Flood		Storm with High Winds		House Fire		Earthquake		Volcanic Eruption		Tsunami		Chem Spill/ Gas Leak		Tornado	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Likely	144	16.9	193	22.7	487	57.2	355	41.7	369	43.3	356	41.8	235	27.6	340	39.9
A chance	432	50.7	500	58.7	304	35.7	417	48.9	183	21.5	232	27.2	454	53.3	312	36.6
Unlikely	263	30.9	142	16.7	45	5.3	61	7.2	284	33.3	243	28.5	141	16.5	181	21.2
Total	839	98.5	835	98.0	836	98.1	833	97.8	836	98.1	831	97.5	830	97.4	833	97.8
Missing	13	1.5	17	2.0	16	1.9	19	2.2	16	1.9	21	2.5	22	2.6	19	2.2
Total	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0

Table 9 Q5. How much does thinking or talking about the hazards below scare or upset you?

Rating Scare/upset	Flood		Storm with High Winds		House Fire		Earthquake		Volcanic Eruption		Tsunami		Chem Spill/ Gas Leak		Tornado	
	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%
Not at all	513	60.2	446	52.3	217	25.5	309	36.3	383	45.0	325	38.1	455	53.4	311	36.5
Sometimes	301	35.3	317	37.2	387	45.4	350	41.1	262	30.8	295	34.6	296	34.7	333	39.1
Often	24	2.8	64	7.5	220	25.8	166	19.5	182	21.4	203	23.8	81	9.5	192	22.5
Total	838	98.4	827	97.1	824	96.7	825	96.8	827	97.1	823	96.6	832	97.7	836	98.1
Missing	14	1.6	25	2.9	28	3.3	27	3.2	25	2.9	29	3.4	20	2.3	16	1.9
Total	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0	852	100.0

Table 10 Q6a. Does talking about any of these hazards upset your parents?

Upset parents	Count	%
Yes	69	8.1
Not sure	575	67.5
No	179	21.0
Total	824	96.7
Missing	29	3.3
Total	852	100.0

Table 11 Q6b. If you said your parents get upset when talking about a hazard, which hazard is the most upsetting for them?

Hazard perceived as most feared by parents	Count	%
Flood	3	.4
Storm	4	.5
House fire	36	4.2
Earthquake	23	2.7
Volcanic eruption	3	.4
Tsunami	19	2.2
Chem spill/gas leak	1	.1
Tornado	11	1.3
Total	100	11.7
Missing	752	88.3
Total	852	100.0

Table 12 Q7. If any of these hazards occur, some kids and adults get upset. That's normal.

- (a) If you got upset, do you think you would be able to help yourself feel less upset?
 (b) If you got upset, do you think your family would be able to help you feel less upset?
 (c) If you got upset, do you think your school would be able to help you feel less upset?

Help feel less upset	Yourself		Family		School	
	Count	%	Count	%	Count	%
1 Not at all	45	5.3	26	3.1	101	11.9
2	18	2.1	19	2.2	70	8.2
3	67	7.9	27	3.2	88	10.3
4 A bit	244	28.6	140	16.4	222	26.1
5	180	21.1	98	11.5	124	14.6
6	134	15.7	199	23.4	105	12.3
7 Completely able	154	18.1	330	38.7	129	15.1
Total	842	98.8	839	98.5	839	98.5
Missing	10	1.2	13	1.5	13	1.5
Total	852	100.0	852	100.0	852	100.0

Table 13 Q8a. Have you ever discussed floods with your parents? If so, who brought it up?

	Discussed Flood		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	354	41.5	121	14.2	161	18.9	65	7.6
No	468	54.9	-	-	-	-	-	-
Total	822	96.5	-	-	-	-	-	-
Missing	30	3.5	731	85.8	691	81.1	787	92.4
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 14 Q8b. Have you ever discussed storms with high winds with your parents? If so, who brought it up?

	Discussed storms with high winds		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	254	29.8	81	9.5	105	12.3	54	6.3
No	561	65.8	-	-	-	-	-	-
Total	815	95.7	-	-	-	-	-	-
Missing	37	4.3	771	90.5	747	87.7	798	93.7
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 15 Q8c. Have you ever discussed house fires with your parents? If so, who brought it up?

	Discussed house fire		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	490	57.5	130	15.3	280	32.9	68	8.0
No	335	39.3	-	-	-	-	-	-
Total	825	96.8	-	-	-	-	-	-
Missing	27	3.2	722	84.7	572	67.1	784	92.0
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 16 Q8d. Have you ever discussed earthquakes with your parents? If so, who brought it up?

	Discussed earthquakes		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	521	61.2	204	23.9	237	27.8	71	8.3
No	298	35.0	-	-	-	-	-	-
Total	819	96.1	-	-	-	-	-	-
Missing	33	3.9	648	76.1	615	72.2	781	91.7
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 17 Q8e. Have you ever discussed volcanic eruptions with your parents? If so, who brought it up?

	Discussed volcanic eruptions		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	188	22.1	65	7.6	62	7.3	49	5.8
No	629	73.8	-	-	-	-	-	-
Total	817	95.9	-	-	-	-	-	-
Missing	35	4.1	787	92.4	790	92.7	803	94.2
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 18 Q8f. Have you ever discussed tsunamis with your parents? If so, who brought it up?

	Discussed tsunamis		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	261	30.6	104	12.2	90	10.6	58	6.8
No	561	65.8	-	-	-	-	-	-
Total	822	96.5	-	-	-	-	-	-
Missing	30	3.5	748	87.8	762	89.4	794	93.2
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 19 Q8g. Have you ever discussed chemical spills or gas leaks with your parents? If so, who brought it up?

	Discussed chemical spill/gas leak		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	170	20.0	52	6.1	75	8.8	32	3.8
No	640	75.1	-	-	-	-	-	-
Total	810	95.1	-	-	-	-	-	-
Missing	42	4.9	800	93.9	777	91.2	820	96.2
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 20 Q8h. Have you ever discussed tornados with your parents? If so, who brought it up?

	Discussed tornados		I brought it up		Parents brought it up		Someone else at home brought it up	
	Count	%	Count	%	Count	%	Count	%
Yes	263	30.9	89	10.4	94	11.0	73	8.6
No	561	65.8	-	-	-	-	-	-
Total	824	96.7	-	-	-	-	-	-
Missing	28	3.3	763	89.6	758	89.0	779	91.4
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 21 Q9a. Have you ever discussed floods with a teacher? If so, who brought it up?

	Discussed floods		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	292	34.3	55	6.5	217	25.5
No	520	61.0	-	-	-	-
Total	812	95.3	-	-	-	-
Missing	40	4.7	797	93.5	635	74.5
Total	852	100.0	852	100.0	852	100.0

Table 22 Q9b. Have you ever discussed storms with high winds with a teacher? If so, who brought it up?

	Discussed storms with high winds		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	200	23.5	43	5.0	143	16.8
No	602	70.7	-	-	-	-
Total	802	94.1	-	-	-	-
Missing	50	5.9	809	95.0	709	83.2
Total	852	100.0	852	100.0	852	100.0

Table 23 Q9c. Have you ever discussed house fires with high winds with a teacher? If so, who brought it up?

	Discussed house fires		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	386	45.3	54	6.3	316	37.1
No	422	49.5	-	-	-	-
Total	808	94.8	-	-	-	-
Missing	44	5.2	798	93.7	536	62.9
Total	852	100.0	852	100.0	852	100.0

Table 24 Q9d. Have you ever discussed earthquakes with a teacher? If so, who brought it up?

	Discussed earthquakes		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	525	61.6	61	7.2	436	51.2
No	284	33.3	-	-	-	-
Total	809	95.0	-	-	-	-
Missing	43	5.0	791	92.8	416	48.8
Total	852	100.0	852	100.0	852	100.0

Table 25 Q9e. Have you ever discussed volcanic eruptions with a teacher? If so, who brought it up?

	Discussed volcanic eruptions		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	160	18.8	31	3.6	123	14.4
No	628	73.7	-	-	-	-
Total	788	92.5	-	-	-	-
Missing	64	7.5	821	96.4	729	85.6
Total	852	100.0	852	100.0	852	100.0

Table 26 Q9f. Have you ever discussed tsunamis with a teacher? If so, who brought it up?

	Discussed tsunamis		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	235	27.6	42	4.9	184	21.6
No	566	66.4	-	-	-	-
Total	801	94.0	-	-	-	-
Missing	51	6.0	810	95.1	668	78.4
Total	852	100.0	852	100.0	852	100.0

Table 27 9g. Have you ever discussed chemical spills or gas leaks with a teacher? If so, who brought it up?

	Discussed chemical spill/gas leak		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	140	16.4	31	3.6	106	12.4
No	652	76.5	-	-	-	-
Total	792	93.0	-	-	-	-
Missing	60	7.0	821	96.4	746	87.6
Total	852	100.0	852	100.0	852	100.0

Table 28 9h. Have you ever discussed tornados with a teacher? If so, who brought it up?

	Discussed tornados		I brought it up		Teacher brought it up	
	Count	%	Count	%	Count	%
Yes	174	20.4	38	4.5	128	15.0
No	627	73.6	-	-	-	-
Total	801	94.0	-	-	-	-
Missing	51	6.0	814	95.5	724	85.0
Total	852	100.0	852	100.0	852	100.0

Table 29 10a. Have you ever discussed floods with your friends? If so, who brought it up?

	Discussed floods		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	277	32.5	143	16.8	120	14.1
No	546	64.1	-	-	-	-
Total	823	96.6	-	-	-	-
Missing	29	3.4	709	83.2	732	85.9
Total	852	100.0	852	100.0	852	100.0

Table 30 10b. Have you ever discussed storms with high winds with your friends? If so, who brought it up?

	Discussed storms with high winds		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	186	21.8	97	11.4	81	9.5
No	635	74.5	-	-	-	-
Total	821	96.4	-	-	-	-
Missing	31	3.6	755	88.6	771	90.5
Total	852	100.0	852	100.0	852	100.0

Table 31 10c. Have you ever discussed house fires with your friends? If so, who brought it up?

	Discussed house fires		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	271	31.8	145	17.0	116	13.6
No	543	63.7	-	-	-	-
Total	814	95.5	-	-	-	-
Missing	38	4.5	707	83.0	736	86.4
Total	852	100.0	852	100.0	852	100.0

Table 32 10d. Have you ever discussed earthquakes with your friends? If so, who brought it up?

	Discussed earthquakes		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	356	41.8	191	22.4	165	19.4
No	459	53.9	-	-	-	-
Total	815	95.7	-	-	-	-
Missing	37	4.3	661	77.6	687	80.6
Total	852	100.0	852	100.0	852	100.0

Table 33 10e. Have you ever discussed volcanic eruptions with your friends? If so, who brought it up?

	Discussed volcanic eruptions		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	167	19.6	78	9.2	82	9.6
No	642	75.4	-	-	-	-
Total	809	95.0	-	-	-	-
Missing	43	5.0	774	90.8	770	90.4
Total	852	100.0	852	100.0	852	100.0

Table 34 10f. Have you ever discussed tsunamis with your friends? If so, who brought it up?

	Discussed tsunamis		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	200	23.5	102	12.0	98	11.5
No	618	72.5	-	-	-	-
Total	818	96.0	-	-	-	-
Missing	34	4.0	750	88.0	754	88.5
Total	852	100.0	852	100.0	852	100.0

Table 35 10g. Have you ever discussed chemical spills or gas leaks with your friends? If so, who brought it up?

	Discussed chemical spills/gas leaks		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	110	12.9	45	5.3	54	6.3
No	701	82.3	-	-	-	-
Total	811	95.2	-	-	-	-
Missing	41	4.8	807	94.7	798	93.7
Total	852	100.0	852	100.0	852	100.0

Table 36 10h. Have you ever discussed tornados with your friends? If so, who brought it up?

	Discussed tornados		I brought it up		Friend brought it up	
	Count	%	Count	%	Count	%
Yes	221	25.9	104	12.2	111	13.0
No	598	70.2	-	-	-	-
Total	819	96.1	-	-	-	-
Missing	33	3.9	748	87.8	741	87.0
Total	852	100.0	852	100.0	852	100.0

Table 37 Q11. Have you ever felt an earthquake? (It can be small or large)

Ever felt an earthquake	Count	%
Yes	790	92.7
No	48	5.6
Total	838	98.4
Missing	14	1.4
Total	852	100.0

Table 38 Q12. Have you studied earthquakes at school in the last two years?

Studied earthquakes at school	Count	%
Yes	470	55.2
No	368	43.2
Total	838	98.4
Missing	14	1.6
Total	852	100.0

Table 39 Q13. Describe the very best sentence to explain what is happening in an earthquake.

Best sentence to explain an earthquake	Count	%
Rocks moving	66	7.7
Moon's gravity pulls the sea	17	2.0
Tectonic plates moving	576	67.6
Ultrasonic waves	168	19.7
Total	827	97.0
Missing	25	2.9
Total	852	100.0

Table 40 Q14. Have you ever been in a scary earthquake?

Been in a scary earthquake	Count	%
Yes	326	38.3
No	498	58.5
Total	824	96.7
Missing	28	3.3
Total	852	100.0

Table 41 Q14a. If you have been in a scary earthquake, how scared were you?

How scared	Count	%
1 A little bit	86	10.1
2	34	4.0
3	55	6.5
4 Pretty scared	89	10.4
5	60	7.0
6	25	2.9
7 Really really scared	39	4.6
Total	388	45.5
Missing	464	54.5
Total	852	100.0

Table 42 Q14b. Where were you in the scariest earthquake you've ever felt?

Where were you	Count	%
Home	290	34.0
School	10	1.2
Somewhere else	86	10.1
Total	386	45.3
Missing	466	54.7
Total	852	100.0

Table 43 Q14c. Did you talk about the scariest earthquake afterwards?

Talk about scariest earthquake	Count	%
Yes	251	29.5
No	129	15.1
Total	380	44.6
Missing	472	55.4
Total	852	100.0

Table 44 Q14d. If you did talk about the scariest earthquake afterwards, who did you talk to, or who talked to you? (Circle more than one answer if you need to.)

	Teacher		Parents		Other adults		Other kids	
	Count	%	Count	%	Count	%	Count	%
Yes	33	3.9	236	27.7	63	7.4	172	20.2
No	-	-	-	-	-	-	-	-
Total	-	-	-	-	-	-	-	-
Missing	819	96.1	616	72.3	789	92.6	678	79.6
Total	852	100.0	852	100.0	852	100.0	852	100.0

Table 45 Q15. Which one of these three sentences describes you best when you think about earthquakes?

Thinking about earthquakes	Count	%
Not too worried	497	58.3
Don't like thinking about	275	32.3
Feel really awful	67	7.9
Total	839	98.5
Missing	13	1.5
Total	852	100.0

Table 46 Q16. If you were inside and felt an earthquake, which of the following things is the best thing to do during the earthquake?

Best thing to do in an earthquake	Count	%
Run outside	20	2.3
Go under a table or bed	660	77.5
Curl into a turtle shape	115	13.5
Stay and wait	30	3.5
Total	825	96.8
Missing	27	3.2
Total	852	100.0

Table 47 Q17. Circle the very best sentence to explain what happens in the ocean to cause a tsunami:

Cause of tsunamis	Count	%
Ice melting at South Pole	29	3.4
Earth gradually changing	34	4.0
Underwater earthquake/movement	706	82.9
Global warming	62	7.3
Total	831	97.5
Missing	21	2.5
Total	852	100.0

Table 48 Q18. Have you every seen anything about a tsunami on TV?

Seen tsunami information on TV	Count	%
Yes	747	87.7
No	91	10.7
Total	838	98.4
Missing	14	1.6
Total	852	100.0

Table 49 Q19. Have you studied tsunamis at school in the last two years?

Studied tsunamis at school in last 2 years	Count	%
Yes	258	30.3
No	573	67.3
Total	831	97.5
Missing	21	2.5
Total	852	100.0

Table 50 Q20. What would be the very best thing to do if a tsunami was coming and you were at the coast?

Best action if tsunami came and you were on the coast	Count	%
Go inside	55	6.5
Run outside & take cover	23	2.7
Go inland & up a hill	730	85.7
Stay at coast & watch for wave	16	1.9
Total	824	96.7
Missing	28	3.3
Total	852	100.0

Table 51 Q21a. Have you had a tsunami evacuation drill at school?

Tsunami drill at school	Count	%
Yes	52	6.1
No	781	91.7
Total	833	97.8
Missing	19	2.2
Total	852	100.0

Table 52 21b. Have you ever seen a tsunami evacuation sign around your home or school?

Seen tsunami evacuation sign	Count	%
Yes	43	5.0
No	791	92.8
Total	834	97.9
Missing	18	2.1
Total	852	100.0

Table 53 Q21c. Have you ever seen a tsunami evacuation map for the area around your home or school?

Seen tsunami evacuation map	Count	%
Yes	51	6.0
No	780	91.5
Total	831	97.5
Missing	21	2.5
Total	852	100.0

Table 54 Q22a. Is your home likely to be affected by a tsunami?

Rated likelihood of tsunami at home	Count	%
Yes	65	7.6
Not sure	206	24.2
No	565	66.3
Total	836	98.1
Missing	16	1.9
Total	852	100.0

Table 55 Q22b. Is your school likely to be affected by a tsunami?

Rated likelihood of tsunami at school	Count	%
Yes	100	11.7
Not sure	245	28.8
No	488	57.3
Total	833	97.8
Missing	19	2.2
Total	852	100.0

Table 56 Q22c. Do you live in an official tsunami evacuation zone?

Live in an official tsunami evacuation zone	Count	%
Yes	33	3.9
Not sure	308	36.2
No	490	57.5
Total	831	97.5
Missing	21	2.5
Total	852	100.0

Table 57 Q22d. Is your school in an official tsunami evacuation zone?

School in an official tsunami evacuation zone	Count	%
Yes	18	2.1
Not sure	395	46.4
No	419	49.2
Total	832	97.7
Missing	20	2.3
Total	852	100.0

Table 58 Q23. If you felt a strong earthquake while you were at the beach, would you expect to get an official warning?

Official warning while at the beach	Count	%
Yes	272	31.9
No	100	11.7
Not sure	270	31.7
Not sure what an official warning is	185	21.7
Total	827	97.1
Missing	25	2.9
Total	852	100.0

Table 59 Q24. Have you ever been involved in an education programme that told you about earthquakes and what to do in an earthquake?

Participated in earthquake education	Count	%
Yes	517	60.7
No	300	35.2
Total	817	95.8
Missing	35	4.1
Total	852	100.0

Table 60 Q25a. Have you been taught about floods in the last two years? If so, were you taught at school, or outside school? (If you were taught at school and outside school, you can circle both)

	Taught about floods		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	381	44.7	249	29.2	119	14.0
No	426	50.0	-	-	-	-
Total	807	94.7	-	-	-	-
Missing	45	5.3	603	70.8	733	86.0
Total	852	100.0	852	100.0	852	100.0

Table 61 Q25b. Have you been taught about storms with high winds in the past two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about storms with high winds		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	228	26.8	135	15.8	82	9.6
No	562	66.0	-	-	-	-
Total	790	92.7	-	-	-	-
Missing	62	7.3	717	84.2	770	90.4
Total	852	100.0	852	100.0	852	100.0

Table 62 Q25c. Have you been taught about house fires in the last two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about house fires		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	498	58.5	308	36.2	206	24.2
No	305	35.8	-	-	-	-
Total	803	94.2	-	-	-	-
Missing	49	5.8	544	63.8	646	75.8
Total	852	100.0	852	100.0	852	100.0

Table 63 Q25d. Have you been taught about earthquakes in the last two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about earthquakes		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	651	76.4	511	60.0	177	20.8
No	155	18.2	-	-	-	-
Total	806	94.6	-	-	-	-
Missing	46	5.4	341	40.0	675	79.2
Total	852	100.0	852	100.0	852	100.0

Table 64 Q25e. Have you been taught about volcanic eruptions in the past two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about volcanic eruptions		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	241	28.3	173	20.3	61	7.2
No	545	64.0	-	-	-	-
Total	786	92.3	-	-	-	-
Missing	66	7.7	679	79.7	791	92.8
Total	852	100.0	852	100.0	852	100.0

Table 65 Q25f. Have you been taught about tsunamis in the past two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about tsunamis		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	270	31.7	193	22.7	77	9.0
No	526	61.7	-	-	-	-
Total	796	93.4	-	-	-	-
Missing	56	6.6	659	77.3	775	91.0
Total	852	100.0	852	100.0	852	100.0

Table 66 Q25g. Have you been taught about chemical spills or gas leaks in the last two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about chemical spills/gas leaks		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	140	16.4	81	9.5	57	6.7
No	647	75.9	-	-	-	-
Total	787	92.4	-	-	-	-
Missing	65	7.6	771	90.5	795	93.3
Total	852	100.0	852	100.0	852	100.0

Table 67 Q25h. Have you been taught about tornados in the last two years? If so, were you taught at school, or outside school? (if you were taught at school and outside school, you can circle both)

	Taught about tornados		Taught at school		Taught outside school	
	Count	%	Count	%	Count	%
Yes	236	27.7	162	19.0	78	9.2
No	557	65.4	-	-	-	-
Total	793	93.1	-	-	-	-
Missing	59	6.9	690	81.0	774	90.8
Total	852	100.0	852	100.0	852	100.0

Table 68 Q26. How many separate education units or programmes do you think you've ever been involved in where you learnt about any hazards or disasters?

No. of hazard education programmes	Count	%
None	196	23.0
1	142	16.7
2	164	19.2
3	152	17.8
4	62	7.3
5	25	2.9
Over 5	74	8.7
Total	815	95.7
Missing	37	4.3
Total	852	100.0

Table 69 Q27. Has your school ever encouraged you to talk with your parents about hazards?

School encouraged talk with parents	Count	%
Yes	382	44.8
No	435	51.1
Total	817	95.9
Missing	35	4.1
Total	852	100.0

Table 70 Q28. Have you ever gone home and told your parents what you learned at school about dealing with hazards?

Shared school hazard education with parents	Count	%
Yes	423	49.6
No	398	46.7
Total	821	96.4
Missing	31	3.6
Total	852	100.0

Table 71 Q29. If you talked to your parents about dealing with hazards, did your parents want to discuss how to be prepared?

Parents willing to discuss hazard preparation	Count	%
Yes	330	38.7
No	151	17.7
Total	481	56.5
Missing	371	43.5
Total	852	100.0

Table 72 Q30. Does your family have an emergency plan that tells you what to do to be ready for an emergency?

Family emergency plan	Count	%
Yes	247	29.0
Not sure	395	46.4
No	164	19.2
Total	806	94.6
Missing	46	5.4
Total	852	100.0

Table 73 Q31a. Have you ever practised what to do in an emergency at home?

Practised drill	Count	%
Yes	231	27.1
No	586	68.8
Total	817	95.9
Missing	35	4.1
Total	852	100.0

Table 74 Q31b. If you did practise what to do in an emergency at home, what did you practise?

Home emergency drill	Count	%
Earthquake	80	9.4
Fire	43	5.0
Earthquake and fire	29	3.4
Stand doorway	2	.2
Get under table bed	2	.2
Go outside	12	1.4
Ring 111	1	.1
Other	51	6.0
Total	220	25.8
Missing	632	74.2
Total	852	100.0

Table 75 Q31c. Have you ever practised what to do in an emergency at school?

Emergency drill at school	Count	%
Yes	680	79.8
No	137	16.1
Total	817	95.9
Missing	35	4.1
Total	852	100.0

Table 76 Q31d. If you have practised what to do in an emergency at school, what did you practise?

School emergency drill	Count	%
Earthquake	237	27.8
Fire	128	15.0
Earthquake and fire	137	16.1
Get under desk	13	1.5
Go outside	27	3.2
Walk don't run	1	.1
Other	119	14.0
Total	662	77.7
Missing	190	22.3
Total	852	100.0

Table 77 Q32a. Have you and your family arranged a place to meet if you're away from home and there's an emergency?

Arranged a place to meet	Count	%
Yes	192	22.5
No	622	73.0
Total	814	95.5
Missing	38	4.5
Total	852	100.0

Table 78 Q32b. If you and your family have arranged a place to meet if you're away from home and there's an emergency, where have you arranged to meet?

Places arranged for family to meet in emergency	Count	%
Go home	10	1.2
At school	2	.2
At grandparents	4	.5
Other	159	18.7
Total	175	20.5
Missing	677	79.5
Total	852	100.0

Table 79 Q33a. Have you and your family arranged a place to leave a message for one another if you're away from home and there's an emergency?

Arranged a place to leave message in emergency	Count	%
Yes	116	13.6
No	695	81.6
Total	811	95.2
Missing	41	4.8
Total	852	100.0

Table 80 Q33b. If you and your family have arranged a place to leave a message for one another if you're away from home and there's an emergency, where have you arranged to leave the message?

Location of message for family members in emergency	Count	%
Phone	6	.7
Cell phone	19	2.2
At school	1	.1
At grandparents	6	.7
Other	73	8.6
Total	105	12.3
Missing	747	87.7
Total	852	100.0

Table 81 Q34a. In an emergency, do you know who is responsible for collecting you from school?

Know who picks you up from school in emergency	Count	%
Yes	382	44.8
No	323	37.9
Not sure	115	13.5
Total	820	96.2
Missing	32	3.8
Total	852	100.0

Table 82 Q34b. If you do know who is responsible for collecting you from school in an emergency, who is it?

Person responsible for collecting you from school in emergency	Count	%
Mum	66	7.7
Dad	26	3.1
Grandparent	15	1.8
Sibling	4	.5
Neighbour	1	.1
Specific adult	23	2.7
Other	240	28.2
Total	375	44.0
Missing	477	56.0
Total	852	100.0

Table 83 Q35. Are you aware of the civil defence loudspeaker system in your area?

Aware of where local CD loudspeaker is located	Count	%
Yes	145	17.0
Not sure	384	45.1
No	287	33.7
Total	816	95.8
Missing	36	4.2
Total	852	100.0

Table 84 Q36. If you were at home and you heard the civil defence loudspeaker, what would you do? (circle any things that you would do)

What would you do if heard CD loudspeaker	Count	%
Do nothing-wait for someone to tell me what to do	93	2.7
Go outside & look around	161	4.7
Ask parent/caregiver what to do	536	15.7
Listen to radio	225	6.6
Total	1015	29.8
Missing	2393	70.2
Total	3408	100.0

6.0 KEY FINDINGS

The children generally demonstrated a realistic understanding of the likelihood of earthquakes and tsunami occurring in the Wellington region at large; just under a quarter of the participants reporting they were 'often' scared or upset when thinking or talking about earthquakes or tsunami. The large majority of children understood the causes of earthquake and tsunami, and knew best practice in the event of these two hazards. However, family preparedness rates were low for dealing with an emergency event. It appears that only a minority of children discuss with their parents what they have learnt about hazards at school.

Other key findings include:

- Children rated house fire as the most likely of all the hazards (with 58% of participants rating harm from a house fire as likely). Next most likely were volcanic eruption (44%) and tsunami and earthquake (both 43%).
- The most feared or upsetting hazard for participants to think or talk about was also a house fire, with 27% saying it "often" scares them. This was followed by tsunami (25%), tornado (23%), volcanic eruptions (22%) and earthquakes (20%).
- In the past two years, 76% of participants had been involved in an earthquake programme, and 30% had been involved in a tsunami programme at school. Just under a quarter (23%) that they had never been involved in any hazard education programmes at all.
- The majority of children understood the causes of earthquakes (68%) and tsunamis (83%).
- The majority demonstrated knowledge of initial safety behaviours in the event of an earthquake (76% knowing to shelter under a table or bed; 14% curling in to a turtle shape), and in a tsunami (86% knew to go inland and up a hill). However, only 6% of participants had participated in a tsunami drill at school.
- Participants considered their parents would be their greatest source of help to cope with anxiety about hazards (74% scored 5, 6 or 7 on a 7-point Likert scale: higher scores indicating greater help), followed by their own resources (55%), and lastly the school could help them (42%).
- Just under half (47%) of participants reported that schools encouraged them to talk to their parents about hazards, and 32% of these participants (i.e., 15% of participants overall) reported that their parents were willing to do so.
- Of the 39% of participants who reported having experienced a 'scary' earthquake, 75% said they were at home when they felt it, but the children were more likely to talk to their teachers about it (97%) or to their peers (99%) than to their parents (28%).
- Under a third of participants reported their family had an emergency plan (29%), or had practised what to do in an emergency at home (27%).

House fires were the most feared hazard, with children demonstrating a reasonable level of understanding and anxiety in respect of this hazard; many children had perhaps observed house fires and had heard of fire-related deaths. While earthquakes occur reasonably frequently in the Wellington region, the children were unlikely to have experienced any personal injury, death, or extensive earthquake damage to date. This factor may have

accounted for the lower levels of fear for earthquakes and tsunami, in comparison with fire. Television coverage of tsunami events, and perhaps discussion at home and school prior to the present study being undertaken, may have contributed to the children's understanding of tsunami-cause and best practice. Part of this knowledge may have been gained through incidental discussion which may have arisen at school, or through media coverage of tsunami events. While the present study did not investigate the possible effect of such exposure and discussion, the pervasive influence of the media and the potentially powerful influence of related incidental discussions should be considered when evaluating future hazards education.

Of particular importance in this study is that less than half the participants reported that their school encouraged them to talk to their parents about hazards, less than one third of participants reported an emergency plan at home, and only a minority of participants reported talking to their parents about hazards. Further, about one fifth of the children 'often' felt upset when thinking or talking about earthquakes or tsunamis, and only about half the children thought they could help themselves feel 'less upset' in a hazardous event. Such findings suggest that hazards programmes at school should include emotional-coping components to help reduce maladaptive fear, as well as include hazards related homework requiring interaction with the whole family. Such components in hazards programmes could assist children to develop coping knowledge and ability beyond the safety behaviours that are typically emphasised in hazards programmes, and also encourage the flow-on effect of school learning to the home and wider community. Programmes should include information about a range of possible hazards so that children are prepared for hazards they may encounter anywhere in New Zealand.

Although hazards education materials are available to all schools (e.g., *What's the Plan Stan?*: Ministry of Civil Defence and Emergency Management, 2009), the present study did not investigate the particular nature and frequency of hazards programmes as they are undertaken in different schools. There is a need for such research in the future to identify gaps and strengths and weaknesses of school hazards-programmes so the findings can inform the continuing development of hazards education in schools.

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