OCCUPATIONAL EXPOSURE TO ELF-MF AND ELECTRIC SHOCKS AND MOTOR NEURONE DISEASE

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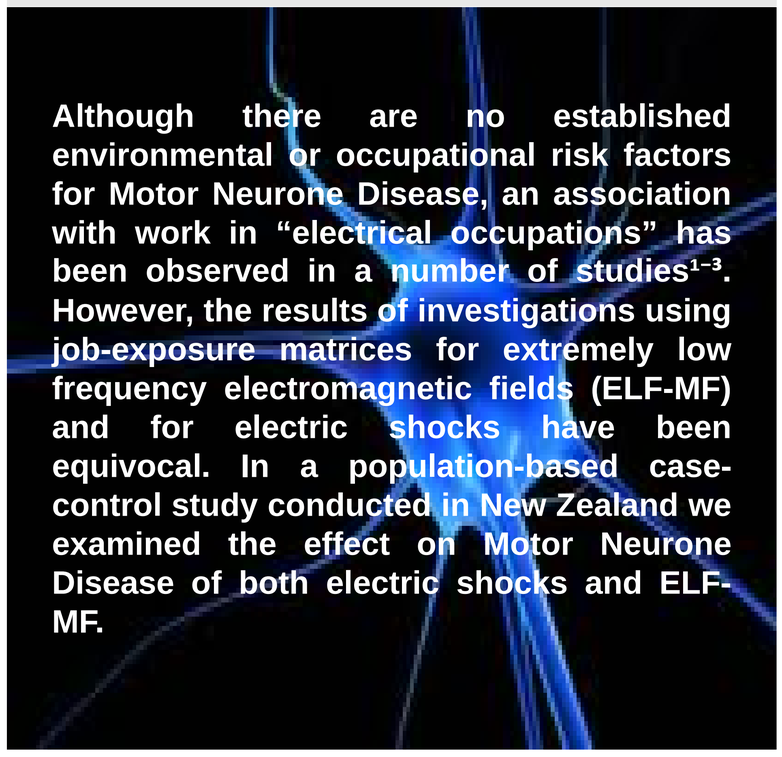
BACKGROUND



Although there are no established environmental or occupational risk factors for Motor Neurone Disease, an association with work in "electrical occupations" has been observed in a number of studies[1–3]. However, the results of investigations using job-exposure matrices for extremely low frequency electromagnetic fields (ELF-MF) and for electric shocks have been equivocal. In a population-based case-control study conducted in New Zealand we examined the effect on Motor Neurone Disease of both electric shocks and ELF-MF.

AIM OF THIS STUDY

To investigate the association between occupational exposure to extremely low frequency electromagnetic fields (ELF-MF), electric shocks and Motor Neurone Disease in New Zealand.

METHODS

A population-based case-control study was conducted to examine the associations between occupational and environmental risk factors and Motor Neurone Disease in New Zealand.

Cases were recruited through the Motor Neurone Disease Association of New Zealand (MNDANZ) supplemented by the National Minimum Dataset (NMDS) (hospital events routinely registered through the NMDS), and notifications by neurologists. Controls were randomly selected from the New Zealand Electoral Roll, two controls for each case, frequency matched by age and gender. These controls are therefore representative of the general population that generated the cases.

All participants completed comprehensive questionnaires on demographic and personal data, lifestyle factors and a lifetime occupational history. Participants were asked to list all jobs ever held for 6 months or more. All jobs were assigned a New Zealand Standard Classification of Occupations (NZSCO99) 5-digit code and then converted to the International Standard Classification of Occupation 2008 (ISCO08). The occupational histories of all participants were linked to the Dutch job-exposure matrices on ELF-MF exposure and on electric shocks[4].

Unconditional logistic regression models were used to estimate odds ratios (OR) and 95% confidence intervals (CI) adjusted for age, gender, ethnicity, socioeconomic status (NZDep2006) and smoking.

RESULTS

The analyses were based on 259 cases and 474 controls.

Table 1: Characteristics of the study population

Table 1		Cases		Controls	
		Number	%	Number	%
Gender	Male	170	65.66%	260	54.89%
	Female	89	34.34%	214	45.11%
Age at interview	20-50	21	8.30%	34	7.14%
	51-60	57	21.89%	74	15.60%
	61-70	104	40.00%	150	31.58%
	≥71	77	29.81%	216	45.68%
Smoking	Never	132	50.94%	247	52.07%
	Ex	106	41.13%	191	40.23%
	Current	19	7.17%	28	6.02%
	Missing Data	2	0.75%	8	1.69%
Ethnicity	European/Pakeha	230	89.06%	430	90.79%
	Maori	12	4.53%	21	4.32%
	Pacific & others	17	6.42%	23	4.89%
Deprivation Index Quintile	1-2	80	30.94%	128	27.07%
	3-4	63	24.53%	111	23.31%
	5-6	56	21.51%	99	20.86%
	7-8	35	13.58%	88	18.61%
	9-10	25	9.43%	48	10.15%

Table 2: Exposure to ELF-MF by occupation

Exposed to ELF by occupation	Cases	%	Controls	%	OR	95%CI	P value
No exposure	101	39.00	167	35.23	1	---	
Low Exposure	131	50.58	268	56.54	0.82	0.59-1.14	0.2311
High Exposure	27	10.42	39	8.23	1.04	0.60-1.83	0.8972

Table 3: Risk of electric shock by occupation

Risk of electric shock by occupation	Cases	%	Controls	%	OR	95%CI	P value
Low risk	115	44.40	260	54.85	1	---	
Medium risk	58	22.40	92	19.41	1.29	0.86-1.93	0.2208
High risk	86	33.20	122	25.74	1.26	0.85-1.86	0.2621

CONCLUSION

There was no association between ELF-MF exposure and Motor Neurone Disease, with an OR=1.04 (95% CI, 0.60-1.83) for the high exposure group. For electric shock the risk was elevated (but not statistically significant) for both the medium risk group OR=1.29 (95% CI, 0.86-1.93) and high risk group OR=1.26 (95% CI,0.85-1.86) when compared with the reference low risk group.

We found no strong evidence of elevated risk of Motor Neurone Disease associated with either ELF-MF or electric shock. However, further analyses will be conducted to examine the effect of exposure duration.

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