ARTICLES

Facets of Multiple Sclerosis in Kuwait - A Descriptive Study

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Abstract:

Purpose

This study was designed to delineate facets of MS in Kuwait and to use the information obtained to guide health information on MS in Kuwait.

Design

150 questionnaires were distributed to each of MS patients and persons not suffering from MS. Returned questionnaires were analyzed by contingency table analysis.

Findings

Significant relationshipas were found between MS and gender; age; martial status; country of birth; living in Kuwait during childhood; Kuwaiti nationality; relatives with MS; not using Kuwaiti agricultural products; non-consumption of milk and milk products; depression severe headache; numbness; dizziness; double vision; permanent disability (any; walking; speech; vision)

Research Limitations

Limitations of the study are the small; possible selection bias; and inherent inaccuracies of self-reported questionnaires. A larger study with closely matched groupings is required to validate the findings.

Practical Implications

The results imply that health education should stress the importance of considering a diagnosis of MS in relative of MS patients with double vision, numbness, depression, severe, headache, or dizziness, and in other appropriate cases. A possible protective effect of consuming fruit and vegetables, milk and milk products could also mentioned. Also, patient could be reassured that, while a degree of permanent disability is probable, it is nonetheless likely that they will continue to lead a normal life.

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Introduction

Multiple sclerosis (MS) is a progressive degenerative disorder of the central nervous system including the brain, the optic nerve and the spinal cord. It is characterized by many areas of inflammation and scarring of the myelin sheaths in the brain and spinal cord, which typically leads to either distorted communication or lack of communication between the nerve endings. Multiple sclerosis can produce a multiplicity of symptoms, ranging from slurred speech to vision problems to loss of mobility. In about two-thirds of known cases of MS, disease onset occurs between the ages of 20-40, with women affected slightly more often than males (Compston and Coles, 2008).

The geographic distribution of the disease shows that the areas with the highest rates of MS are all located in the higher latitudes in both the northern and southern hemispheres. The most high-risk areas include the northern United States, Canada, Great Britain, Scandinavia, Northern Europe, New Zealand and Tasmania. However, there are exceptions to this observed pattern of geographic and topographic distribution, as the disease is uncommon in Japan at any latitude (Ellison *et al*., 1984, Robbins *et al*., 1984).

The pathology of MS, with the interplay of inflammation and neurodegeneration causing intermittent neurological disturbance and progressive disability, is well described (Peterson and Fujinami, 2007). A genetic component likely influences susceptibility to MS. There is an increased risk of MS among siblings and children of people with the disease, and family clusters have been described in the literature. A total of 57 genes have now been found to have some correlation with MS, most of which involve some aspect of the immune system, indicating a primary role for cell-mediated immune mechanisms (International Multiple Sclerosis Genetics Consortium & Wellcome Trust Case Control Consortium 2, 2011). However, a number of studies have shown correlations between various environmental or lifestyle factors and MS, and it could be that these are triggering factors. MS patients have been shown to have an abnormal blood-brain barrier, presumably as a result of excessive platelet adhesiveness and aggregation (Cullen and Swank, 1954, Haeren *et al*., 1964). Damage to the blood-brain barrier may allow influx into the

cerebrospinal fluid of substances in the blood that are toxic to myelin, such as bacteria, viruses, antibodies, toxic chemicals and other compounds (Murray and Pizzorno, 1999).

It has frequently been postulated that mercury poisoning may be behind many cases of MS. Mercury has been shown to bind to the DNA of cells and cell membranes, causing cellular distortion and inhibited cell function. The installation of mercury amalgam dental fillings has been known to produce symptoms indistinguishable from those of multiple sclerosis in some people. Further, the levels of mercury in people with MS have been found to be an average of seven times higher than those in healthy people (Balch and Balch, 2000, McTaggart, 1996). It has been found that, when silver amalgam fillings are exposed to gingival action and oxidation, inorganic mercury in the fillings (especially Class V fillings and root canals) may be converted to an organic form which may act as a neurotoxin (Ingalls, 1983, 1986). A related theory holds that dental caries may be a precursor of one form of MS (Craelius, 1972).

Stress and malnutrition, whether from poor absorption or poor diet, often precede the onset of the disease (Balch and Balch, 2000).

A virus may also be involved, with Epstein-Barr virus a prime candidate (Pender, 2011). In animals, many viruses are capable of causing demyelination (Ellison *et al*., 1984, Robbins *et al*., 1984). The process of demyelination may be caused by viral destruction of the myelin-producing cells or by the viral infection inciting the immune system to attack the myelin.

Chemical poisoning of the nervous system by substances such as pesticides, industrial chemicals, and heavy metals may also play a part in the development of MS. Environmental toxins can cause disturbances in the body's normal metabolic pathways, resulting in damage to the nerves' protective myelin sheaths. Even substances that are not necessarily toxic to the general population can pose a problem for particularly sensitive or susceptible individuals. In a survey of 2000 patients, those with food hypersensitivities were the most severe cases of MS, those hypersensitive to molds or fungi showed moderate symptoms, and those strongly sensitive to pollens were least affected (Jonez, 1953, Boines, 1968).Finally, diet may play a role in the

development of MS. This is suggested by the fact that MS is fairly common in the United States and Europe and almost unheard of in some other countries such as Japan, Korea and China. People in Asian countries typically consume much less fat than people in North America and Northern Europe do, and Swank (1970, 1977) has provided convincing evidence that a diet low in saturated fats, maintained over a long time, tends to retard the disease process and reduce the number of attacks. Their diets are also rich in marine foods, seeds, and fruit oils, which are high in essential fatty acids. It has long been known that essential fatty acids have an inhibitory effect on the inflammatory response (Swank, 1950, 1952, 1970, Alter *et al*., 1974, Bernohn and Stephanides, 1963). Diets high in gluten (Hewson, 1984) and milk (Butcher, 1986, Agranoff and Goldberg, 1974) are also much more common in those areas where there is also a high rate of MS. Again, rates of MS have been found to be higher in wheat-and rye-growing areas than in corn-growing regions but absent in widely separated areas on three continents where cassava, millet and rice are predominantly grown (Shatin, 1964).*Aim of the Study*

This study was designed to delineate facets of MS in Kuwait and to use the information obtained to guide health information on MS in Kuwait.

Materials and Methods

150 questionnaires were distributed to MS patients or their carers attending meetings of the MS support group and 150 to non-MS patients or carers at such meetings or at other gatherings at schools or colleges. The questionnaire was consisting of 6 independent variables and 20 dependent variables. 82 questionnaires distributed to MS patients and 104 from those distributed to non-MS patients for a total of 186 were returned and analyzed. Returned questionnaires were analyzed by contingency table analysis.

Results

Of the total sample, 105 (56.5%) were female and 81 (43.5%) male; 19 (10.2%) were 25 years or younger, 57 (30.6%) 26-36 years, 63 (33.9%) 37-47 years, and 47 (25.3%) 48 years and older; 123 (66.1%) were married and 63 (33.9%) single; 152 (81.7%) were born in Kuwait

and 34 (18.3%) outside it; 123 (71.5%) were Kuwaiti nationals while 53 (28.5%) were not.

Of the MS cases, 16 (19.5%) were diagnosed before 1990, 47 (57.3%) in 1990-2000, and 19 (23.2%) in 2001-2011. MS symptoms appeared when they were 25 years or less in 36 (43.5%) of patients, when they were 26-36 years in 30 (36.6%), and 37 years or older in 16 (19.5%).

Contingency Table Analyses

Of the factors possibly related to the causation of MS examined by this means (Table 1), the following were significantly correlated with MS at the $p = < 0.05$ level: age ($>$ 36 years compared with 36 years); marital status (single $>$ married); being born in Kuwait; living in Kuwait during childhood; being a Kuwaiti national; having a relative with MS. There was also a significant correlation with using Kuwaiti agricultural products and with consuming milk and milk products, but here the correlation was negative, i.e., those doing so were less likely to have MS.

No significant correlation was found between having MS and any of the following factors: gender; suffering a viral disease; having suffered an accident or bad fall; regularly using pesticides; working in industry; living near industry; living near power lines or an electrical sub-station; using Kuwaiti ground water; eating red meat; having amalgam fillings; using aluminum cookware; taking vitamins.

Table (1)

Contingency table analyses factors possibly related to causation of MS

Factor	Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio
Gender	1.221	> 0.05	0.081	1.2 (female: male)
Age	6.529	0.011	0.187	1.57 ($>$ 36 y: $\leq$36 y)
Marital status	5.084	0.024	0.165	1.46 (single: married)
Country of birth	7.132	0.008	0.196	2.1 (Kuwait: not Kuwait)
Living in another country during childhood	3.994	0.046	0.046	1.69 (Kuwait: other country)

Con| Table (1)
Contingency table analyses factors possibly related to causation of MS

Factor	Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio
Nationality	9.389	0.002	0.225	1.94 (Kuwaiti: non-Kuwaiti)
Relative with MS	8.936	0.003	0.219	Relative to have MS: 2.21 (MS patient: not MS patient) Patient to have MS: 1.67 (MS relative: not MS relative)
With viral disease	1.170	0.279	0.079	1.48 (not viral disease: viral disease)
Accident/bad fall	1.028	0.311	0.074	1.22 (no: yes)
Pesticides	1.109	0.292	0.077	1.2 (do not use often: use often)
Work in industry	0.143	0.705	0.028	1.33 (no: yes)
Live near industry	0.147	0.701	0.028	1.18 (no: yes)
Live near power line	1.896	0.169	0.101	1.816 (no: yes)
Use Kuwaiti agricultural products	3.894	0.048	0.145	1.39 (no: yes)
Use Kuwaiti ground water	0.263	0.608	0.038	1.1 (no: yes)
Eat red meat	0.175	0.676	0.031	1.07 (yes: no)
Consume milk/ milk products	7.047	0.006	0.195	1.61 (no: yes)
Have amalgam fillings	0.538	0.463	0.054	1.13 (yes: no)
Use aluminium cookware	0.051	0.821	0.017	1.04 (yes: no)
Take vitamins	0.714	0.398	0.062	1.15 (no: yes)

Symptoms which were significantly more common in MS (Table 2) were depression, severe headache, numbness, dizziness, and double vision, while fatigue, nausea and vomiting, and severe diarrhea were not more common.

MS patients were 22.47 times more likely to have a permanent disability than non-MS patients (Table 3). Permanent disability in walking, vision, and speech were all significantly higher in MS patients than in non-MS patients.

Somewhat surprisingly, there was no significant difference in the number of MS patients v. non-MS patients who felt they were living a normal life (46.3% v. 57.7%) (Table 4).

Table (2)
Contingency table analyses symptoms and MS

Symptom	Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio
Depression	12.434	< 0.001	0.239	MS: 1.77 (depression: not depression) Depression: 2 (MS: not MS)
Severe headache	5.478	0.019	0.172	MS: 1.47 (headache: not headache) Headache: 1.55 (MS: not MS)
Numbness	16.041	< 0.001	0.294	MS: 2 (numbness: not numbness) Numbness: 1.79 (MS: not MS)
Dizziness	4.147	0.042	0.149	MS: 1.4 (dizziness: not dizziness) Dizziness: 1.46 (MS: not MS)
Double vision	43.642	< 0.001	0.484	MS: 2.84 (double vision: no double vision) Double vision 6.02 (MS: not MS)

Table (2)
Contingency table analyses symptoms and MS

Symptom	Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio
Fatigue	0.06	0.807	0.018	MS: 1.04 (fatigue: not fatigue) Fatigue: 1.05 (MS: not MS)
Nausea/vomiting	0.318	0.573	0.041	MS: 1.27 (nausea/vomiting: not nausea/vomiting)Nausea/vomiting: 1.15 (MS: not MS)
Severe diarrhea	0.024	0.876	0.011	MS: 1.05 (diarrhea: not diarrhea) Diarrhea: 1.09 (MS: not MS)

Table (3)
Contingency table analyses permanent disabilities in MS

Disability	Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio	Incidence in MS
Any	47.801	< 0.001	0.507	22.47 (MS: non-MS)	42.7%
Walking	41.805	< 0.001	0.474		34.1%
Vision	16.053	< 0.001	0.294		17.1%
Speech	3.867	0.049	0.144		3.7%

Table (4)
Contingency table analysis of MS and living a normal life

Pearson X^2 (1, N = 186)	P	Cramer's V	Likelihood ratio	Incidence in MS
2.370	0.124	0.113	1.25 (non-MS: MS)	46.3%

Discussion

As in other reports (Compston and Coles, 2008), we found a predominance of the disease in females, but the difference in the

present study was non-significant. This may be a result of the relatively small sample size.

While onset of the disease is said to usually occur in young adults (Compston and Coles, 2008), MS patients in this study were about 1 ½ times more likely to be aged 36 or more.

MS patients were also about 1 ½ times as likely to be single as to be married. This may represent a deleterious effect of MS on relationships rather than a protective effect of marriage.

Kuwaiti nationals, persons born in Kuwait and persons spending their childhood in Kuwait were all significantly more likely to suffer from MS. This could indicate a primary role for genetics, environmental factors or a combination of both.

The significant relationship between patients with MS and relatives with MS indicates a definite genetic component but does not preclude the effect of environmental factors.

However, no significant relationship was found between MS and frequent use of pesticides, working in industry, living near an industrial site, living near power lines or an electrical sub-station, using Kuwaiti ground water, consuming red meat, possessing amalgam fillings, or using aluminum cookware, so if environmental or lifestyle factors are involved, they do not seem to be the ones looked at in this study. on the other hand, persons consuming Kuwait-grown fruits and vegetables or milk and milk products were less likely to have MS, indicating a possible protective effect. However, taking vitamins (A, B, C, E, multivitamin) had no influence on MS (or vice versa). Unfortunately, consumption of vitamin D, for which genetic studies have indicated a possible role in MS, was not queried.

There was no evidence of experiencing an accident or fall being significant in development of MS.

Patients with MS were twice as likely to be suffering depression, 1 ½ times as likely to experience severe headaches, twice as likely to have numbness, nearly 1 ½ times as likely to experience dizziness, and nearly 3 times as likely to have double vision. These findings could be important in two ways: 1) as a possible indicator of MS in an appropriate setting; and 2) as a warning of what symptoms are likely to

occur and should be looked for when the diagnosis of MS has been made.

Permanent disability is a fact of life for many patients with MS, with 42.7% suffering some disability. Disability in walking (34.1% incidence) was most likely, followed by vision disability (17.1%). Permanent speech disability was reported in 3.7%.

Despite the high incidence of disability, MS patients were statistically no more likely than non-MS individuals to report that they were not living a normal life.

Conclusions and Recommendations

Given the small size of the survey, conclusions must be tentative. However, it can be said that the data agree with the generally held view that who will develop MS depends largely on genetic makeup, probably with unknown triggers.

The first point, therefore, that should be stressed in health education on the topic of MS is that those with relatives with MS (and their doctors) should be aware of symptoms that may be indicative of MS and be tested if these are present. These symptoms are double vision, numbness, depression, severe headaches, and dizziness. MS should also be considered in other unexplained instances of these symptoms. Conversely, when a patient has been diagnosed with MS, it could be anticipated that these symptoms may develop if not already present. In particular, the high incidence of depression is something that should be borne in mind.

The second point that could be made is the apparent protective effect of fruit and vegetables, milk and milk products. Finally, patients can be reassured that, while some degree of permanent disability is probable, they are likely to be able to continue a normal life.

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