Journal of the Neurological Sciences 353 (2015) 107–110

Contents lists available at ScienceDirect

Journal of the Neurological Sciences

journal homepage: www.elsevier.com/locate/jns

Incidence and prevalence of pediatric onset multiple sclerosis in Kuwait: 1994–2013

R. Alroughani [a,b,*], S. Akhtar [c], S.F. Ahmed [d,e], R. Behbehani [b,f], J. Al-Abkal [g], J. Al-Hashel [d,h]

[a] Division of Neurology, Amiri Hospital, Arabian Gulf Street, Sharq 13041, Kuwait
[b] Neurology Clinic, Dasman Diabetes Institute, P.O. Box 1180, Dasman 15462, Kuwait
[c] Department of Community Medicine & Behavioural Sciences, Faculty of Medicine, University of Kuwait, PO Box 24923, Safat 13110, Kuwait
[d] Department of Neurology, Ibn Sina Hospital, P.O. Box 25427, Safat 13115, Kuwait
[e] Department of Neurology and Psychiatry, Minia University, P.O. Box 61519, Minia 61111, Egypt
[f] Department of Ophthalmology, Al-Bahar Ophthalmology Center, Kuwait
[g] Department of Medicine, Mubarak Al-Kabeer Hospital, PO Box 33978, Alrawdha 7346, Kuwait
[h] Department of Medicine, Faculty of Medicine, Kuwait University, P.O. Box 24923, Safat 13110, Kuwait

ARTICLE INFO

Article history:
Received 3 March 2015
Received in revised form 21 March 2015
Accepted 16 April 2015
Available online 24 April 2015

Keywords:
Multiple sclerosis
Pediatric
Incidence
Prevalence
Kuwait

ABSTRACT

Objectives: This study aimed to assess the incidence and prevalence of pediatric-onset multiple sclerosis (POMS) along with temporal and gender differentials in these estimates in Kuwait.
Methods: We identified MS patients with pediatric (age < 18 years) onset between 1994 and 2013 from national MS registry. Year and gender-specific incidence rate and prevalence estimates were computed. Multivariable Poisson regression analyses of time-series cross-sectional panel data were conducted to evaluate temporal and gender related variations in yearly POMS incidence rate and prevalence.
Results: 122 POMS patients were identified; of which 90 (73.8%) were females. During 2013, POMS incidence rate and prevalence (per 100,000) were 2.1 and 6.0 respectively. Multivariable Poisson regression model revealed statistically significant 5% increase in POMS incidence rate ($p = 0.002$) and 6% increase in prevalence ($p < 0.001$) from 1994 to 2013. Furthermore, during the study period, female children were more likely to have higher POMS incidence rate (relative rate = 2.9; $p < 0.001$) and prevalence (prevalence ratio = 2.8; $p < 0.001$).
Conclusions: The temporal increase and gender disparity in POMS incidence and prevalence corroborate the findings of earlier studies conducted elsewhere. Knowledge of increasing POMS burden may help in optimal planning for better management of patients in the region.

1. Introduction

Multiple sclerosis (MS) usually occurs between the ages of 20 and 40 years, and a pediatric onset is relatively uncommon [1]. Early onset MS accounts for 2%–10% of all MS cases, representing the most frequent neuro-immunological disorder in children and young adolescents [2,3]. The prevalence of MS appears to be increasing worldwide and the Middle-East including Kuwait may not be an exception [4,5]. However, the incidence rates of childhood acquired demyelinating syndromes remain largely unknown worldwide and they were primarily estimated using selected hospital-based studies in the western countries [6]. Hence, studying epidemiological change in early MS is important to determine the risk of development and progression of pediatric onset MS (POMS). Barring a Dutch study [7], most past studies used variable age cutoffs (< 15 years to < 17 years) for inclusion of patients in POMS cohort [8–12], which were inconsistent with the International Pediatric MS Study Group (IPMSSG) consensus definition [13]. This study aimed to assess the incidence rate and prevalence of POMS between January 1, 1994 and December 31, 2013, and to determine the temporal and gender differentials in these estimates.

2. Patients and methods

We used the time-series cross-sectional panel approach in procuring the data from the Kuwait National MS Registry (KNMSR). Detailed methods of setting up KNMSR have been reported elsewhere [5,14,15], and briefly outlined here. KNMSR was established in 2010 after combining the databases of all major hospitals including MS clinics, which together accounted for nearly 98% of the MS patients diagnosed in Kuwait. This included the neurology tertiary hospital and other 3 peripheral hospitals that have neurology clinics along with the main MS clinic at Dasman Research Institute and Ibn Sina hospital. An initial and a follow-up assessment sheets were provided to all hospitals to be

* Corresponding author at: Division of Neurology, Department of Medicine, Amiri Hospital, Arabian Gulf Street, Sharq 13041, Kuwait. Tel.: +965 2245 0005x4444; fax: +965 2246 7499.
E-mail address: alroughani@gmail.com (R. Alroughani).

http://dx.doi.org/10.1016/j.jns.2015.04.025
0022-510X/

Table 1
Incidence rate (per 100,000) of pediatric onset multiple sclerosis in Kuwait: 1994–2013.

Year	No. of patients	Total population	Incidence rate (95% CI[a])	No. of male patients	Total male population	Incidence rate (95% CI[a])	No. of female patients	Total female population	Incidence rate (95% CI[a])
1994	1	314,377	0.3 (0.1–2.0)	0	172,738	–	1	168,639	0.6 (0.1–3.7)
1995	2	353,249	0.6 (0.1–2.2)	0	178,916	–	2	174,333	1.1. (0.1–4.5)
1996	4	363,419	1.1 (0.3–2.9)	2	184,310	1.1 (0.1–4.2)	2	179,109	1.1 (0.1–4.3)
1997	1	376,139	0.3 (0.1–1.7)	0	190,860	–	1	185,279	0.5 (0.1–3.4)
1998	4	387,148	1.0 (0.3–2.8)	0	196,477	–	4	190,671	2.1 (0.6–5.6)
1999	7	396,645	1.8 (0.8–3.7)	3	201,525	1.5 (0.3–4.6)	4	195,120	2.1 (0.6–5.5)
2000	3	407,380	0.7 (0.1–2.3)	1	207,249	0.5 (0.1–3.0)	2	200,131	1.0 (0.1–3.9)
2001	3	417,812	0.7 (0.1–2.2)	0	212,571	-	3	205,241	1.5 (0.3–4.5)
2002	9	432,304	2.0 (1.0–4.4)	3	220,081	1.4 (0.3–4.2)	6	212,223	2.8 (1.1–6.3)
2003	5	437,136	1.1 (0.4–2.8)	3	222,434	1.4 (0.3–4.2)	2	214,702	0.9 (0.1–3.6)
2004	9	447,094	2.0 (1.0.–3.9)	2	227,579	0.9 (0.1–3.4)	7	219,515	3.2 (1.4–6.7)
2005	7	456,884	1.5 (0.7–3.2)	1	232,745	0.4 (0.1–2.7)	6	224,139	2.7 (1.1–6.0)
2006	4	468,584	0.9 (0.2–2.3)	0	238,653	–	4	229,931	1.7 (0.5–4.6)
2007	5	478,349	1.0 (0.4–2.5)	0	243,767	–	5	234,582	2.1 (0.8–5.1)
2008	9	489,638	1.4 (0.9–3.5)	0	249,431	–	9	240,207	3.8 (1.9–7.2)
2009	8	499,641	1.6 (0.8–3.2)	3	254,470	1.2 (2.0–3.6)	5	245,171	2. (0.7–4.9)
2010	6	510,971	1.2 (0.5–2.6)	3	260,262	1.2 (0.2–3.6)	3	250,709	1.2 (0.2–3.7)
2011	10	520,608	1.9 (1.0–3.6)	3	264,893	1.1 (0.2–3.5)	7	255,715	2.7 (1.2–5.8)
2012	11	528,160	2.1 (1.1–3.8)	1	268,663	0.4 (0.1–2.3)	10	259,497	3.9 (2.0–7.2)
2013	11	535,592	2.1 (1.1–3.7)	6	272,570	2.2 (0.9–4.9)	5	263,022	1.9 (0.7–4.6)

[a] CI: confidence interval.

filled by neurologists. All the data acquired were crosschecked and entered by neurologists experienced in MS. Prior to the application of the revised 2010 McDonald criteria [16], used in the registry, MS diagnosis was based on the previously accepted diagnostic criteria [17,18]. The POMS registry is a subset of the national MS registry. Once entered in the registry, patients were followed prospectively on regular basis (at least one visit every 6 months) and their clinical data were updated in the registry. The national MS registry including the POMS dataset is being maintained and updated on a monthly basis.

In this study, we included POMS patients who had had the diagnosis of MS before the age of 18 years based on IPMSSG consensus definition [13]. Demographic data including patient's age, sex, nationality, date of onset and diagnosis were collected. Patients with possible MS or other demyelinating disorders such as acute disseminated encephalomyelitis (ADEM) and neuromyelitis optica were excluded. The pertinent data on Kuwaiti population (age < 18 years) were obtained from the Public Authority of Civil Information of Kuwait. The primary objective of the study was to estimate the year- and gender-specific incidence rate and prevalence of POMS over the study period in Kuwaiti pediatric population. We also evaluated whether there was any overall temporal trend in these estimates over the 20-year study period.

2.1. Statistical analysis

We computed mean, standard deviation (SD), range of age for all, and female and male POMS patients. Difference in mean age of male and female POMS patients was tested with Student's t test. The crude, year- and gender-specific prevalence (number of existing cases in a given year per 100,000 of mid-year population in the same year) and incidence rate (number of new cases in a given year per 100,000 of mid-year population of the same year) along with their 95% confidence intervals (CIs) were computed assuming the Poisson distribution of POMS cases [19]. Yearly estimates of incidence rate and prevalence for all and gender-specific POMS cases were portrayed using line graphs. Multivariable Poisson regression analyses of time-series cross-sectional panel data were carried out to test the significance of

Table 2
Prevalence (per 100,000) of pediatric onset multiple sclerosis by year: 1994–2013.

Year	No. of total patients	Total population	Prevalence (95% CI[a])	No. of male patients	Male population	Prevalence (95% CI[a])	No. of female patients	Female population	Prevalence (95% CI[a])
1994	4	314,377	1.3 (0.4–3.4)	1	172,738	0.6 (0.1–3.6)	3	168,639	1.8 (0.3–5.5)
1995	5	353,249	1.4 (0.5–3.4)	1	178,916	0.6 (0.1–3.5)	4	174,333	2.3 (0.7–6.3)
1996	7	363,419	1.9 (0.8–4.1)	3	184,310	1.6 (0.3–5.0)	4	179,109	2.2 (0.6–6.0)
1997	7	376,139	1.9 (0.8–3.9)	3	190,860	1.6 (0.3–4.8)	4	185,279	2.2 (0.6–5.8)
1998	8	387,148	2.1 (1.0–4.2)	2	196,477	1.0 (0.1–4.0)	6	190,671	3.2 (1.3–7.0)
1999	14	396,645	3.5 (2.0–6.0)	5	201,525	2.5 (0.9–6.0)	9	195,120	4.6 (2.3–8.9)
2000	14	407,380	3.5 (2.0–5.8)	5	207,249	2.4 (0.9–5.8)	9	200,131	4.5 (2.2–8.7)
2001	10	417,812	2.4 (1.2–4.5)	1	212,571	0.5 (0.1–2.9)	9	205,241	4.4 (2.2–8.5)
2002	18	432,304	4.2 (2.6–6.6)	5	220,081	2.3 (0.8–5.5)	13	212,223	6.1 (3.5–10.6)
2003	21	437,136	4.8 (3.1–7.4)	7	222,434	3.2 (1.4–6.6)	14	214,702	6.5 (3.8–11.0)
2004	25	447,094	5.6 (3.8–8.3)	8	227,579	3.5 (1.6–7.1)	17	219,515	7.7 (4.7–12.5)
2005	22	456,884	4.8 (3.1–7.3)	6	232,745	2.6 (1.0–5.8)	16	224,139	7.1 (4.3–11.7)
2006	23	468,584	4.9 (3.2–7.4)	6	238,653	2.5 (1.0–5.6)	17	229,931	7.4 (4.5–11.9)
2007	21	478,349	4.4 (2.8–6.7)	4	243,767	1.6 (0.5–4.4)	17	234,582	7.3 (4.4–11.7)
2008	22	489,638	4.5 (2.9–6.8)	3	249,431	1.2 (0.2–3.7)	19	240,207	7.9 (5.0–12.4)
2009	23	499,641	4.6 (3.0–6.9)	5	254,470	2.0 (0.7–4.7)	18	245,171	7.3 (4.6–11.7)
2010	23	510,971	4.5 (3.0–6.8)	7	260,262	2.7 (1.2–5.7)	16	250,709	6.4 (3.8–10.4)
2011	27	520,608	5.2 (3.5–7.6)	9	264,893	3.4 (1.7–6.6)	18	255,715	7.0 (4.4–11.2)
2012	33	528,160	6.3 (4.4–8.8)	6	268,663	2.2 (0.9–5.0)	27	259,497	10.4 (7.1–15.2)
2013	32	535,592	6.0 (4.2–8.5)	11	272,570	4.0 (2.2–7.3)	21	263,022	8.0 (5.2–12.2)

[a] CI: confidence interval.