Multiple sclerosis (MS) is a demyelinating disease of the nervous system that can lead to both physical and mental symptoms in those affected. The etiology of MS is not fully elucidated; however, both genetics and environmental factors have been suggested as the underlying cause (Rich et al. 2016). Studies have shown that patients with a previous infection with some neurotropic viruses such as Epstein-Barr, measles, mumps, and varicella zoster are at higher risk of developing MS (Virtanen and Jacobson 2012). Interestingly, people living with HIV, which is also a neurotropic virus, have a lower risk of developing MS (Gold et al. 2015, Nexo et al. 2013). The hepatitis C virus (CHC) is mainly hepatic, but has been reported to infect other cells as well (Zignego et al. 1992). Patients with chronic hepatitis C (CHC) virus infection are at higher risk of developing peripheral neuropathy, which is another disease affecting the nerves (Santo et al. 2006).

The current treatments is to slow down disease progression and alleviate disease symptoms with immunomodulating drugs, such as interferon-β, steroids, dimethyl fumarate, glatiramer acetate, type II topoisomerase inhibitors, thymopoietin depleting inhibitors, or monoclonal antibodies against CD20 (e.g., rituximab), CD25 (daclizumab), CD30 (alemtuzumab), or-4 integrin (Nykodim et al. 2017). Autologous stem cell transplantation was considered as a potential investigation treatment for aggressive MS by “resuspending” the immune system (Muraro et al. 2017).

Compared with other countries, the diagnosis rate of MS is higher in Sweden (40 (95% CI: 35–46)) compared with other countries (Algren et al. 2014). In the present study, around 80% in both the CHC and the MS cohort were identified using the Swedish CHC Register. The CHC cohort consisted of a higher frequency of patients from northern Europe and Africa, and lower frequency patients from Latin America (Table 1).

Demographics of patients with MS

The mean age of patients at the time of MS diagnosis during the study was 44 years in the CHC cohort and 46 years in the MS comparator cohort. The proportion of men was 66% in the full CHC cohort and 65% in the full MS comparator cohort. The proportion of married patients was 46% in the CHC cohort and 47% in the comparator cohort. None of the patients in CHC had been treated with either interferon-α- or β- after the commencement of the Swedish prescription registry in July 2005. The proportion of patients receiving treatment in any of the past 12 months was 33% in the CHC cohort (7% vs. 11% Table 3).

The proportion of Swedish patients with MS was similar among the two cohorts. Northern Europeans were more represented in the CHC cohort, while Asians were common in the comparator cohort (Table 3). The study was approved by the Regional Ethics Committee, Karolinska Institute, Stockholm, Sweden.

This study suggests that patients with CHC have a lower risk of multiple sclerosis. This lower risk of MS diagnosis would make CHC the largest reported protective factor compared with other previously described factors, including non-infectious, neurotropic genotypes, HIV infection, non-vitamin D deficiencies, and previously described factors such as Epstein-Barr (Gold et al. 2015). MS prevalence is more common in women, but CHC is more common in men. This result is contrary to what is normally representative of the general population. Nevertheless, the lower risk for MS was significant in both men and women, in all national regions, and in all subanatomical regions of the body.

One possible explanation for the lower risk of MS in patients with CHC could be that patients with CHC are less likely to be infected with HTLV, which can reduce the likelihood of HCV transmission. However, a previous study suggested that patients with an HTLV infection have a higher risk of acquiring HCV infections, which can lead to other chronic liver infections, such as hepatitis B. Limitations and strengths

The main strength of the study is the large number of patients included, with virtually complete national coverage of patients who were born in Sweden and entered both MS and CHC are diseases diagnosed by specialists, and a recent study showed that the Swedish National Prescription Register is a representative database of patients with chronic hepatitis C patients with MS (Algren et al. 2014).

In the general population, the initial MS diagnosis is usually made in patients approximately 30 years of age, however, this is not the case in patients with CHC as the patients in the present study were 44 years of age old. Therefore, it is possible that some patients in both cohorts may have been diagnosed earlier, but did not have a MS-related visit from 2005 through 2013. In most patients with CHC, the infection occurs during the early twenties; hence, any positive impact by the CHC infection starts around 10 years before the manifestation of MS in the general population.


table