Journal of the Neurological Sciences 336 (2014) 211–219

Contents lists available at ScienceDirect

Journal of the Neurological Sciences

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

The association of alcohol consumption and smoking with quality of life, disability and disease activity in an international sample of people with multiple sclerosis

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ARTICLE INFO

Article history:
Received 25 July 2013
Received in revised form 17 October 2013
Accepted 30 October 2013
Available online 8 November 2013

Keywords:
Multiple sclerosis
Quality of life
Alcohol
Smoking
Disability
Relapse
Survey

ABSTRACT

Background: Modifiable lifestyle factors represent important targets for preventive intervention in multiple sclerosis (MS). We aimed to explore the association of cigarette smoking and alcohol consumption with major MS morbidity outcomes.
Methods: We surveyed a large, international sample of people with MS recruited via Web 2.0 platforms about type of MS, relapse rates, disability, disease activity, health-related quality of life (HRQOL), alcohol use and smoking.
Results: Of 2469 respondents with confirmed MS, 11.7% were current and 40.3% former smokers. Most (61.5%) consumed less than 15 g alcohol weekly; few (0.8%) drank large amounts. Moderate alcohol consumption was associated with increased HRQOL; and after controlling for age and gender, was associated with lower odds of significant disability (41% decrease). After controlling for age, gender and alcohol use, smokers had an increased likelihood of major mobility requirements by 90% compared to never smokers. There was no association between alcohol or smoking and relapse rate or disease activity after controlling for age and gender, however among former smokers, a longer duration of smoking cessation was associated with reduced disease activity. Smokers had significantly lower HRQOL than never smokers and former smokers; heavier smoking was associated with greater decreases in HRQOL.
Conclusion: This cross-sectional study supports previous research showing a link between morbidity indicators in MS and alcohol use and smoking. While people with MS should be advised of the potential risks of smoking, any risks and benefits of alcohol consumption require validation using a prospective cohort of people with MS.

1. Introduction

Multiple sclerosis (MS) is a chronic inflammatory disease of the central nervous system with an incidence of 3.6 cases per 100,000 people in women and 2.0 in men [1], although this varies greatly geographically. The precise aetiology is unknown, but is understood to be influenced by genetic and particularly environmental factors including modifiable lifestyle factors [2].

It appears that people with MS are likely to engage in adverse health behaviours with high smoking rates, obesity, and poor physical activity, similar to the general population of developed countries [3]. However the degree to which such behaviour affects the risk of developing MS, its course, and associated health outcomes, has only recently received attention.

Lifestyle behaviours such as cigarette smoking and hazardous alcohol use have been linked to an escape–avoidance coping response [4,5]. This coping style has been suggested to be maladaptive to active engagement with one's health and disease management [6], and may, as a result, be associated with poorer disease outcomes or increased co-morbidities [7]. A large body of evidence has been accumulated suggesting a link between smoking and incidence of MS [8,9]. A meta-analysis of six studies revealed increased odds of developing MS of up to 1.51 for those smoking prior to disease onset [10]. Some studies also suggest a role for smoking in disease progression as indicated by standard disability measures and MRI [11–13].

Studies examining the association between alcohol and MS risk or morbidity indicators are fewer in number and less consistent in findings than those for smoking. Studies of drinking habits and the development of MS reveal mixed findings [14–16]. A US survey has shown a dose

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http://dx.doi.org/10.1016/j.jns.2013.10.046

response association for alcohol use and lower disability scores in people with relapsing–remitting MS and progressive MS [17]. More recently, alcohol consumption was shown to be inversely associated with increased disease progression among those with relapsing onset MS [18]. The duration of moderate alcohol consumption has been linked to disability and MRI changes (normalized lateral ventricular volume and normalized grey matter volume), with reduced disability among those consuming alcohol for 15 years or less and greater disability among non-drinkers or longer-term drinkers [19]. Interestingly, moderate alcohol consumption has recently been shown in a meta-analysis to be protective against the development of another autoimmune disease, rheumatoid arthritis [20].

With notable exceptions [21,22], health related quality of life (HRQOL) has consistently been measured to be lower among those with MS [23,24]. For people with MS, HRQOL is thought to be affected by a complex interplay between physical, psychological and social factors, rather than by disability alone [25]. Whether alcohol or cigarette use moderates these effects, however is unknown.

We sought to examine the patterns of alcohol use and smoking in a large, international population of people with MS, and to describe the association of these behaviours with a broad range of outcomes including disability, health-related quality of life, and, for people with relapsing–remitting MS, relapse rates and disease activity.

2. Method

2.1. Participants

The study methodology and participant demographics have been detailed previously [26]. To summarise, participants were recruited through Web 2.0 platforms, including social media, through which an online survey was distributed. The web-based tool, SurveyMonkey®, was used to present participants with both a participant information sheet, and for consenting participants, the survey itself. Those eligible for this cross-sectional study included adults diagnosed with MS by a physician. Respondents were excluded if they were under 18 years of age or were unsure of the diagnosis of MS.

2.2. Data collection and tools used

The survey was comprehensive, consisting of 163 questions in total, and took approximately 40 min to complete, with the ability to suspend and re-enter the survey if required. The survey where possible used validated tools that had sound psychometric properties and had been tested in a similar population. The survey collected demographic data and self-reported data for disease profile, medications and supplements, and lifestyle factors. The latter included information on the frequency of alcohol use, and the amount normally consumed on a day when alcohol was consumed (in standard drinks). We advised participants that a standard drink was considered to be one glass of full strength beer (285 ml); two 285 ml glasses of low strength beer; one glass of wine (100 ml); or a 30 ml nip or equivalent of mixed spirits. Each of these is equivalent to 10 g of ethanol. Participants were asked to specify their alcohol intake based on this definition. Data for frequency of alcohol use were collected on an 11-point ordinal scale ('never drink' to 'drink daily'), collapsed to a five point scale (non-drinker, rarely, <1/week, 1 day/week to 3 days/week, 4 days/week to daily). Data for volume of alcohol use were collected on an 11 point scale ('not applicable' to '10+ standard drinks per day'). Data for the frequency and volume (standard drinks) of alcohol consumed were used to derive the variables for alcohol level and binge drinking.

Data were subsequently re-calculated in grammes of ethanol to permit comparison with alternate definitions of a standard drink. Internationally standardised definitions for binge drinking, and guidelines for daily or weekly consumption are lacking. Therefore, we adopted definitions based on median cut-off values for daily alcohol intake specified in guidelines in various countries [27].

A low level of consumption was defined as <15 g/week; participants that specified a frequency of alcohol use of never, rarely or less than once a week were assumed to have a low level of alcohol use. For those not meeting this definition and providing sufficient data on both frequency and volume of consumption, consumption was calculated as either moderate or high. Moderate consumption was considered an average daily intake of 15–210 g/week (or up to 30 g/day) for women and 15–315 g/week (or up to 45 g/day) for men; high was deemed >210 g/week (or >30 g/day) for women and >315 g/week (or >45 g/day) for men [27]. Binge drinking was defined as consuming >75 g/day on any one occasion or a calculated average intake of >75 g/day. Participants who provided data for frequency of alcohol use but failed to specify a volume were excluded from analyses for binge drinking.

Participants were also asked if they were a current smoker, former smoker or never smoker of any tobacco products; the frequency of smoking among former and current smokers (collected on a six-point scale: 'less than one per day' to '>20 per day'); and the time since quitting among former smokers collected on an eight-point ordinal scale ('less than 6 months ago' to '10 years or more ago'). Based on the distribution of responses, these data were collapsed to form a three-point scale (<12 months; 12 months to <10 years; 10 years or more), and amount per day was subsequently combined with data for smoking status and collapsed into three groups (never-smoker; <1–15 per day; 16+ per day).

For all participants, we explored the number of self-reported doctor-diagnosed relapses over the previous 12 months. We then derived the pre-determined variable "disease activity": when specialist-determined relapse rate in the preceding 12 months exceeded the 5 year annualised relapse rate, disease activity was categorised as increasing; when relapse rate for the preceding 12 month was lower than the five year annualised rate, disease activity was categorised as decreasing; and when 12 month relapse rate was the same as the 5 year annualised rate, disease activity was categorised as stable. For this variable, five year annualised relapse rates were calculated by dividing the number of doctor diagnosed relapses over five years by the number of years of disease with an upper limit of five.

Health-related quality of life was assessed using the Multiple Sclerosis Quality Of Life (MSQOL-54), a measure of health related quality of life (HRQOL) developed from the RAND 36-Item Health Survey (SF-36) and supplemented with 18 additional items. It comprises 52 items distributed across 12 scales, giving rise to physical and mental health composites, and two single items and has been extensively validated [28–30].

Level of disability was assessed using the Patient-Determined Disease Steps (PDDS) [31], a self-reported tool which can be used as a surrogate tool for the Expanded Disability Status Scale (EDSS) commonly used to assess gait disability. It is scored on an ordinal scale from 0 (normal) to 8 (bed bound) and correlates strongly with the EDSS (Spearman Rank $r = 0.64$) and moderately with the Multiple Sclerosis Functional Composite (Spearman Rank $r = 0.58$), with excellent concordance between raters (kappa 0.8). The PDDS has been used in several studies of people with MS [32–34]. For analyses the PDDS was collapsed from nine to three categories (normal, mild disability, moderate disability = "normal/some disability"; gait disturbance, cane, late cane = "gait/cane disability"; bilateral support, wheelchair, and bedridden = "major mobility support").

Ethics approval was granted by St Vincent's Hospital Melbourne Human Research Ethics Committee (LRR 055/12).

2.3. Data analysis

Data were analysed using IBM SPSS Statistics 20.0 (IBM Corporation). We undertook univariate and multivariate analyses. Continuous data