This is a digest of selected articles published in peer reviewed journals over the last quarter relevant to health and social care professionals working to support people with MS.

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**Symptoms and symptom management**

   **Polypharmacy in multiple sclerosis: relationship with fatigue, perceived cognition, and objective cognitive performance.** 
   85 people with MS were recruited to the study. They provided a list of the medications they were currently taking and completed a number of questionnaires and tests. It was found that 33% of participants were taking five or more medications, so were classified as "with polypharmacy" and those who were taking four or less were considered to be "without polypharmacy". Those participants who were with polypharmacy were older, had been diagnosed with MS for a longer time, were more disabled and also had more comorbid health conditions. This group also reported more memory problems, more fatigue, difficulties in processing information and prospective memory. The authors suggest that polypharmacy may play a role in fatigue and cognitive difficulties seen in people with MS, as the association was still significant after taking into account age, duration of MS diagnosis, level of disability and other health conditions. 

   **Fatigue is associated with poor sleep in people with multiple sclerosis and cognitive impairment.** 
   121 people with MS with cognitive impairment were assessed via the Modified Fatigue Impact Score (MFIS), Fatigue Severity Score (FSS) and Pittsburgh Sleep Quality Index (PSQI). Fatigue, as measured by the MFIS and FSS, was significantly correlated with decreased sleep quality and daytime dysfunction. The authors conclude the study suggests a relationship between fatigue and sleep quality in people with MS and cognitive impairment. They do highlight that the participant's cognitive impairments could have affected their recall and ability to accurately complete questionnaires and the study would have benefited from an objective measure of sleep quality. 

3. Mahadeva A, Tanasescu R, Gran B. 
   **Urinary tract infections in multiple sclerosis: under-diagnosed and under-treated? A clinical audit at a large university hospital.** 
   Describes the process and results of a clinical audit to examine if the hospital was adhering to NICE guidance protocols on the management of UTI in patients with neurogenic bladder dysfunction. 21 people with abnormal urine dipsticks were identified from 118 people presenting for review or relapse assessment. The study found the hospital was largely compliant with the guidance, although the authors did identify people with UTIs which were asymptomatic. Several recommendations are made with regards to testing, antibiotic treatment and when to start steroids if a person is judged to be in relapse. 

**Disease modifying treatments**

   **The TRUST (EvaluAtion of Bladder Function in Relapsing-Remitting MUltiple Sclerosis Patients Treated with Natalizumab) observational study.** 
   The study enrolled 30 people with RRMS and bladder dysfunction, who had never previously taken natalizumab. To be included, participants were required to have an EDSS score of 0 – 6.5 and a UDI-6 (shortened Urogenital Distress Inventory) score of six or greater at baseline. 28 participants completed the study. Each received an IV infusion of 300mg natalizumab every four weeks for six months. The study found that mean UDI-6 score was significantly lower from week four and this continued to week 24, by which time a mean improvement of 4.4 points could be seen. 86% of participants demonstrated an improvement from their baseline score. Those who had higher UDI-6 score, incontinence impact score and more incontinence episodes a week at baseline showed a greater initial improvement and maintained this over time while receiving natalizumab. The authors conclude the study demonstrates natalizumab may reduce the impact of incontinence on quality of life, although further larger studies are needed. 
**Natalizumab in progressive MS: results of an open-label, phase 2A, proof-of-concept trial.**  
12 people with SPMS and 12 with PPMS were included in the study, each received 300mg of natalizumab every four weeks for 60 weeks. Seven people with SPMS and 10 with PPMS completed the study, which found decreased MRI measures and biomarkers of inflammation, neuronal damage and demyelination after 60 weeks of natalizumab treatment. EDSS and MS Functional Composite scores also decreased significantly from baseline to week 60. The authors conclude that the results of this small proof of concept trial, encourage the initiation of placebo-controlled clinical trials examining natalizumab in SPMS and PPMS.  

**A randomized placebo-controlled phase III trial of oral laquinimod for multiple sclerosis.**  
1,331 people with RRMS, from 155 sites in 18 countries, were randomly assigned to receive once daily laquinimod 0.6mg, placebo or interferon beta 1a (IFNβ1a) 30µg injected once a week. 1,090 people completed the 24 month treatment phase. Compared to placebo there was a non-significant reduction in annualised relapse rate for those receiving laquinimod and a significant reduction in the IFNβ1a group. Laquinimod had a significant effect on reducing brain atrophy and a non-significant effect on reducing disability progression, whereas IFNβ1a had no effect on brain volume loss and a non-significant effect on disability progression. The authors conclude that laquinimod appears to have activity that only partially overlaps with IFNβ1a, as it showed only modest effect on reducing inflammation but had a greater effect on reducing brain atrophy. The authors suggest it may make a good candidate for combination therapy.  

**Other treatments**

**Summary of evidence-based guideline: complementary and alternative medicine in multiple sclerosis: report of the guideline development subcommittee of the American Academy of Neurology.**  
Overview which summarises the American Academy of Neurology’s evidence-based guideline on the use of complementary and alternative medicine (CAM) in MS, produced following an extensive review of the literature and analysis of the evidence available for each treatment. The following questions are addressed by the guideline: Do CAM therapies reduce specific symptoms and prevent relapses or disability? Can CAM worsen MS or cause serious adverse effects? Can CAM use interfere with MS disease modifying drugs? The authors link the recommendation to the evidence quality.  

**Outcome measures**

8. Lamers I, Feys P.  
**Assessing upper limb function in multiple sclerosis (Review).**  
A comprehensive summary of currently used upper limb outcome measures used in MS. Includes a description of each test and what is measured, plus their strengths and weaknesses. The authors provide recommendations for selecting appropriate upper limb outcome measures and a review of the limitations of current upper limb assessment.  
Mult Scler 2014;20(7):775-84.

**Vitamin D**

9. Bäärnhielm M, Olsson T, Alfredsson L.  
**Fatty fish intake is associated with decreased occurrence of multiple sclerosis.**  
1,879 people with MS in Sweden, were matched to two controls, for gender, age and residential area. All participants answered a questionnaire, which collected information on their consumption of oily and lean fish, sun exposure and assessed vitamin D obtained from dairy products in their diet. Frequent fatty fish intake was associated with decreased occurrence of MS, but there was no significant association between intake of lean fish and MS. The protective effect of oily fish was still seen after taking into account sun exposure and vitamin D obtained from dairy products. The authors suggest that fatty fish intake might decrease the risk for MS by compensating for vitamin D deficiency.  

**Vitamin D status and the risk of multiple sclerosis: a systematic review and meta-analysis.**  
11 studies including 1,007 MS participants and 829 healthy controls met the inclusion criteria for the study. The meta-analysis indicated that people with MS had lower levels of vitamin D than healthy controls, although there was statistically significant heterogeneity in the levels of vitamin D measured. The authors state that this may be due to differences in ethnicity, country, season when blood sampling occurred, and age of the participants, all of which are known to have an effect on vitamin D levels. The authors conclude that low vitamin D levels are associated with a higher risk of MS, but further confirmation of these results in a large cohort is needed.  
Psychological aspects

Brain reserve and cognitive reserve protect against cognitive decline over 4.5 years in MS.
45 people with MS underwent evaluations of cognitive efficiency and memory, and MRI to quantify disease progression at baseline and after 4.5 years. From baseline to follow-up the participants showed a decline in cognitive efficiency and memory and demonstrated disease progression, indicated by reduced brain volume and increased EDSS score. Those participants who had larger brain reserve or greater intellectual enrichment at baseline had less cognitive and memory decline at 4.5 years follow-up. Disease progression was strongly linked to cognitive decline in participants with a lower brain reserve and lesser intellectual enrichment. The authors suggest that clinicians may use this evidence to encourage people with MS to pursue a brain-healthy lifestyle, including engaging in activities, such as reading, to preserve their current brain reserve.

Prognosis

Validating predictors of disease progression in a large cohort of primary-progressive multiple sclerosis based on a systematic literature review.
Three prospective and five retrospective natural history cohort studies were included in the analysis to identify predictors for progression in PPMS. Individual case data from the Sylvia Lawry Centre and the Hamburg MS patient database was also analysed. The study could not find any association between any variables measured and disease progression as measured by annualised EDSS change. The authors conclude PPMS could still be unpredictable, or their results may be due to limitations of assessments, or selection of which outcomes to measure. They make suggestions for future work, including new outcome measures, as the EDSS appears to be too imprecise to detect disease progression in people with PPMS.

Provision of care

13. Quinn D, Adams J.
Developing a community multiple sclerosis nursing service.
Overview explores the development and evaluation of a community specialist MS nursing service. Reforms to the NHS following the passing of the Health and Social Care Act 2012 have created new purchaser organisations: clinical commissioning groups (CCGs). This paper outlines steps taken to work with other local health service providers, collect data, conduct patient and GP satisfaction surveys and demonstrate service effectiveness to the local CCGs to preserve the service.

Pregnancy and childbirth

Pregnancy, sex and hormonal factors in multiple sclerosis (Review).
Article provides an overview of the content and recommendations of a workshop held in March 2013 at the European Committee for Treatment and Research in Multiple Sclerosis (ECTRIMS) and a comprehensive literature search, examining sex, hormonal and pregnancy factors in MS. Focuses on what is known about the impact of these factors on disease demographics, pathophysiology, clinical course and outcomes. Sets out recommendations for the management of MS including counselling about risk factors and managing drug treatments during the reproductive years. Recommendations are also made for future research to fill gaps in knowledge.

Final results from the Betaseron (interferon β-1b) Pregnancy Registry: a prospective observational study of birth defects and pregnancy-related adverse events.
Outlines the results of the Betaseron (interferon β-1b) Pregnancy Registry, which enrolled and monitored women exposed to interferon β-1b prior to conception or during pregnancy. The registry enrolled 99 women, there were 96 birth outcomes (including 3 sets of twins), with three lost to follow-up. Outcomes consisted of 86 live births, two stillbirths and 11 spontaneous abortions. There were five cases of birth defects, which were not clustered around a single type of defect or organ system. No developmental concerns were identified at the four month infant assessment. There were no significant differences between rates of spontaneous abortion or birth defects in the registry group and the general population. This suggests there is no increased risk following exposure to interferon β-1b, although the authors do conclude that the sample size is too small to draw definitive conclusions. Continued monitoring through postmarketing surveillance activities is recommended.
**Birth outcomes in newborns fathered by men with multiple sclerosis exposed to disease-modifying drugs.**  
Five databases in British Columbia (BC) were linked to create a large dataset of births fathered by men with MS, using or not using a disease modifying therapy (DMT). These included the BC MS database, Vital Statistics Birth Registry, the BC Perinatal Database Registry, Population Data BC Consolidation File and BC PharmaNet. The analysed sample consisted of 195 births fathered by 137 men with MS. 125 newborns had fathers who had used a DMT, 53 had been exposed to a DMT within 64 days prior to conception; 37 were exposed to beta interferon and 16 to glatiramer acetate. The study found that there were no significant differences in the mean birth weight or gestational age between newborns exposed or unexposed to DMTs. The authors conclude that although no evidence was found for poorer birth outcomes for births fathered by a man using a DMT, the sample size was relatively small, developmental outcomes were not assessed, and so vigilance must be maintained.  
CNS Drugs 2014;28(5):475-82.

**Employment**

**Disclosure of diagnosis of multiple sclerosis in the workplace positively affects employment status and job tenure.**  
The Australian Multiple Sclerosis Longitudinal Study (AMSLS) is a large national sample of people with MS in Australia. 2,949 AMSLS participants, aged 18 to 65, were sent a questionnaire each year for three years. A total of 1,438 people responded to all three surveys, which collected demographic and employment information. Information regarding symptoms was collected via the MS Disease Steps Scale. The study found that people who disclosed their diagnosis to their employer were more likely to still be working in year three. This effect remained even after taking into account age, gender, the number of hours worked and the level of disability. Additionally those who disclosed their diagnosis were also more likely to be in employment for longer periods of time. The authors conclude that this study provides the first evidence that diagnosis disclosure can have a positive impact in terms of both job retention and tenure.  

**Children**

**Children’s and adolescents adjustment to parental multiple sclerosis: a systematic review.**  
18 studies met the inclusion criteria for this review, these studied a total of 2,051 children. Due to the varied nature of the studies examined, a meta-analysis was not possible. The analysis found that most studies reported that children of people with MS exhibited more negative psychosocial traits than those with “healthy” parents. It was also suggested that children had higher rates of body concern, depression, anxiety and behavioural problems. Caregiving roles meant more stress for the child, as well as fewer social relationships. The review found positive effects reported in three studies, such as higher personal competence and more empathy. The authors conclude that as few high quality studies were identified, drawing evidence-based conclusions is difficult, but the current evidence suggests that as there are potentially long-term impacts on the children, more and higher quality research is needed.  

**Information Provision**

**Information provision for people with multiple sclerosis (Review).**  
Ten randomised control trials involving a total of 1,314 participants met the inclusion criteria for the study. The studies evaluated a variety of approaches, including provision of written information, decision aids and educational programmes. Four studies assessing the level of MS-related knowledge detected significant differences between the groups, showing that information provision may successfully increase a person’s knowledge. There were mixed results from four studies examining the effects on decision making and five studies assessing quality of life. No adverse effects were reported. The authors conclude that telling people about their disease seemed to have no negative side effects, though they could not provide clear recommendations for specific information provisions, as the studies were too varied in their interventions and outcome measures.  