
Posters

Abstracts - Posters

- S1** A Behavioral Approach to Weight Loss in Individuals with MS
- S2** A Pilot Study Measuring the Utility of the MSQLI within a Short-Term Rehab Program
- S3** A Survey of Issues Related to Fatigue Among a Large Group of People with MS
- S4** Acupuncture Versus Medical Treatment for Bladder Dysfunction in MS
- S5** Exercise Patterns of MS Patients Experiencing Primary and Secondary MS Fatigue
- S6** Advancement in Intrathecal Baclofen Delivery System for Management of Spasticity
- S7** Atypical Multiple Sclerosis; Cases Presentation
- S8** Disease Modifying Therapy and Multiple Sclerosis: Insider Perspectives on Utilization and Adherence
- S9** Cognitive Functioning and Everyday Function in MS; The Role of the MSNQ
- S10** Considerations for the Use of the MSFC in Clinical Practice
- S11** Continuous Combined Treatment of MS with Avonex and Prednisone
- S12** Developing a Competency Framework for MS Specialist Nurses
- S13** Developing Patient Education Materials: The Experience at the Calgary MS Clinic
- S14** Does the EDSS Reflect Quality of Life? Relationship Between the EDSS and MSQOL-54
- S15** Electron Microscopic Studies of Spinal Fluid in MS Revisited
- S16** Eight-Year Experience With Interferon BETA-1A In Subjects With Multiple Sclerosis
- S17** Gender Differences in Memory Function: Evidence of Cognitive Reserve
- S18** Health-Related Quality of Life in Relapsing-Remitting MS
- S19** Immunodulatory Therapy in Pediatric MS
- S20** Impact of Education and Brief Telephone Counseling on Sexual Dysfunction in MS
- S21** Infant Feeding Method and Health of Infant Born to Mothers with MS
- S22** MS Nurses International Certification; Standards of Professional Nursing and Patient Care
- S23** Nursing Algorithm for Long-Term Treatment Optimization in MS
- S24** Pain in Multiple Sclerosis: Prevalence, Effects on Mood and Quality of Life
- S25** Perceived Quality of Life in Adults with MS
- S26** Personal Patient Guide; Multiple Sclerosis
- S28** Role of Hormonal Therapy for Prevention of Osteoporosis in MS Patients
- S29** Sex (and MS) in the City
- S30** Weight Loss Program for Women with MS
- S31** Trial of Rehabilitation After Exacerbations of MS: Recovery Prior to Randomization
- S32** Use of Botulinum Toxin for Detrusor-Spinchter Dyssynergia in MS
- S33** Using Motivational Interviewing to Promote Health in People with MS
- S34** Utility, Impact & Cost Effectiveness of Assistive Technology Interventions
- S35** Validity of the MS Neuropsychological Screening Questionnaire (MSNQ): A Further Study
- S36** Tau Protein And Beta Amyloid In Cerebrospinal Fluid Of The Pateints With MS
- S37** Screening For Depression: Two Questions Versus Many
- S38** Recognition And Treatment Pathway For Psychiatric Illness In Multiple Sclerosis
- S39** Enriching Program Design for an MS Wellness Program

(S1) A BEHAVIORAL APPROACH TO WEIGHT LOSS IN INDIVIDUALS WITH MS

OBJECTIVE:

To determine the benefits of a lifestyle behavior program in obese patients with multiple sclerosis (MS).

BACKGROUND:

MS often produces disability that reduces activity levels and impairs mobility. A shift in activity levels is associated with increased obesity in the adult population, and MS patients experience the same or greater incidence of obesity. Additionally, fatigue, heat intolerance, and limited self-care are barriers to weight loss. MS patients may have a benefit in disease course, as well as fatigue and mobility by losing weight. The Lifestyle Initiatives, Fitness and Education (LIFE) program was designed to overcome these difficulties.

METHOD:

Five obese patients with primary progressive MS were enrolled in a 20-week pilot behavioral education LIFE program. Patients included 1 male and 4 females with a mean age of 55.8 ± 3.0 yrs (mean \pm SD), and BMI of 29.8 ± 1.3 . The mean disability score measured by the Kurtzke Expanded Disability Scale (EDSS) was 6.5. The program focused on changing energy intake and expenditures. Daily calorie intake and physical activity expenditures were tracked. Self-monitoring and problem solving skills were taught in weekly 90-minute classes.

RESULTS:

The mean weight loss was 20.4 ± 13.2 pounds ($p < .05$). The mean physical activity expenditure was 1190 ± 384.7 calories per week, with energy intake maintained at 1300 ± 324.7 calories. Class attendance and record keeping were 86%. The correlation between record keeping and weight change over 20 weeks was .60 ($p < .05$).

DISCUSSION:

These results indicate that mobility impaired obese patients can lose weight. Compliance was especially significant for recording calorie intake and expenditure. Careful self-monitoring appears to be associated with weight loss more so than high levels of physical activity. Research is underway with a larger population sample to evaluate long-term effects of the program on weight loss, fatigue and mobility.

Study supported by The John R. Oishei Foundation

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The Spectrum of Multiple Sclerosis Care

**(S2) A PILOT STUDY MEASURING THE UTILITY OF THE MSQLI
WITHIN A SHORT-TERM REHAB PROGRAM**

PURPOSE:

The purpose of this pilot study is to explore the utility of the Multiple Sclerosis Quality of Life Inventory (MSQLI) as a measure of quality of life outcome within a short-term outpatient rehabilitation program for patients with multiple sclerosis (MS).

BACKGROUND:

Rehabilitation studies have primarily measured outcome in terms of disability, rather than health-related quality of life (QOL). The MSQLI, a new multidimensional quality of life battery designed specifically for MS, incorporates a generic measure (SF-36), as well as nine disease-specific indices.

DESIGN/METHODS:

Patients with clinically definite MS, referred from an MS Clinic to an ambulatory interdisciplinary rehabilitation program, completed the MSQLI at the time of referral (T1), at the start (T2), and following discharge from the program (T3). A quasi-experimental research design was used, where patients acted as their own controls. Data were collected from a consecutive series of 30 patients who had completed interventions with at least 3 disciplines. An interview was also completed for all patients following discharge from the program to obtain global perceptions of QOL changes.

PRELIMINARY RESULTS:

Of 117 eligible patients, only 31 (26.5%) completed all three measures. Repeated measures analyses on the primary indices found no statistically significant changes and relatively small effect sizes (range = .006 to .070). Analyses are currently in progress to evaluate responsiveness to patients' global perceptions of change in QOL.

CONCLUSIONS:

This pilot study presents important data for planning further studies relating to the effects of rehabilitation treatment on QOL (e.g., effect size, staff time required) and the feasibility of using the MSQLI as a standard, on-going measure for program evaluation.

Study supported by Multiple Sclerosis Society of Canada

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**(S3) A SURVEY OF ISSUES RELATED TO FATIGUE AMONG
A LARGE GROUP OF PEOPLE WITH MS**

OBJECTIVE:
To collect data regarding fatigue among a group of people with MS.

BACKGROUND:

Although fatigue is among the most common and debilitating symptoms affecting people with MS, there is little data regarding the relative efficacy of various treatment strategies, the impact of immunomodulating agents (IMAs) on fatigue, and the frequency of non-MS fatigue-producing comorbidities and circumstances.

DESIGN/METHODS:

Using email, a registry (www.ms-cam.org), and a web-based survey, we collected self-reported data related to fatigue from 1815 people with MS.

RESULTS:

Of the 1815 respondents, 58% reported fatigue that interfered with their social, work, or home life on at least half of all days for at least six weeks. Of those with fatigue, potential non-MS explanations for fatigue included: depression, 40%; ambulation difficulties, 25%; sleep difficulties, 19%; demanding lifestyle, 17%; comorbid fatigue-producing diagnosis, 11%; and sedating medications, 8%. Of those who did not report confounding sources of fatigue, the interventions tried for fatigue most frequently described as helpful included: modafinil (Provigil), 84% (n=90); cooling, 80% (n=144); fatigue management strategies, 77% (n=170); amantadine (Symmetrel), 64% (n=39); pemoline (Cylert) 64% (n=14); exercise, 60% (n=121); yoga, 54% (n=41); coffee, 53% (n=136); fluoxetine (Prozac), 45% (n=22); vitamin B complex, 39% (n=65); and vitamin B12, 37% (n=38). In order, those reporting that IMAs improved their fatigue were taking: glatiramer acetate (Copaxone), 22% (n=192); interferon beta-1a (Avonex), 17% (n=228); and interferon beta-1b (Betaseron), 16% (n=88). Those reporting that IMAs worsened fatigue were taking: interferon beta-1b (Betaseron), 30%; interferon beta-1a (Avonex), 26%; and glatiramer acetate (Copaxone), 13%.

CONCLUSION:

Among our respondents, fatigue, as defined above, was reported by 58%. Both pharmacological interventions, especially modafinil (Provigil), and non-pharmacological interventions, especially cooling and fatigue management strategies, have been found helpful. Most did not report any effect on fatigue from IMAs, but glatiramer acetate (Copaxone) users reported a deleterious effect less often.

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(S4) ACUPUNCTURE VERSUS MEDICAL TREATMENT FOR BLADDER DYSFUNCTION IN MS

To date, no randomized controlled clinical trials (RCTs) have studied the effectiveness of acupuncture for bladder dysfunction, although surveys report favourable results with Traditional Chinese Medicine (TCM).

PURPOSE:

To examine the effectiveness of acupuncture therapy versus best medical practice on bladder dysfunction and other symptoms, in adults with MS.

METHODS:

Adults with confirmed MS and bladder symptoms, who met the inclusion criteria were randomized to one of 4 groups: 1) regular MS care with no add-on therapy, 2) regular MS care with best pharmacological/medical bladder care as determined by the MS neurologist; 3) regular MS care with acupuncture added on; 4) regular MS care with acupuncture and best pharmacological/medical bladder care. Assessments were blinded. Treatment was twice/week for 16 weeks. The primary outcome measure was bladder post void residual (PVR) with ultra sound scanner. Secondary outcomes were: Urinary frequency and urgency, weekly bladder diary, TCM assessment, neurological disability status scale, timed 25 ft walk, Ashworth spasticity scale and spasm scale, pain, fatigue scales and health status scales (SF36).

RESULTS:

41 subjects were recruited over 2 years. One subject withdrew early from the acupuncture group and 4 from the non-acupuncture groups. There were no significant differences in descriptive characteristics between groups. PVR improved for all 4 groups ($p=0.05$) regardless of intervention. Significant beneficial effects were found for the acupuncture group for bladder urgency ($p=0.05$) and for the bladder diary ($p=0.00$). All groups improved significantly on the Physical and Mental Health composite scores of the SF36 ($p=0.000$, $p=0.000$, respectively). There were 2 interaction effects: the benefit of medical treatment on PVR varied dependant on acupuncturist ($p=0.00$); and the TCM assessments showed medical treatment or acupuncture only to be of benefit in the absence of each other ($p=0.05$). Adverse events: Spasticity increased with medical treatment ($p=0.05$).

CONCLUSIONS:

A placebo effect produced positive biological changes in PVR, and improved Health Status scales. Acupuncture appears to provide benefit for bladder urgency and decreases incontinence episodes. The cost-benefit ratio of acupuncture needs to be considered.

Study supported by MS Association of America and The Canadian MS Association

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**(S5) EXERCISE PATTERNS OF MS PATIENTS
EXPERIENCING PRIMARY AND SECONDARY MS FATIGUE**

MS patients are encouraged to exercise as one strategy for managing fatigue. Although exercise has been shown to be beneficial for fatigue in MS, the patterns of exercise among fatigued patients are not know.

PURPOSE:

The purpose of this study was to investigate the intensity and frequency of exercise patterns in a group of MS patients with documented fatigue, and to correlate exercise characteristics with fatigue severity and other parameters.

METHODS:

As part of a fatigue assessment, the exercise habits of 50 MS patients were documented. Fatigue severity was measured using the Fatigue Severity Scale (FSS) and the Modified Fatigue Impact Scale (MFIS). Depending on intensity and frequency, subject_s exercise patterns were coded as aerobic exercise (AEx i.e.walking, swimming, cycling), non-aerobic exercise (NonAEx i.e.stretching, strengthening), or no exercise (NoEx).

RESULTS:

Demographic characteristics were: 39 (78%) female, 11 (22%) male, mean age 47.4 (8.9 SD), disability (EDSS) mean 3.2 (1.8 SD). Exercise patterns: 16 were classified as AEx, 24 as NonAEx, and 10 as NoEx. The AEx group had lower mean fatigue scores (FSS=5.4, MFIS=46.1) than the NoEx group (FSS=6.2, MFIS=56.0) and NonAEx group (FSS=6.2, MFIS=58.1). There was no significant effect of disability (EDSS) on fatigue scores, FSS p=0.4, MFIS p=0.3. There was a significant effect of exercise group on fatigue scores, FSS p=0.02, MFIS p=0.00. It appears that, on average, the AEx group had a 0.6 point lower FSS score and a 10 point lower MFIS score than the other 2 groups.

CONCLUSIONS:

Although 80% of this group with fatigue performed some form of exercise, aerobic exercise was significantly associated with lower fatigue scores. Further studies need to explore the association between exercise characteristics and fatigue.

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**(S6) ADVANCEMENT IN INTRATHECAL BACLOFEN DELIVERY SYSTEM
FOR MANAGEMENT OF SPASTICITY**

Spasticity is a common complication of Multiple sclerosis resulting from hyperexcitability of reflexes in the an upper Motor neuron. Spasticity is often associated with pain. Increased spasticity may interfere with sleep, mobility, sitting balance, transfers, activities of daily living, safety, and quality of life. Spasticity is often managed well with oral medications and exercises. Some people do not respond to oral medication or experience intolerable side effects. Intrathecal Baclofen reduces severe spasticity and improves functional activities without side effect of oral medication. This poster presentation introduces the most advanced Baclofen pump that would last the life of individual. The advantages of Arrow 3000 Baclofen pump will be discussed to include the outcomes of clients who received Baclofen pump implant.

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(S7) ATYPICAL MULTIPLE SCLEROSIS. CASES PRESENTATION**B**ACKGROUND:

These unusual presentations in Multiple Sclerosis (MS) are rarely seen in the diagnosis and evolution of the disease.

Objective:

Present 8 patients with atypical clinical manifestations of MS.

MATERIAL AND METHODS:

Eight patients with Multiple Sclerosis (McDonald et al) and MRI criteria (Fazekas et al and/or Barkhof et al) will be presented.

RESULTS:

The first case was a woman with facial peripheral palsy at onset with several recurrent relapses and familiar Melkersson-Rosenthal Syndrome who developed MS after 25 years. The second case was a woman with progressive sensorial aphasia and optic neuritis and her husband died from Devic disease. The third case was a woman with partial motor seizures who developed MS after 15 years. The fourth case was a woman with RR-MS who developed an acute relapse with sensory-neural deafness that improved with intravenous methylprednisolone (IVMP). The fifth case was a woman with acute onset of cervical dystonia that improved with IVMP and clonazepam. The MRI and CSF showed a typical MS. The sixth case was a woman with RR-MS who had a chronic relapsing peripheral neuropathy confirmed by nerve biopsy. The seventh case was a man with SP-MS who had a severe relapse with respiratory depression and intestinal occlusion. The two surgical operations did not show any aetiology for the intestinal occlusion but he had a full recovery after intramuscular neostigmine and IVMP. The last patient was a 70 year-old woman who developed a 6 month history of intracranial hypertension suggestive of a brain tumour but the MRI showed a typical MS. She improved with IVMP.

CONCLUSIONS:

These case presentations confirm the wide clinical spectrum of MS.

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**(S8) DISEASE MODIFYING THERAPY AND MULTIPLE SCLEROSIS
INSIDER PERSPECTIVES ON UTILIZATION AND ADHERENCE**

Multiple Sclerosis is thought to be an autoimmune disease developing from a complex interaction of early exposure to viruses and genetic vulnerability. Disease modifying therapies (DMT), known as the ABC drugs, Avonex®, Rebif®, Betaseron®, and Copaxone®, are delivered by subcutaneous or intramuscular injection and can reduce exacerbation rates by 30% in RRMS. They also show potential for slowing disease progression in SPMS. There is general consensus that early treatment with DMT can prolong the onset of disability, and treatment should begin immediately after confirmed diagnosis. Despite these recommendations, not all patients who should be on DMT are, and many that begin treatment will stop. The purpose of this study was to better understand which factors contribute to the decision-making processes of individuals with MS regarding the use of DMT. Using qualitative research methodology that examined the experiences of the participants, four themes emerged: DMT is beneficial; The personal cost of DMT: More than money; Opting out of DMT; and Physician discouraged DMT. Subjects using DMT felt more control over their disease, improved predictability, and better stability. However, these benefits had costs in terms of side effects, financial costs, and emotional struggles to overcome fear, denial, and uncertainty about the effectiveness of the drugs. Individuals not taking DMT cited barriers to treatment such as fear of needles, lack of overt symptoms, and a lack of desire to have regular injections as reminders of their disease. Physician discouragement or concerns about costs also contributed to opting out of DMT. As treatments for MS continue to improve, it is important for practitioners to understand factors that contribute to the patients' decisions to use or not use DMT. Careful consideration of patient perspective and potential anxiety regarding treatment could improve treatment participation and adherence and have long term benefits for patient outcomes.

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**(S9) COGNITIVE FUNCTIONING AND EVERYDAY FUNCTIONING IN MS:
THE ROLE OF THE MSNQ**

Although as many as 65% of persons with multiple sclerosis (MS) are likely to experience some problems with cognitive functioning, no psychometrically-sound screening measure has been established. Recently, the Multiple Sclerosis Neuropsychological Questionnaire (MSNQ) self-report and family-report were developed as a quick screening for estimating the presence of cognitive impairment. To investigate the validity of the MSNQ, we conducted a preliminary analysis to examine its relationship with everyday functioning as measured objectively with the Executive Function Performance Test (EFPT) and subjectively as measured by the Functional Behavior Profile (FBP) self-report and family-report, and the Functional Assessment of Multiple Sclerosis (FAMS). Participants with MS (n=23) and healthy controls (n=23) matched for age and level of education were administered standardized neuropsychological tests, as well as tests of everyday functioning including the EFPT, FBP, and FAMS. The EFPT requires participants to complete common daily tasks that vary in their cognitive complexity from very simple (e.g., using a telephone) to complex (e.g., preparing a simple meal and paying two bills with insufficient funds) in a natural setting. The MSNQ self- and family-reports significantly correlated with cognitive functioning as measured by a neuropsychological battery. With regard to everyday functioning, the MSNQ self- and family-reports were significantly correlated to the bill-paying task on the EFPT, as well as the FBP self- and family-reports, and the FAMS. These findings suggest that the MSNQ does predict cognitive functioning, as well as everyday functioning as measured by the EFPT, FBP, and FAMS. The results also support to the use of the MSNQ as a brief screening device of cognitive impairment, and the EFPT as an objective measure of functional status, and the FBP self- and family-reports and FAMS as subjective measures of functional status.

Study supported by National Multiple Sclerosis Society

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(S10) CONSIDERATIONS FOR THE USE OF THE MSFC IN CLINICAL PRACTICE

The MS Functional Composite (MSFC) was developed as an outcome measure for MS clinical trials. It is a brief assessment tool to measure ambulation, arm/hand function, and cognitive function, and it is viewed as an improvement over assessment with the Expanded Disability Status Scale (EDSS) alone. Other strengths of the MSFC are good psychometric properties, direct assessment of cognitive functioning, and sensitivity to treatment effects. Some clinicians who have used the MSFC within a clinical trial have begun to incorporate this measure into clinical practice. The administration manual for the MSFC provides instructions for calculating and interpreting test scores relative to a database sample. This study compares MSFC scores obtained from a clinic sample to the database sample and investigates factors that should be taken into consideration when interpreting MSFC scores in clinical practice. A total of 53 individuals (37 women and 16 men) with a confirmed diagnosis of MS were given the MSFC as part of their regular clinical evaluation. Time since diagnosis ranged from < 3 months to 39 years with a median of 2 years. Mean age was approximately 45 years. MSFC z scores were calculated according to the manual instructions using the database population as a reference sample. Scores were reanalyzed using the sample means and standard deviations to create a z score for each individual relative to our clinic population. The mean difference between the database z score and clinic sample z score was small (.11). Regression analyses did not indicate significant effects of age, sex, or education on the total MSFC score. However, there was an effect of education on the PASAT 3" score. This is consistent with studies using the PASAT in other neurologic populations, and suggests that level of education should be taken into account during clinical interpretation of PASAT 3" scores.

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(S11) CONTINUOUS COMBINED TREATMENT OF MS WITH AVONEX AND PREDNISONE**B**ACKGROUND:

The Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology recently concluded that there is no evidence of long term functional benefits from a brief use of glucocorticoids (GC) in MS.

However, there are no studies addressing the risk/benefit ratio of a continuous treatment of MS patients with low maintenance dose of GC.

METHODS:

In 177 MS patients (38 males and 139 females) treatment with interferon- β (INF β) 1-a (Avonex, 30 mcg injections i.m. per week) and prednisone (7.5mg-15mg/day) was applied for 4-74 months (median duration 39 months). Relapses with worsening in the EDSS rating exceeding two points were treated with intravenous (IV) methylprednisolone (total dose not exceeding 3,500 mg) and in worsening not exceeding two EDSS points with oral prednisone (1/mg/kg/day) for five days and subsequent gradual decrease to the daily maintenance dose. In over 70% of the patients in our series the daily dose of prednisone did not exceed 7.5mg.

RESULTS:

In the patients studied 69 instances of a relapse were established representing an annualized relapse rate of 0.11. Disability rating during the study decreased from 2.98 +/-1.33 to 2.37+/-1.61 ($p < 0.001$). In 37 (20.9%) patients increased blood pressure was effectively treated. Seven patients (3.9%) were treated for diabetes including three individuals diagnosed prior to entering the study. The mean mineral bone density examined in menopausal and wheelchair bound patients in this series was T-0.80 +/- 1.18; the mean body mass index was 27.71 +/- 6.11.

DISCUSSION:

Compared to pulse therapy with intravenous GC, not suitable for ongoing management of MS, combined therapy using low maintenance dose of prednisone with Avonex shows superior clinical results and is significantly less costly.

CONCLUSIONS:

In MS patients with break-through symptoms on treatment with INF β ; combined therapy using low maintenance dose of prednisone should be considered.

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(S12) DEVELOPING A COMPETENCY FRAMEWORK FOR MS SPECIALIST NURSES

Although over the past decade the number of specialist nursing roles has risen dramatically in the UK there continues to be a lack of consensus surrounding the specific knowledge, education, competence, and role preparation nurses require to practice at a-specialist-level. Specialist nurses, even those working in a distinct speciality such as MS, often lack role definition and role boundaries and as a result there is lack of parity in the 'MS Specialist Nurse' throughout the country. Whilst it is acknowledged that standards, safety and competence are important they have neither identified nor defined what they are or how they will be assessed, instead they have elected to devolve this responsibility to the individual nurse.

It is essential that MS Specialist nurses are clear about their scope of clinical practice and the values and beliefs of their specialism. They need to take ownership of their role and not have it dictated to them (Carroll 2002)¹. A project has recently been completed by a working party of MS Specialist Nurses, the MS Trust and the Royal College of Nursing (RCN), which identifies the Key Elements for Developing UK MS Specialist Nursing Services². This produced a model for MS nursing by defining their role and identifying developmental needs. Following on from this, it became obvious that there was now a need to address the training and education of MS Specialist Nurses in order to provide the optimum level of care for patients and their families as well as developing a career framework for nurses in post, whatever their level of experience.

A steering group met in January 2002 to produce a framework aimed at establishing a competency-based assessment appropriate for all UK MS Specialist Nurses. This presentation will discuss the development of the project so far and examine its potential in clinical practice. It will identify how this assessment will gain credibility within the nursing profession and the method proposed to evaluate its effect on both professional development and the quality of patient care.

References:

- 1 Carroll, M. (2002) *Advanced Nursing Practice. Nursing Standard.* 16. 29. 33-35
- 2 United Kingdom Multiple Sclerosis Nursing Association, Royal College of Nursing, MS Research Trust. (2001) *The key elements for developing MS specialist services in the UK.* RCN, London.

Study supported by TEVA Pharmaceuticals

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**(S13) DEVELOPING PATIENT EDUCATION MATERIALS:
THE EXPERIENCE AT THE CALGARY MS CLINIC**

INTRODUCTION:

Printed materials are one of the most effective methods for communicating health information. Developing patient educational materials are an important aspect of providing comprehensive MS care to patients. The University of Calgary has been providing MS care since 1976. This year both patients and clinic staff identified a need to review the content and quality of patient education materials at our clinic, revise existing pamphlets, and develop new materials on identified topics.

METHODS:

The initial process in the development of educational materials included identifying topics requiring printed material and assessing existing educational materials both within the MS Clinic and the Calgary Health Region. After this was determined, literature searches were performed, and draft documents were prepared with assistance from the department of educational resources. Printed materials on fatigue, spasticity, osteoporosis, steroids, and Mitoxantrone were drafted and produced, and evaluations forms were distributed for critical feedback from patients and members of the multidisciplinary team.

RESULTS:

Feedback was obtained from individuals with MS, members of our rehabilitation team, representatives from the MS Society, and MS clinic nurses and neurologists. This process provided valuable feedback and the materials were edited in collaboration with our educational resource consultant to reflect the comments of the evaluators. To date, five new and revised patient education pamphlets have been produced and are being utilized by our MS Clinic.

CONCLUSIONS:

Developing printed teaching materials for MS patients is a challenging and time consuming process. However, effective printed materials do provide patients, family practitioners, and other health care providers with current, accurate, and ultimately valuable information on many issues related to MS care and treatment.

Study supported by Calgary MS Clinic

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(S14) DOES THE EDSS REFLECT QUALITY OF LIFE? RELATIONSHIP BETWEEN THE EDSS AND MSQOL-54

The EDSS is meant to quantify impairment and disability in individuals with MS. However, it is criticized for being primarily a mobility scale, which is insensitive to other major functions.

Quality of life is thought to be related to physical status and function. The MSQOL-54 is a standardized measure that consists of 14 subscales and 2 cumulative scores (Physical Summary Score and the Mental Summary Score). The purpose of this study is to determine the relationship (using Pearson correlations) of the Functional System (FS) scores and the MSQOL-54 subscale scores.

Each subject was assigned an EDSS score and completed the MSQOL-54. 139 individuals contributed to this data set (154 total sample) 81% female, mean age 44.7, mean EDSS 3.3.

For the EDSS, all FS scores correlate ($>.3$) with at least 2 of the MSQOL-54 subscales except Brainstem and Visual, and the highest correlations are in the expected subscales (i.e.: Pyramidal with Physical Health = $-.520$, and Mental with Cognitive Function = $-.431$).

The majority (10 of 14) of the subscales of the MSQOL-54 have low correlations with the FS scores. The four that have moderate correlations ($.3$ or above) include the Physical Health, Role Physical, Social Function, and Cognitive Function. The Physical Summary score correlations range from 0 to $-.468$ (5 greater than $.3$), while the Mental Summary score correlations are all less than $.3$ except for Mental ($-.301$).

These results indicate that the MSQOL-54 is a valid measure in MS. In addition, the EDSS not only measures physical function, but also captures information regarding cognitive function, and the impact of disease on social function. The low correlations indicate that both scales are measuring different traits. While there are issues with both measures, when taken together, they appear to reflect the total impact of the disease on the individual.

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(S15) ELECTRON MICROSCOPIC STUDIES OF SPINAL FLUID IN MS REVISITED

BACKGROUND:

Evidence has been presented in recent years suggesting the presence of *Chlamydia pneumoniae* in the cerebrospinal fluid of many patients with multiple sclerosis both by culture and by polymerase chain reaction. This has been criticized because it was considered unlikely that a microorganism as large as *C pneumoniae* would have escaped detection by electron microscopists examining multiple sclerosis tissue. However, pleomorphic structures such as *C pneumoniae* are extremely difficult to recognize in complex tissues especially if it is not being looked for specifically. We here report results of a search for structures compatible with *C pneumoniae* in cerebrospinal fluid (CSF) pellets examined by electron microscopy.

METHODS:

Approximately 500 electron micrographs of CSF pellets from twelve individuals with MS and an equal number of micrographs from other neurologic disease control specimens were examined for evidence of the presence of *C pneumoniae*.

RESULTS:

In addition to myelin fragments which were frequently found in the CSF specimens, reticulate bodies compatible with *C pneumoniae* were found in ten of twelve specimens reviewed, structures resembling elementary bodies of chlamydia were seen in three specimens and vacuoles with both were seen in three specimens.

CONCLUSION: The finding of previously unrecognized *C pneumoniae* like structures in previously studied CSF specimens supports the culture, polymerase chain reaction and oligoclonal band binding data suggesting the presence of *C pneumoniae* in multiple sclerosis CSF. Whether this is related to the cause of MS or simply an incidental finding will require further study.

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The Spectrum of Multiple Sclerosis Care

**(S16) EIGHT-YEAR EXPERIENCE WITH INTERFERON BETA-1A
IN SUBJECTS WITH MULTIPLE SCLEROSIS**

OBJECTIVE:

To report results of an open-label, safety-extension study of the phase III pivotal trial of intramuscular (IM) interferon beta-1a (IFN β -1a, Avonex) 30 mcg once weekly in patients with relapsing multiple sclerosis (MS).

BACKGROUND:

MS is a life-long disease that requires long-term therapy. Hence, it is important that therapies are safe and effective over the long term.

METHODS:

Patients who participated in the phase III trial were allowed to enroll in an open-label extension study and receive IFN β -1a for an additional 6 years; hence, patients who originally received IFN β -1a in the phase III trial were treated for up to 8 years. Patients who did not participate in the phase III trial were also eligible for enrollment in the extension study. Safety was assessed by adverse events, tolerability was evaluated by treatment discontinuations, and immunogenicity was assessed by measurements of neutralizing antibody (NAb) titers every 3 months. In addition, data were collected on the number of annual IV steroid courses for relapses in patients who participated in the pivotal phase III trial.

RESULTS:

Of 382 patients enrolled in the extension study, 218 patients had participated in the phase III trial. The most common treatment-related adverse events were similar to those observed in the pivotal phase III trial, and included flu-like symptoms, headache, myalgia, asthenia, chills, and fever. There were no unexpected adverse events. The incidence of NABs in patients who tested negative at baseline (titer=0) and had at least one NAb titer ≥ 20 LU/mL over the extension phase was 5%. IV steroid use was evaluated in patients who participated in the phase III trial and were in the extension study at Year 6 (total of 8 years of treatment). An intent-to-treat analysis showed a 70% reduction in the number of IV steroid courses (from the phase III trial to Year 6) was observed in patients who previously received placebo during the phase III trial and then switched to IM IFN β -1a during the open-label extension (0.83 vs. 0.25 courses/patient/year). Patients who received IM IFN β -1a during the phase III trial and stayed on IM IFN β -1a in the extension study showed a 44% reduction in the number of steroid courses (0.59 vs. 0.33 courses/patient/year).

CONCLUSIONS:

Once-a-week IM IFN β -1a was well tolerated for up to 8 years of treatment in patients with relapsing MS. The incidence of NABs was 5% in patients treated with IM IFN β -1a over the extension study.

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**(S17) GENDER DIFFERENCES IN MEMORY FUNCTION:
EVIDENCE OF COGNITIVE RESERVE IN MS?**

INTRODUCTION:

Gender differences have been noted to moderate the neurocognitive sequelae of a number of neurologic diseases, raising the hypothesis that women may have greater cognitive reserve than men. While MS is much more prevalent among women than men, little attention has been given to potential gender differences in cognitive functions.

METHODS:

Participants consisted of 260 consecutive referrals for neuropsychological evaluation who had been diagnosed as having definite MS of either a relapsing-remitting (RRMS; n=196) or secondary progressive (SPMS; n=64) nature. The gender distribution was similar to national male:female prevalence rates (74:186). Men and women did not differ on education, age of symptom onset, or duration of symptoms. Participants were administered the Wechsler Intelligence (WAIS--III) and Memory (WMS—III) scales, and their age-corrected factor scores were analyzed by 2x2 (Gender x Course) ANOVAs.

RESULTS:

Analyses of the WAIS—III Verbal Comprehension (VCI), Perceptual Organization (POI), and Processing Speed (PSI) Index scores yielded no significant Gender or Gender by Course effects. The RRMS group did perform better than the SPMS group ($p < .000$) on POI and PSI. RRMS patients also performed significantly better than the SPMS group on the WMS—III Working Memory (WMI), Immediate Memory (IMI) and General Memory (GMI) index ($p < .000$) scores. However, there was also a significant Gender effect for IMI and GMI, with women performing better than men ($p < .000$).

CONCLUSIONS:

Although no gender differences were observed on measures of intellectual ability, women manifested better short-term and long-term memory than men, regardless of MS course. While this study did not take into account lesion burden or level of physical disability, the present data suggest that women may possess greater cognitive reserve than men within some cognitive domains such as memory.

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**(S18) HEALTH-RELATED QUALITY OF LIFE IN
RELAPSING-REMITTING MULTIPLE SCLEROSIS (MS)**

BACKGROUND:

Researchers have found that quality of life decreases substantially in the early stages of MS. Knowledge of the factors associated with quality of life in this stage may assist health care providers to minimize reductions.

OBJECTIVE:

The purpose of this study was to determine the factors associated with the health-related quality of life of Saskatchewan adults with relapsing-remitting MS.

METHODS:

To address the research objective, we used baseline data from a population-based study examining the health-related quality of life in MS patients about to begin drug treatment to reduce the exacerbation rate. Subjects completed a self-report questionnaire before the initiation of therapy. The questionnaire included questions about demographic and socio-economic status, alternative therapies sought, fatigue severity, comorbid medical conditions, disease status, and valid and reliable inventories to measure illness intrusiveness (Illness Intrusiveness Scale), health-related quality of life (SF-36 Health Status Survey), and depression (Beck Depression Inventory). Multiple linear regression models were used to identify the factors associated with the physical health summary score and mental health summary score of the SF-36.

RESULTS:

Fatigue severity, comorbid medical conditions, EDSS score, number of MS attacks in past 6 months, employment status, age, and gender were found to be significantly associated with the physical health summary score. Illness intrusiveness score, age, comorbid medical conditions, headaches, and gender were found to be significantly associated with the mental health summary score. These factors explain 49.2% and 15.6% of the variance in the physical and mental health models, respectively.

CONCLUSIONS:

This study provides insight into the factors associated with the health-related quality of life of MS patients in the early stages of the disease. This knowledge may assist health care providers in identifying patients who may be at risk for decline in their quality of life, permitting appropriate and timely interventions.

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(S19) IMMUNOMODULATORY THERAPY IN PEDIATRIC MULTIPLE SCLEROSIS

INTRODUCTION:

Treatment tolerability of the four main immunomodulatory therapies approved for use in Multiple Sclerosis (MS) is well described for adult MS patients. We describe the use of these medications in a cohort of pediatric MS patients followed in a multidisciplinary clinic at the Hospital for Sick Children, Toronto.

METHODS:

Immunomodulatory therapy was offered to all patients with clinically definite MS, as defined by the criteria of Poser et al, followed in our pediatric MS clinic.

RESULTS:

Thirty-one pediatric MS have been followed for at least 3 months, 28 patients are currently receiving immunomodulatory therapy: 18 with Interferon b-1a (Avonex); 5 with Interferon b-1a (Rebif); 2 with Interferon b-1b (Betaseron); and 2 with Glatiramer Acetate. One patient is receiving cyclophosphamide. Two patients have refused immunomodulatory therapy due to a reluctance to receive injections (1 patient) and clinically stable disease (1 patient), and one patient was non-compliant with treatment. Seven patients have been switched from their initial treatment to their current medication due to injection site reactions (3 patients), patient dissatisfaction with the frequency of injection (2 patients), and lack of efficacy (2 patients).

Flu-like symptoms and headache have been easily managed with prophylactic ibuprofen or acetaminophen. Six patients developed transient liver enzyme elevations (all on interferon) which resolved spontaneously. One child receiving interferon developed marked liver dysfunction, but liver biopsy and laboratory studies demonstrated concurrent autoimmune hepatitis.

CONCLUSION:

Pediatric MS patients accept and tolerate immunomodulatory therapy. Compliance is excellent, relating in part to active involvement of the child in treatment selection. Liver enzyme elevation occurs with interferon therapy and close monitoring of liver function studies is strongly recommended.

Study supported by Serono, Inc. and Biogen, Inc.

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**(S20) IMPACT OF EDUCATION AND BRIEF TELEPHONE COUNSELING
ON SEXUAL DYSFUNCTION IN MS**

Introduction:

Sexual dysfunction is a highly prevalent symptom in MS that negatively impacts the quality of life. There are few validated treatments, with most efficacious for men only. The purpose of this study was to evaluate whether sexual function in women with MS could be ameliorated with either education or education and brief counseling.

Methods: Outcome Measure:

The outcome measure utilized was the Multiple Sclerosis Intimacy and Sexuality Questionnaire-19 (MSISQ-19), a reliable and valid 19-item self-report instrument (Sanders et al, 2000).

Procedure:

Patients attending a large MS Center were invited to participate in the study one week prior to their annual visit. Sixty-two patients who agreed were randomized into 1 of 2 groups. Group 1 received an educational packet that described primary, secondary, tertiary sexual dysfunctions in MS, and how to compensate for them, and additional resources (books, websites, and a list of local psychologists). Group 2 received the educational packet and 3 counseling sessions, the latter 2 by telephone.

Results:

At baseline, EDSS score was not correlated with primary, secondary, tertiary, or total sexual dysfunction. Total MSISQ-19 score was correlated with use of anti-cholinergic meds ($r(54)=.28, p<.05$), but not other meds, alcohol or tobacco use.

Repeated-measures Analysis of Variance were conducted in order to evaluate whether either group changed on sexual dysfunction score over time, or whether the education + counseling group benefited more than the 'education only' group. Results indicated that there were no differences at baseline, but both groups had significant reductions in primary sexual dysfunction ($F(1)=14.79, p<.001$). There were no significant interaction effects, which means both groups decreased on primary sexual dysfunction equivalently. There was a trend towards an interaction effect for tertiary sexual dysfunction ($F(1)=2.88, p=.096$, in the direction of Group 2 (education + counseling) benefiting more than the education group alone.

Study supported by Teva Marion Canada

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(S21) INFANT FEEDING METHOD AND HEALTH OF INFANTS BORN TO MOTHERS WITH MS

PROBLEM & PURPOSE:

Controversy surrounds whether mothers with multiple sclerosis (MS) who wish to breastfeed their infants should forgo breastfeeding in order to begin or resume immunomodulating therapy following birth even though breastfeeding has not shown to have deleterious effects on these mothers. Knowledge of potential health benefits to infants through breastfeeding could influence health care providers to encourage mothers with MS who wish to breastfeed to do so and delay starting immunomodulating therapy. The purpose of the study was to identify the type and prevalence of illness and if differences in illness existed between breastfed and non-breastfed infants of mothers with MS.

DESIGN/METHOD:

In this descriptive comparative longitudinal study, the sample consisted of 140 breastfeeding and 35 non-breastfeeding mothers who were primarily Caucasian women. Self-report diaries were used to obtain percent of feedings by breast and bottle on a weekly basis for the first 6 postpartum months and at 9 and 12 months. Differences between breast and non-breastfed infants for specific illnesses were determined by Mann-Whitney U Tests and hierarchical binary logistic regression.

RESULTS:

Significantly more non-breastfed than breastfed infants experienced otitis media, lower respiratory illness, constipation, milk intolerance, and allergy during the first year. Significantly more male than female infants experienced otitis media and infants with no siblings experienced more constipation. After controlling for maternal and infant characteristics, lower respiratory illness, constipation, and allergy continued to be significantly greater among non-breastfed than breastfed infants.

CONCLUSION:

Results support the need to encourage mothers with MS who wish to breastfeed their infants to do so and delay immunomodulating therapy unless deemed safe for the breastfed infant.

Study supported by Rutgers, The State University of NJ Research Council & MBRS (NIH) Grant #5 425 GM 60826-03

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(S22) MULTIPLE SCLEROSIS NURSES INTERNATIONAL CERTIFICATION STANDARDS OF PROFESSIONAL NURSING PRACTICE AND PATIENT CARE

BACKGROUND:

The Multiple Sclerosis Nurses International Certification Board (MSNICB) was formed by special initiative of the International Organization of Multiple Sclerosis Nurses (IOMSN) to establish domains specific to multiple sclerosis nursing practice. MS nurses with expertise in nursing research, education, and practice representing Australia, Canada, Italy, the Netherlands, the United Kingdom and the United States gathered to delineate nursing roles that cross oceans, borders, cultures and healthcare systems.

PURPOSE:

To achieve the vision of the IOMSN that unites MS nurses from around the globe through standard practices based on common knowledge, skills and tasks to encourage best outcomes for the nurse-patient collaborative relationship; To evaluate best practices through examination leading to certification that recognizes and validates international multiple sclerosis nursing knowledge.

METHODS:

MSNICB developed a certification examination reflecting international domains of multiple sclerosis nursing. Domains are the full range of knowledge, skills and tasks of MS nursing responsibility and accountability. Examination questions were submitted from five countries, including three continents, and are reflective of international MS nursing practice. Examination content was reviewed by regional constituents for validity and defensibility.

RESULTS:

Domains of clinical practice, advocacy, education, and research were identified by a board of international multiple sclerosis education, research and practice professionals. The examination conforms to psychometric standards, is relevant to practice and reflects basic preparedness for a registered nurse with two years of experience caring for persons with multiple sclerosis. The first certification examination was held in June 2002 in conjunction with the annual meeting of the Consortium of Multiple Sclerosis Centers. The certification examination is offered twice yearly in forty cities in North America, Australia, Finland, Italy, the United Kingdom and the Netherlands.

CONCLUSIONS:

Certification benefits the individual nurse to the full extent of professional expertise with impact on practice outcomes. Certification establishes standards and recognizes those nurses meeting the standards. The certified nurse brings a known expertise to patient care. Certification is a benefit to the neurological community as standards enhance communication. International multiple sclerosis nurse certification is a revolutionary concept in professional nursing and patient care.

Study supported by IOMSN

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**(S23) NURSING ALGORITHM FOR LONG-TERM TREATMENT OPTIMIZATION
IN MULTIPLE SCLEROSIS NURSING**

The North American MS Nurses' Treatment Optimization Group.

The introduction of disease modifying therapies for MS over the last seven years has had a significant impact on the management of those living with this disease. Initially the focus to improve treatment outcomes and adherence was to manage drug-related adverse events. However, managing adverse events is only one facet of ensuring optimal health outcomes and treatment adherence for patients using disease modifying therapies. Other important factors that impact treatment outcome and adherence include: 1) patient appropriateness for therapy and readiness to initiate treatment; 2) efficacy of selected treatment; 3) adequate MS education and self-injection training; 4) monitoring and the management of side effects; and 5) physical, cognitive and psychosocial functioning.

In late 2002, a group of eighty nurses from Canada and the United States (The North American MS Nurses' Treatment Optimization Group) convened in Montreal, Canada, to address long-term adherence to disease modifying therapies. This group developed an evidence based resource to address potential adherence issues, thereby, providing MS nurses with a tool for optimizing treatment outcomes. The result of their work is the Nursing Algorithm for Long-Term Treatment Optimization in MS.

For each of the five algorithm activities, the authors have provided background information as well as dynamic nursing care plans that outline assessment strategies, optimal sequencing and timing of interventions, desired patient outcomes, and evaluation methods. The ultimate goal of this algorithm is to ensure the best possible medical, psychosocial and quality of life outcomes for patients with MS.

Study supported by Serono, Inc.

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**(S24) PAIN IN MULTIPLE SCLEROSIS:
PREVALENCE, EFFECTS ON MOOD AND QUALITY OF LIFE**

INTRODUCTION:

Reports of pain in MS vary widely, ranging from *_rarely_* to 80% of the time (Moulin, 1998). The purpose of the present study is to assess the prevalence of certain types of pain in patients with MS and effects on mood and quality of life. This study represents preliminary data from a larger study in progress.

METHODS:

Patients were randomly selected from a tertiary care center specialized for MS and asked to participate in a study about pain in MS. Those who indicated interest in participating were mailed a packet of questionnaires that assessed types of pain experienced, mood, and quality of life.

RESULTS:

80% of the sample reported pain due to their present disease, while 42% reported pain as one of the first symptoms they experienced. The most frequent types of pain reported were dysthetic extremity pain (53%), paroxysmal limb pain (47%), and migraine (47%).

Bivariate correlations demonstrated that patient's ratings of their *_worst pain_* were significantly related to interference with their general activity ($r(1, 13) = .81, p = .001$), mood ($r(1, 13) = .73, p = .001$), normal work ($r(1, 13) = .76, p = .002$), enjoyment of life ($r(1, 13) = .68, p = .01$) and relations with other people ($r(1, 13) = .78, p = .002$). Pain 'at its worst' was also significantly correlated with fatigue ($r(1, 13) = .64, p = .02$), and depression, ($r(1, 13) = .61, p = .03$).

CONCLUSIONS:

Results of this study indicate that pain is prevalent in 80% of a randomly selected sample of patients with MS. Patients reported that when their pain was at its worst, they experienced significant interference with daily activities and increased depression and fatigue. In conclusion, it is evident that pain is a significant and devastating symptom of MS that can hinder overall quality of life.

*Study supported by Gimbel Multiple Sclerosis Center
Grant from Consortium of Multiple Sclerosis Centers*

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(S25) PERCEIVED QUALITY OF LIFE IN ADULTS WITH MS

Recent developments in the management of Multiple Sclerosis recognise the importance of the “Expert Patient” and emphasise self-management in the care of people with MS. Quality of life issues are central to this approach but have not been studied extensively from the patient’s own perspective. It is difficult to assess the experience of living with MS, in particular we do not know precisely how individual health determinants impact on quality of life nor which domains have the greatest influence. Here we present preliminary findings from a community study of people with MS living in the Midlands area of the UK. The 54-item Multiple Sclerosis Quality of Life questionnaire (MSQOL-54) formed the core of the self-report study instrument used. This was complemented by the Nottingham Extended Activities of Daily Living scale and some demographic questions. The mean age of the 201 respondents recruited was 51.2 ± 12.6 years. Mean duration of symptoms was 16.7 years. Only 11 participants reported co-morbidity. All respondents were assigned to one of 3 categories: mild, moderate and severe disability. The domains measured by the MSQOL-54 were examined as predictors of quality of life except the most highly interrelated variables: “health distress”, “sexual functioning” and “energy”. “Physical health”, “role limitation due to physical problems”, “role limitation due to emotional problems”, “pain”, “emotional wellbeing”, “health perception”, “social functioning”, “cognitive function”, “change in health”, and “satisfaction with sexual function” explained 70% of the variance in perceived QOL. After controlling for age and duration of symptoms, the three domains which most significantly predicted perceived quality of life in order of importance were: “emotional well-being”, “physical health” and “satisfaction with sexual function”. These findings provide valuable guidance for policy makers determining health and social care priorities and are especially important in view of the good response rate from this community sample.

Study supported by the University of Nottingham

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(S26) PERSONAL PATIENT GUIDE: MULTIPLE SCLEROSIS

The newly diagnosed MS patient is given an enormous amount of material to read and understand. Typically, the patient experiences stress from their recent diagnosis and often experiences difficulty in understanding the many levels of information necessary to treat this disease. Taking into consideration the variety of physical, cognitive and psychosocial needs of our patient, a guide was designed to assist in organizing their thoughts. This guide is easily adaptable to any clinic.

The information is organized in a 9X6 inch three ring binder with a pocket inside to keep appointment cards and other directions. The patient is encouraged to use this guide when calling or visiting the office. It is believed that this tool will help the patient report their symptoms, making it easier to answer the neurologist questions and to report any new symptoms. During the office visit, the nurse educator is able to provide updated pages for the guide.

The guide outlines which symptoms can be assessed and treated by their primary physician vs. those that need the attention of the neurologist. This can prevent patient anxiety caused by waiting for a return call from the physician.

Patients of the Ruan MS Center reported this guide assisted their adjustment to the many phases of diagnosis and treatment. Staff reported that patients come to their appointments better prepared for their examination and symptom reporting. This leads to improved treatment outcomes and patient satisfaction.

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(S28) ROLE OF HORMONAL THERAPY FOR PREVENTION OF OSTEOPOROSIS IN MS PATIENTS

Individuals with MS are at increased risk for complications of osteoporosis because of decreased mobility, steroid use, and lack of hormone replacement in postmenopausal women. There is an increased risk for falls and fractures.

Clinical manifestations include acute fractures, low back or pelvic pain, and posture changes. Inquiries about risk factors alone will miss 70% of women with bone loss. DEXA is the most accurate way to determine bone loss.

Bone becomes more porous through loss of normal bone spicules and cross links that provide structure and strength. Bone remodeling has 5 phases: 1) Activation and 2) Resorption requiring osteoclasts, 3) Reversal and 4) Formation requiring osteoblasts, and 5) Quiescence. Remodeling is increased by PTH, thyroxine, GH, and vitamin D and decreased by calcitonin and estrogen. Estrogen helps absorb dietary calcium and magnesium and inhibits osteoclasts, blocking bone breakdown. Progesterone has a modest effect on osteoblasts, stimulating new bone growth. Progesterone exerts its action only if adequate estrogen is present. Testosterone (40 -60 ng/dl) is an osteoblast stimulator and has greater bone building effect than progesterone by stimulating new bone growth and enhancing bone strength. Estradiol, progesterone, and testosterone are severely decreased at menopause.

Standard dose of horse-derived estrogen does not give adequate levels of estradiol to preserve bone. Estrace is 100% human estradiol. Prevention of bone loss requires estradiol levels above 80 pg/ml.

Prevention requires: 1) calcium, magnesium, Vitamin D; 2) weight-bearing exercise, and 3) hormones: estradiol, 0.5-2.0 mg/day; progesterone (Prometrium), 100 mg/day; micronized testosterone, 1.0-4.0 mg/day.

The combination of hormones, calcium-magnesium supplements, and exercise has greater bone protective effect than 1) calcium alone, 2) exercise alone, or 3) exercise and calcium without hormone therapy. Adding testosterone can actually rebuild lost bone density.

Cumulative data indicate that management of osteoporosis in postmenopausal women should be incorporated into their care plans.

Study supported by NIDRR grant #H133B980017 and by EPVA MS Clinical Fellowship

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The Spectrum of Multiple Sclerosis Care

(S29) SEX (AND MS) IN THE CITY

INTRODUCTION:

Staff who care for patients attempt to provide current information related to management of sexual health, yet scientific data, educational programs, or health professionals' time are limited. Therefore these problems are often overlooked or untreated. We developed an educational program for patients aimed at improving awareness of sexual function issues related to MS.

METHODS:

An educational program consisting of two evening sessions was held at the University of Pittsburgh Medical Center in conjunction with the Allegheny Chapter of the NMSS in October 2002. Session One consisted of anatomy and physiology of sexual function and sexual response. Treatment options including medications, pelvic floor rehabilitation, and other complementary therapies were presented. Session Two focused on psychological issues, emotional closeness, communication strategies, and behavioral therapies. Humor was interwoven into all of the topics.

RESULTS:

More than fifty people with MS attended each program, as well as a fair number of significant others. Evaluations were extremely positive. Questions asked by the audience were quite candid, even in such a large forum. Attendees requested that this program be repeated. Consequently, we developed a CD ROM version of this content. Feedback has been extremely positive in relation to the CD ROM version of the program. Future plans include placing this on the website of the Allegheny Chapter NMSS website (email pax.nmss.org).

CONCLUSIONS:

Sexual health is an important topic in the life of one affected by MS, a topic which critically needs to be addressed by health professionals. Our data suggests that creative programs that are carefully designed can help patients learn to manage their symptoms. When well designed these can be fun for the participants as well.

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(S30) WEIGHT LOSS PROGRAM FOR WOMEN WITH MS

INTRODUCTION:

Obesity can be a consequence in MS of inactivity, fatigue, and/ or poor eating habits. Patients with MS are aware of weight gain and have negative feelings toward the unwanted weight. Little information concerning weight loss for people with chronic illness or physical disability is available.

METHODS:

With the support of the Allegheny District Chapter National Multiple Sclerosis Society, a Weight Watchers program was begun in Pittsburgh PA at Magee Women's Hospital. Only women with physical disabilities or chronic illness were invited to participate. Course content was tailored to address the physical issues of these women. A wheelchair scale was available to weigh 5 women who were chair bound.

RESULTS:

A total of 22 women enrolled in the program, however of these 20 women were able to meet weekly. Nineteen of these women had MS. The remaining 3 had cerebral palsy, osteoarthritis, or diabetes. The duration of the program was 12 weeks. By week 9, a total of 200 total pounds was lost by these twenty women. Some of these women had attended other weight watchers programs but were extremely pleased to join in this particular group, as the needs and situations of the women were very similar.

CONCLUSIONS:

A Weight Watchers program directed solely to a group of women with disabilities proved very successful. Few adaptations were required for the course. This weight loss program could be easily replicated within other communities or MS Centers.

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**(S31) TRIAL OF REHABILITATION AFTER EXACERBATIONS OF MS:
RECOVERY PRIOR TO RANDOMIZATION**

BACKGROUND:

Despite the use of disease modifying therapies, MS patients continue to experience exacerbations. High-dose intravenous steroids enhance recovery, but available evidence supports the persistence of residual symptoms and disability. We are conducting a randomized, controlled trial to test the efficacy of a structured course of outpatient rehabilitation after steroid treatment for an exacerbation.

METHODS:

All subjects with relapsing-remitting or early secondary progressive MS treated with IV steroids at our center for a recent worsening of MS symptoms are offered to enroll. Randomization occurs 4 weeks later to allow time for expected recovery, and subjects are followed for one year. Outcome measures include the Incapacity Status Scale (ISS), the Multiple Sclerosis Quality of Life Inventory (MSQLI), the EDSS, and health care utilization. This report includes analysis of data collected at baseline and week 4, prior to any rehabilitative intervention.

RESULTS:

107 subjects were included in the analysis. Mean age was 41 +/- 9 years, 73% were female. Mean disease duration was 9.9 +/- 7.4 years, and disease course was RR in 68 % of cases. Mean delay between onset of worsening and treatment was 27 +/- 23 days. There was statistically significant improvement of scores for ISS ($p=0.017$) and Modified Fatigue Impact Scale _ cognitive ($p=0.046$) and psychosocial ($p=0.004$) subscales. There was a trend for improvement of SF-36 Physical Functioning subscale ($p=0.65$). ISS scores were significantly correlated with age, disease duration, EDSS, MFIS, and SF36-physical component.

CONCLUSION:

These data give us insight into the characteristics of our sample and into the recovery in the first 4 weeks. Our results confirm findings from our pilot study, particularly that the ISS (our primary outcome measure), appears more sensitive than the EDSS, and that improvement in objective disability is not necessarily reflected by improvement of subjective general health status.

Study supported by the National Multiple Sclerosis Society

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(S32) USE OF BOTULINUM TOXIN FOR
DETRUSOR-SPHINCTER DYSSYNERGIA IN MULTIPLE SCLEROSIS

BACKGROUND:

Detrusor-sphincter dyssynergia (DSD) is frequently encountered in neurogenic bladder dysfunction from multiple sclerosis (MS). Injections of botulinum toxin (BT), a potent muscarinic antagonist, in the external bladder sphincter, have been proposed to relieve symptoms related to DSD.

METHODS:

The diagnosis of DSD was based on urodynamic studies. 100 IU of BT A (Botox.) were injected in the external sphincter 3 times at 4-week intervals. Outcome measures included post-voiding residual volume (PVR) measured via bladder ultrasound, voiding diary (frequency, urgency, leakage, retention), patient's perception of the severity of urinary symptoms (bladder perception=BP), and quality of life measures (Incontinence Impact Questionnaire-Short Form=IIQ-7, and Urogenital Distress Inventory-Short Form=UDI-6). Visits took place at weeks 0, 1, 3, 5, and 9. Differences between baseline and follow-up scores were tested with the Wilcoxon sign-rank test.

RESULTS:

12 MS patients were enrolled. Mean age was 51.2 +/- 16.9 years, 84% were female. There was significant improvement of PVR at visit 4 (p=0.027). BP and reported urinary frequency were significantly improved at visit 3 (p=0.035 and p=0.027 respectively) and visit 4 (p=0.007 and p=0.026). There was no significant change in quality of life scores.

CONCLUSION:

BT A injected in the external sphincter relieves some of the symptoms of DSD in MS. Further studies are needed to confirm these results on larger populations, to evaluate long-term treatment effect, and to better understand the impact of this treatment modality on patients' quality of life.

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(S33) USING MOTIVATIONAL INTERVIEWING TO PROMOTE HEALTH IN PEOPLE WITH MS

Many people with multiple sclerosis (MS) are eager to engage in activities that may improve their health. Consequently, they are good candidates for brief collaborative interventions that empower them to make healthy lifestyle changes. We are studying whether brief face-to-face and telephone-based motivational interviewing is an effective way to help people with MS make lifestyle changes to improve their overall health.

Motivational interviewing is an empirically supported therapy that we have adapted for use in a randomized controlled health promotion trial. In this presentation we will review the theoretical framework of motivational interviewing and describe the six core ingredients of this therapeutic approach. We will discuss how the therapeutic principles are applied within the clinical trial to improve exercise, fatigue management, stress management, social support and reduce substance abuse. The presentation will focus on specific strategies the counselor uses initially to build a strong therapeutic relationship, guide realistic goals setting, increase motivation to change, resolve ambivalence about change, empower the client, maximize the client's self-efficacy, reduce barriers to change and provide relevant resources and referrals. She will explain how to use subsequent planned telephone counseling sessions to sustain motivation, facilitate follow-through with the initial change plan and problem-solve difficulties that arise. Since the clinical trial is still enrolling subjects and the final analysis of outcomes is more than one year away, she will briefly describe the counseling process and outcomes of two representative cases. A 78 year old female had given up golfing due to fatigue. After beginning to exercise she was able to resume golf, even to the point of playing 6 rounds in 8 days. In the other case a busy woman with a large family learned to enlist her family's support to help her cope with stress better through exercise and making time for herself.

Study supported by NIDRR, MS Research and Training Center Grant

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(S34) UTILITY, IMPACT & COST EFFECTIVENESS OF ASSISTIVE TECHNOLOGY

Interventions MS can impose many functional limitations and activities restrictions on an individual, compromising quality of life. Assistive technology (AT) is defined as “any item [or] piece of equipment that is used to maintain or improve functional capabilities of individuals with disabilities”. Despite its increasing use and sometimes high cost, the literature contains few studies of the effectiveness of AT interventions. As resources become more scarce, it is essential to carefully evaluate AT requests before providing equipment. The Denver VA Medical Center established an interdisciplinary team to assess and treat veterans’ AT needs. The team is implementing an outcomes measure to insure that the AT recommendations fit the clients’ expectations and successfully improve the veterans’ active participation in their lives. The research will begin with a case study to follow a veteran through the AT process.

Mr. M. is a 60-year old veteran with secondary progressive MS diagnosed in 1970. His current EDSS score is 8.5, and he is tetraplegic. He relies on his wife and home care providers for all activities of daily living. Mrs. M. contacted the AT team for assistance because her husband can no longer use his hands to operate the television, radio or lights. The couple requested a voice-activated system to control these devices. Occupational, speech, and physical therapies, along with psychology and social work, will evaluate Mr. M. He will complete the Assistive Technology Device Predisposition Assessment portion of the Matching Person and Technology assessment protocol. This measure is used to assist in the selection of AT devices that match the user’s needs, with the goal of minimizing the likelihood of device abandonment and ensuring cost effective use of AT resources. If the instrument proves to be a usable measure, we will implement it with each referral and use the data to guide future team AT decisions.

Study supported by Denver VAMC

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The Spectrum of Multiple Sclerosis Care

(S35) VALIDITY OF THE MS NEUROPSYCHOLOGICAL SCREENING QUESTIONNAIRE (MSNQ): A FURTHER STUDY

CONTEXT:

Recently, the MSNQ has been introduced for identifying MS-related cognitive deficits. Earlier, several short neuropsychological test batteries had been developed for the same purpose. It might be interesting to find out how the MSNQ relates to commonly used objective screening instruments as Rao's Neuropsychological Screening Battery for MS (NSBMS). Also, as with any questionnaire, it seems worthwhile to study the MSNQ in another language and culture.

OBJECTIVE:

To examine in a Belgian, Dutch-speaking MS-center population, the validity of the MSNQ at the prediction of neuropsychological test scores, among which failing NSBMS sumscores.

METHODS:

Eighty-one patients, in- or outpatients from the Melsbroek Belgian National MS Center, were asked to complete the MSNQ and the Mental Health Inventory (MHI) and were submitted to a series of neuropsychological tests, including the 4 NSBMS subtests, the Symbol Digit Modality Test (SDMT), the Trailmaking Test, the D-KEFS Sorting Test (D-KST), and the Judgement of Line Orientation Test. Seventy-three caregivers completed the MSNQ-informant form. Correlations of MSNQ informant- and patient- forms with objective testing and with MHI were calculated.

RESULTS:

The informant MSNQ-form related significantly ($\alpha < 0.01$) to both SDMT and D-KST, was a valuable predictor of NSBMS-sumscore failure (correct matches=72%), but did not relate to MHI. In contrast, MSNQ-patient form did not correlate with NSBMS sumscores but was significantly correlated with MHI-total score. A cut-off score on the MSNQ informant-form as low as 14 optimally separated passing and failing NSBMS sumscores.

CONCLUSION:

The results of the present study were similar to those of an earlier American study. In the Belgian study, however, the validity of the MSNQ at the prediction of MS-related cognitive impairment as measured with Rao's NSBMS was poorer than expected on the base of the American study. Therefore, it seems that the predictive validity of the MSNQ depends importantly on the specific (cultural, disease, demographic) characteristics of the patient population in which it is used.

Study supported by Belgian National MS Center

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**(S36) TAU PROTEIN AND BETA AMYLOID IN CEREBROSPINAL FLUID
OF THE PATIENTS WITH MS**

Multiple sclerosis is the most frequent, chronic inflammatory disease of the central nervous system. Axonal damage is now being recognized as a common finding in multiple sclerosis lesions and a cause of irreversible neurological damage. The examination of biochemical markers of the damage of the central nervous system may be the complement of the neuroimaging methods.

In this paper there are described the new markers- tau protein and beta amyloid as a marker of damage. Tau protein and beta amyloid were measured by double antibody sandwich ELISA.

Increased CSF tau levels were found in MS as compared to controls. These results may indicate axonal impairment in MS, and may provide a tool for the estimation of the axonal damage during in life.

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(S37) SCREENING FOR DEPRESSION: TWO QUESTIONS VERSUS MANY

INTRODUCTION:

Depression is a common and disabling condition associated with multiple sclerosis. A major challenge is rapid and accurate identification of people who need treatment. Recent research suggests that two depression screening questions may perform almost as well as longer questionnaires. We examined the psychometric utility of two screening questions from the PRIME-MD study (Spitzer et al, 1994).

SUBJECTS:

Subjects were 52 consecutive patients attending a specialized MS clinic. A trained assistant administered all measures as part of routine care. Demographic and medical data were obtained via chart review. Subjects were administered the 20-item Centers for Epidemiological Studies-Depression Scale (CES-D; Radloff, 1977), a widely used depression screening tool chosen for its well established psychometric properties and norms, ease of administration, and minimal emphasis on somatic symptoms which may be non-specific for depression in people with neurological disease. The CES-D was used as the 'gold standard' measure to which the two screening questions were compared.

RESULTS:

Sixty-two percent screened positive for depression by the CES-D (cutoff > 16), and 50% by the two item screen (cutoff > 1). Compared to the CES-D, the two item screen had a sensitivity of 72%, a specificity of 85%, and a positive predictive value (PPV) of 88%. Overall agreement was 77%. Using a CES-D cutoff more likely to be indicative of major depression (> 21), the sensitivity, specificity, and PPV of the two item screen were 76%, 68%, and 62%, respectively. Those determined to be depressed by the two item screen did not differ from non-depressed on EDSS scores. They did report significantly worse fatigue and poorer general health, as well as a trend toward having poorer social support.

CONCLUSION:

Two simple depression screening items hold some promise for identifying persons more likely to be depressed within a MS clinic population.

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**(S38) RECOGNITION AND TREATMENT PATHWAY
FOR PSYCHIATRIC ILLNESS IN MULTIPLE SCLEROSIS**

Disorders such as depression, cognitive impairment and anxiety are often under recognized and under treated in patients with multiple sclerosis (MS). Depression is prevalent in MS patients and estimated to occur in over half of patients sometime during the course of their illness. Quality of life is often significantly affected by psychiatric illness and can be confounded by other related symptomatology such as fatigue, memory loss and altered sleep.

With the collaborative efforts of a neurologist, psychiatrist, neuropsychologist, physician assistant and clinical nurse with expertise in MS, a systematic approach to psychiatric illness in MS was developed. Our primary goals include recognizing and effectively treating patients with depression and other psychiatric disease. We hope to improve their quality of life through a multidisciplinary approach incorporating therapy, medication and social support.

Screening tools such as the ZUNG Depression Scale are being utilized in the assessment process to recognize symptoms and identify patients. After the initial evaluation by a neurologist or coordinator, patients are assigned to an appropriate treatment pathway based on the classification and severity of the psychiatric disease. Patients are seen and evaluated at regular intervals to begin, adjust or change medication and for referrals to a clinical counselor or support group. Refractory depression may require more immediate attention and referral to the psychiatric staff at our center.

Ultimately, the pathway offers a tool to help identify, stratify and treat psychiatric illness in MS.

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(S39) ENRICHING PROGRAM DESIGN FOR AN MS WELLNESS PROGRAM

Isolation from others due to the effects of MS can lead to many problems: decreased socialization, limited mental stimulation, decreased physical activity, and reduced ability to cope with life's challenges. All these issues may contribute to hopelessness and depression.

In response to a community needs assessment, The Good Shepherd Wellness Program was designed to help those with MS increase their level of "wellness" by addressing the many facets of being human: spiritual, social, physical, and mental. Helping those with chronic disease to have an improved sense of control over their own life situation and a more proactive and positive frame of reference is an important component to living well.

The Wellness Program is offered in thirteen-week segments of biweekly four-hour sessions, with an option to attend either one day or both. Successful programming, which offers components that address specific needs of MS as well as general topics of health and wellness, has solidified the commitment in attendance by most participants. A mindfulness-based healing approach is offered to enable more flexible responses to life's challenges. This approach has been adapted to more readily engage participants, including those with cognitive impairment. Cooperative work on craft and art projects that extend over a period of time also facilitates a sense of continuity. Caring staff (including a peer with MS) and a colorful blend of personalities adds to the camaraderie that is the "glue" for program participants and provides a vital sense of connection.

This presentation will focus on aspects of programming that have been particularly successful (and some that have especially challenging) in contributing to group cohesiveness, more positive outlooks, and active engagement in lifestyle changes and improved sense of wellbeing. Data collection related to program efficacy and life satisfaction is ongoing and results of this effort will be reported.

Study supported by Good Shepherd Rehabilitation Hospital

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