Differences Between General Neurologists and Multiple Sclerosis Specialists in the Management of Multiple Sclerosis Patients: A National Survey

Murat KÜRTÜNCÜ1, Aslı TUNCER2, Uğur UYGUNOĞLU3, Zeynep Çalışkan4, Ayşenur KÖKENLİ PAKSOY4, Hüsnu EFENDİ5, Ayşe SAGDUYU KOCAMAN6, Cemal ÖZCAN7, Murat TERZİ8, Ömer FARUK TURAN9, Sabahattin SAİP3, Rana KARABUDAK2, Aksel SİVA3

1Department of Neurology, İstanbul University İstanbul School of Medicine, İstanbul, Turkey
2Department of Neurology, Hacettepe University School of Medicine, Ankara, Turkey
3Department of Neurology, İstanbul University Cerrahpaşa School of Medicine, İstanbul, Turkey
4Novartis, İstanbul, Turkey
5Department of Neurology, Kocaeli University School of Medicine, Kocaeli, Turkey
6Department of Neurology, Acibadem University School of Medicine, İstanbul, Turkey
7Department of Neurology, İnönü University School of Medicine, Malatya, Turkey
8Department of Neurology, Ondokuz Mayıs University School of Medicine, Samsun, Turkey
9Department of Neurology, Uludağ University School of Medicine, Bursa, Turkey

ABSTRACT

Introduction: The management of multiple sclerosis (MS) has become more complicated after the introduction of new diagnostic and treatment options. Despite the abundance of guidelines, the experience of physicians still plays a major role in the management of patients. This study aimed to define differences in behavior patterns between general neurologists (GNs) and MS specialists (MSSs).

Methods: We conducted a survey of 36 questions to 318 neurologists, including 33 MSSs. The survey covered topics including laboratory investigations, pregnancy, and treatment.

Results: Our study found many differences between GNs and MSSs in terms of management, the most important being treatment initiation and switching. GNs had a tendency to initiate treatment later than MSSs however, they tended to switch treatment faster. Our study also showed that GNs ordered magnetic resonance imaging (MRI) more frequently than MSSs, even if patients were clinically stable. Moreover, although GNs more frequently relied on MRI, they did not consider brain atrophy as an important measure in the follow-up of their patients. Furthermore, GNs considered replacement therapy less often than MSSs, even in patients with vitamin D deficiency.

Discussion: Our study revealed important discrepancies between the management patterns of GNs and MSSs in MS patients. These findings suggest the need for a national education program for GNs on MSSs.

Keywords: Multiple sclerosis, general neurologists, multiple sclerosis specialists, management differences

INTRODUCTION

There has been more progress in the management of multiple sclerosis (MS) than in most other neurological conditions over the last decade. The management of MS is becoming increasingly complicated, particularly with the tremendous increase in the number of new treatments. When inter-patient individual differences are added to this challenge, clinicians find it quite difficult to make a decision.

Complex processes may result in differences in approaches adopted by clinicians (1). Clinicians even make experience-based decisions instead of evidence-based decisions because of the lack of scientific evidence under some specific circumstances. This represents a particularly important challenge for neurologists in their decision-making processes and who have inadequate experience in treating MS.

The experience of a clinician is important for diagnosing and treating MS. However, there are a very limited number of studies that have attempted to estimate the necessary extent of this experience. However, one survey on German neurologists regarding pregnancies in MS patients revealed that general neurologists (GNs) were able to provide correct answers to only 54% of the questions (2). This study, which was published by Borisow et al. (2) showed that the proportion of physicians providing correct answers was higher among those seeing more than 400 MS patients annually. In Turkey, it can be estimated that only those neurologists employed in an MS clinic could follow that number of patients.

Our study, which aimed to demonstrate the differences in the levels of experience of neurologists and their management patterns of MS patients, utilized a survey of 36 questions that examined investigations used by physicians when diagnosing MS, factors affecting pregnancy decisions, criteria to initiate disease-modifying treatments (DMTs), and how neurologists used laboratory investigation results.
METHODS
We performed a survey by making face-to-face contact with 318 physicians, of whom 285 were GNs and 33 were multiple sclerosis specialists (MSSs), from 22 cities. The study was conducted according to the Declaration of Helsinki. Informed consent was obtained from all respondents. With this survey of 36 questions, we asked questions on factors such as pregnancy, use of vitamin D, and presence of brain atrophy, which influence neurologists when they are diagnosing and treating MS. For example, the 16th, 17th, and 18th questions of the survey are: “In your clinical practice, do you think that vitamin D deficiency affects the course of MS?”; “Which of the following statements do you think are more applicable regarding the relationship between MS and vitamin D levels?”; and “Would you initiate vitamin D treatment when you detect low vitamin D levels in MS patients?” respectively. From these questions, we examined the approaches of physicians regarding vitamin D use and any differences therein; with the 28th and 29th questions, i.e., “Do you think that brain atrophy is a measurable parameter?” and “Is brain atrophy a parameter that determines your choice of treatment in your clinical practice?”, we intended to find out whether brain atrophy influenced the treatment preferences of physicians.

**Statistical Analysis**
Qualtrate® (GfK; Istanbul, Turkey), an online software, was used to collect study data. With this software, data entered by physicians are instantaneously registered in the database and graphs can be simultaneously seen with a macro. The statistical analysis of collected data was performed using Statistical Package for the Social Sciences version 21.0 (IBM Corp.; Armonk, NY, USA). The chi-square test was used to compare categorical data. Quantitative data were compared using the Student's t-test for parametric analyses and the Mann–Whitney U-test for non-parametric analyses. P values of ≤0.05 in the two-sided independent t-test were considered statistically significant.

**RESULTS**

**Differences in Approaches to Pregnancy in MS Patients**
The disease course and disability status were observed to be major factors preceding pregnancy decisions in both groups (GNs: 45%; MSSs: 85%; p<0.01). The number of patients’ children was a more important factor for GNs than for MSSs in pregnancy decisions (31.2% vs. 18.1%) (Table 1).

**Differences in Approaches to Cerebrospinal Fluid (CSF) Analysis and Vitamin D Levels**
In total, 72.1% of GNs and 75.0% of MSSs answered “Yes” to the question “Do you perform CSF analysis to evaluate the risk of MS in patients with clinically isolated syndrome?”, indicating that a comparable proportion of GNs and MSSs chose to perform CSF analysis, with almost three-fourth of all neurologists preferring to perform CSF analysis.

Less than 50% of all neurologists included in the study believed that there was a link between vitamin D levels and MS prognosis, with 42.4% of MSSs and 48.8% of GNs answering “Yes” to the question “In your clinical practice, do you think that vitamin D deficiency affects the course of MS?”; On the other hand, 27.0% of GNs and 6.0% of MSSs did not commence vitamin D replacement therapy even in patients with reduced vitamin D levels (Table 2); this difference was statistically significant (p<0.001).

**Differences with Regard to Radiological Investigations**
General neurologists and MSSs significantly differed in responses to the question “How often do you perform MRI follow-up in a patient who was diagnosed with MS and is clinically stable?”. The proportion of GNs performing quarterly magnetic resonance imaging (MRI) monitoring was 4.6%, with no MSSs performing quarterly MRI monitoring. Among GNs, 34.7% requested semi-annual monitoring, while only 9.1% of MSSs requested semi-annual monitoring. The proportions of GNs performing annual and biannual MRI monitoring were 48.4 and 12.3%, respectively, compared with corresponding proportions of 78.8 and 12.1% for MSSs (Figure 1). In conclusion, GNs were observed to perform more frequent MRI monitoring than MSSs (chi-square test, p<0.05).

| Table 1. Responses to the question “What would your approach be if your patient was planning to get pregnant?” |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **GNs %** | **MSSs %** | **p** |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Those who support based on progression and disability degree | 46 | 85 | <0.01 |
| Those who support only patients with no children | 31 | 18 | 0.08 |
| Those who support patients with 1 child | 15 | 18 | 0.36 |
| Those who support patients with 2 or more children | 12 | 6 | 0.17 |
| Those who do not support conception | 0 | 0 | - |

*Chi-square Test; GNs: general neurologists; MSSs: multiple sclerosis specialists*

| Table 2. Responses to the question “Would you initiate vitamin D treatment when you detect low vitamin D levels in MS patients?” |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **GNs %** | **MSSs %** | **p** |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Yes | 49 | 42 | 0.29 |
| Sometimes | 24 | 52 | <0.01 |
| No | 27 | 6 | <0.01 |

*Chi-square test; MS: multiple sclerosis; GNs: general neurologists; MSSs: multiple sclerosis specialists*

| Table 3. Management of clinically stable patients who have a new lesion on performing MRI |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **GNs %** | **MSSs %** | **p** |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Those who monitor patients in shorter intervals and more frequently | 80 | 94 | <0.01 |
| Those maintaining the current treatment | 27 | 21 | 0.29 |
| Those switching treatment | 12 | 12 | 0.40 |

*Chi-square test; GNs: general neurologists; MSSs: multiple sclerosis specialists*

| Table 4. Parameters important in disability progression in MS |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| **GNs %** | **MSSs %** | **p** |
|---------------------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Attack frequency and MRI activity | 69 | 73 | 0.35 |
| Attack frequency | 17 | 9 | 0.14 |
| Brain atrophy | 14 | 42 | <0.01 |
| Black hole on performing MRI | 12 | 49 | <0.01 |
| Activity on performing MRI | 4 | 9 | 0.25 |

*Chi-square test; MS: multiple sclerosis; GNs: general neurologists; MSSs: multiple sclerosis specialists*
ment efficacy was the most important factor in deciding long-term treat-

This was followed by the choice of treatment at onset and difficulties en-

Figure 1. Responses of GNs and MSSs to the question “How often do you perform MRI follow-up in a patient who was diagnosed with MS and is clinically stable?” (%) (p<0.05, Chi-square test)

In addition, MRI was quite readily available for MSSs, while GNs had prob-

The survey also questioned the approach of clinicians to MRI reports (Figure 2) and demonstrated that more MSSs than GNs preferred interpret-

Evidence of brain atrophy (49.4%) and presence of black holes on per-

Figure 2. Responses of GNs and MSSs to the question “Which of the below statement(s) best describe your behavior toward magnetic resonance reports you requested?” (p<0.05, Chi-square test)

In addition, 14.3% of physicians commenced DMTs in radiologically isolat-

DISCUSSION

There are many international surveys evaluating the approaches of phy-

When the approaches of physicians to radiological investigations were ex-

Our study also showed that GNs had more confidence in the reports of radiologists than MSSs. One might argue that the most important reason for this could be the preference specialist physicians to interpret labora-

From the other results of our survey, it appears that GNs do not monitor their patients frequently enough. It also appears that GNs do not consid-

Results regarding treatment challenges were also interesting. Overall, one of the greatest challenges for neurologists is the criteria recommended to be followed in commencing and switching treatment. This finding is consistent with a previous study conducted outside Turkey (1). Surpris-

The greatest challenge for MSSs in the management of MS patients was the decision to switch treatment in patients not responding to treatment. This was followed by the choice of treatment at onset and difficulties en-

Differences in Treatment Approaches

The greatest challenge for MSSs in the management of MS patients was the decision to switch treatment in patients not responding to treatment.

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In addition, 14.3% of physicians commenced DMTs in radiologically isolat-

Evidence of brain atrophy (49.4%) and presence of black holes on per-

In our study, 15% of GNs responded

Although the difference was not statistically significant compared with

Moreover, our study showed that GNs tend to switch treatments in a shorter

In this study performed by Lumley et al. (7) 53% of neurologists described that they had sufficient knowledge on MS criteria (8), whereas a query with examples demonstrated that only 9% could accurately establish an MS diagnosis. While this also applies to

criteria, they did not initiate DMTs and waited for the next episode for treatment. During their routine clinical experience, only 25.0% of all neu-

Although MSSs and GNs considered the same factors when changing treatment, GNs made more rapid decisions in patients with treatment response (p=0.02). Among all neurologists, 31.2% changed treatment only when their patients requested and 12.0% changed treatment when they detected a new lesion on performing MRI.

According to the OECD data, 119 investigations were performed per 1000 people in Turkey in 2013, making Turkey have highest number of MRI requests (6). In addition, the fact that GNs prescribed MRI more frequently although they had less accessibility to it represents an interesting contrast.

Our study also showed that GNs had more confidence in the reports of radiologists than MSSs. One might argue that the most important reason for this could be the preference specialist physicians to interpret labora-

considerably rely on radiological parameters such as black holes and brain atro-

phy in their patients with progressing disease. These results indicate that not enough emphasis is being placed by GNs on the radiological evidence of MS patients.

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Turkish neurologists, another explanation might be that physicians may be erroneously associating MRI findings with clinical findings in their patients. Another reason for the high proportion of neurologists initiating DMTs in RIS patients could be the inadequacy of GMs in evaluating MRI findings. Furthermore, GNS were observed to not have enough confidence in the presence of brain atrophy and low vitamin D levels. This may be due to the difficulty in accessing and interpreting laboratory investigations.

In conclusion, our study determined that GNS had significant differences in their approaches to MS treatment compared with MSSs. These differences demonstrated by GNS who see many more MS patients than MSSs might have a negative consequence on MS patients. Therefore, it was concluded that country-wide informative training activities regarding the management of MS patients are needed for GNS.

**Study Limitations**

This was a survey, and physicians were expected to provide responses based on their memories of past experiences. This might have resulted in wrong or inadequate responses to some questions.

**Ethics Committee Approval:** Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects” (amended in October 2013).

**Informed Consent:** Written informed consent was obtained from patients who participated in this study.

**Peer-review:** Externally peer-reviewed.


**Conflict of Interest:** Z.K and A.K.P are full-time employees of Novartis, Turkey. Other authors do not have a conflict of interest relevant to the study.

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**REFERENCES**