

## **RESEARCH THESIS**

**Topic:** Effectiveness of communications and misunderstandings of health care to Multiple Sclerosis patients and its impacts

**Completed by:** Mariem A. Alrubaie

**Submitted to:** Dr. Irwin Martin

**School of Health Sciences**

**Eastern Michigan University**

**DATE:** June 15<sup>th</sup>, 2015

**Table of Contents**

Abstract.....	3
Introduction.....	4
Objectives and Research Questions.....	8
Literature Review .....	9
Methods.....	13
Results and Data Analysis.....	15
Discussion.....	19
Conclusions.....	21
References.....	23
Appendix.....	27

## **Abstract**

Multiple Sclerosis (MS) is a chronic and unpredictable crippling neuro-inflammatory disease, affecting an estimated 2.3 million individuals worldwide and 300,000 to 350,000 people in the U.S. MS is the second most costly chronic condition to treat. Given the severity of MS and its impact on patients' lives, it is important that patients feel engaged in positive, effective communications about the disease. Given the complexity of the diagnostic process and the patients' need to adjust to life with MS, patients seek information from as many sources as possible to help them manage health needs. This study sought to investigate MS patient perceptions of their experiences with access to reliable and useful communications from various information sources, including health care professionals as well as the internet and social media. The results showed that MS patients are critical to some extent of health care communication from both sources. Survey respondents overwhelmingly favored being able to obtain MS information from health care professionals as well as the Internet, but a large percentage of the respondents expressed some degree of dissatisfaction with health care communications provided by each.

## **Introduction**

Multiple sclerosis (MS) is a crippling neuro-inflammatory disease that causes mild to severe disability. MS has the following impact on Americans:

- Estimates of the number of MS patients range from 300,000 to 350,000 people in the U.S. (Foley, 2010; National Institute of Neurological Disorders and Stroke (NINDS), 2015).
- Total annual direct and indirect medical and non-medical costs for MS have been estimated to be as high as \$50,707 per patient (Trisolini, Honeycutt, Wiener, & Lesesne, 2010, p.6) and even \$54,244 (Pietrangelo & Higuera, 2015, para 17), making MS the second most costly chronic condition to treat. Only congestive heart failure is more costly.
- Approximately 200 new cases of multiple sclerosis are diagnosed each week (NINDS, 2015).
- Prevalence studies indicate that the rate of the disease has increased steadily during the twentieth century (NINDS, 2015).
- Twice as many women as men are affected, as is true of most autoimmune diseases (NINDS, 2015).
- Studies indicate that 43% to 65% of those diagnosed with MS have objective cognitive impairments that are associated with employment problems, social problems, difficulties in activities in daily living, and quality of life (Foley 2010).

Patients who suffer from chronic illness experience communication with healthcare providers as a critical component of their care. Healthcare professionals treating MS patients includes physiotherapists, occupational therapists, and nurses as well as generalist and specialist physicians and others with whom they may have regular and frequent communication (Thorne, Con, McGuinness, McPherson, & Harris, 2004). However, healthcare professionals are not the patients' only information source. Given the complexity of the diagnostic process and the patients' need to adjust to life with MS, patients seek information from as many sources as possible to help them manage health needs. Increasing numbers of patients turn to the Internet to access information and support communities. In some instances, patients may be exposed to misleading or inaccurate information obtained online. Consequently, the quality of health care communication becomes increasingly important.

MS is a chronic and unpredictable disease, affecting the brain, optic nerves, and spinal cord, which is typically diagnosed between ages 20 and 40. The disease affects an estimated 2.3 million individuals worldwide (National MS Society, n.d.). Because of the difficulty of diagnosis and the way that MS data is reported, no one knows the exact number of people affected by multiple sclerosis. As a result, only estimates are available regarding the prevalence of the disease. The severity of the impact of MS is however unquestioned. MS, which affects more than 1,000,000 in the western world, is the second leading cause of neurological disability in young adults, exceeded only by trauma (Barcellos et al., 2002).

Thought to be caused by the immune system attacking healthy tissue, MS symptoms include weakness, fatigue, poor coordination, loss of balance, bladder and bowel disturbances, pain, blindness and paralysis, sexual dysfunction, abnormal speech, and cognitive and emotional disturbances (Thorne et al., 2004; Trisolini et al., 2010). While the disease is not normally fatal,

it does prevent many of those affected by the disease from leading normal and productive lives (National MS Society, n.d.). Moreover, MS affects not only patients and their quality of life, but their families and society as a whole. Patients depend on health care professionals and other information sources to understand and manage their symptoms, adapt to changes in their lives, and make decisions about treatment.

The etiology of MS is not well understood, but studies tend to show genetic linkage. Haines et al. (1998) found that genetic factors play a role in susceptibility to MS. Studies showed that first, second, and third degree relatives of MS patients were at 15 to 40 times higher risk of developing MS. Twin studies and adoption studies likewise indicated increased risk for biological relatives of MS patients. Similarly, Sospedra and Martin (2005) argued the existence of a predisposing genetic trait that contributes to the development of MS. Barcellos et al. (2002) also found that complex genetic susceptibility played a significant role in MS etiology; however, the precise role of genetic factors remains unknown. The existence of so many poorly understood factors regarding MS causes and treatments contributes to the uncertainty MS patients' experience. This uncertainty also complicates their search for high quality, reliable information necessary for them to participate in health management.

Given the severity of MS and its impact on patients' lives, it is important that patients feel they engage in positive, effective communications about the disease. Therefore, health care relationships can be significant in contributing to MS patient quality of life and self-care management (Thorne et al., 2004). In general, patients can be expected to prefer to participate in shared decision-making so that optimal communication occurs between doctors and patients. In addition to collaborating in clinical decision-making, patients also typically want to strike a balance between taking over the decision-making process and leaving all decisions to the

physician. For patients suffering from chronic diseases, in particular multiple sclerosis, patient preference for significant communications has been well documented (Hamann et al., 2007). Hay, Strathman, Lieber, Wick, and Giesser (2008) noted that MS patients seek information on the Internet not to replace information provided by their physicians, but nonetheless patients were reluctant to discuss Internet information with their physician. This reluctance highlights the dilemma MS patients' face in integrating various sources of health care information.

This study surveyed literature on health care communication for MS patients including the background and significance of miscommunication and misleading communications and new developments. In addition, the study describes the results of a quantitative survey that investigated patient perceptions and discusses how study data were analyzed. This research also discusses the limitations and implications of the study, as well as possible uses of information that is reported.

### **Objectives and Research Questions**

This study sought to investigate MS patient perceptions of their experiences with access to reliable and useful communications from various information sources. It is the goal of this study to provide insights into how satisfied MS patients are with information made available to them. It is significant to understand these perceptions because of their impact on overall patient health, disease management, and adherence to treatment protocols.

This researcher hypothesized that patient satisfaction, the dependent variable, would be positively correlated with health care communication from health care professional and from the Internet and social media, the independent variables. This study used quantitative methods to investigate the relationship between patient perceptions of receiving high quality health-related information from these sources. The central research question that guided this study was: What are the correlations, if any, between patient satisfaction and patient experience with obtaining health-related information from health care professionals and social media and the Internet?

## **Literature Review**

A literature review reveals varying quality and reliability in health care communication for MS patients. Given that research shows that more involved patients experience better health outcomes due to increased treatment adherence and awareness, medicine is becoming increasingly more participatory to promote these outcomes (Lejbkowicz, Paperna, Stein, Dishon, & Miller, 2010). The need to find reliable and trustworthy information online regarding medical conditions exists because significant numbers of people trust the Internet for health information. In recent years surveys show that 60 to 80 percent of Americans used the Internet to find health information (Fox & Jones, 2009; Sarasohn-Kahn, 2008). By January 2008, the Internet rivaled physicians as the leading source for health information (Sarasohn-Kahn, 2008).

Research has shown a correlation between the ability to cope with MS and how well-informed the patient is. Particularly in the early phases, optimizing the information process may help the patient develop coping styles that improve adaptation to living with MS (Lode, Larsen, Bru, Klevan, Myhr, & Nyland, 2007). In addition, information seeking helps to improve the patient's confidence in the treatment received, leading to improved treatment adherence. Given that nonadherence is considered an unnecessary risk for further morbidity and mortality, and a waste of health care resources, non-adherence is an important issue in MS management. Information is therefore a significant factor in patient empowerment in decision making and optimization of therapy, leading to increased adherence (Klauer & Zettl, 2008).

In some cases the need for information can lead to increased anxiety for people with no medical training or background, as is frequently the case with individuals who believe they may

be suffering from a disease or illness. Microsoft Corporation conducted a longitudinal study of the health-related search experiences of 515 individuals. The results showed that the use of Web search engines were potentially responsible for escalating users' anxiety over medical issues (White & Horvitz, 2008). According to the *Washington Post*, the Microsoft study reported that approximately two percent of Windows Live searches were related to health topics. Nearly one-third of the 250,000 users who conducted at least one query during the study escalated their Web surfing to encompass much more serious and less common medical conditions (Butler, 2009). Problems may arise when people mistakenly believe that internet search engines can provide medical diagnostics. Horvitz (2008) argued that the challenge for Internet content providers is to improve health content in such a way that it gives more accurate results reflecting the probability and likelihood of diagnoses and that more complexities are included such as family history.

Another criticism of social media as a source of health information is that content provided by individuals may result in adverse effects or even death. In general it is assumed that low-quality information available on the Internet can cause potential harm, but the literature does not substantiate this (Deshpande and Jadad, 2009). Advocates of online healthcare information argue instead that social network communities tend to be very active and self-correcting. As a result, misinformation does not remain unreported or uncontested for long (Sarasohn-Kahn, 2008).

MS patients can also obtain health information from online support groups and MS patients' communities. Such organizations offer patients and their loved ones a way to search out information from around the globe, as well as from doctors and medical experts. Online communities include Healthline's Facebook page, MS Connection, MS World, the Multiple

Sclerosis foundation's Facebook group, the Multiple Sclerosis Association of America, MS Voices, Daily Strength, and Patients Like Me (Holland, 2013).

In addition to seeking out support, MS patients look to the Internet for information on treatments and developments. The FDA recently rejected Lemtrada, a new MS drug, on the grounds that the drug's serious risks are not outweighed by potential benefits (Doheny, 2013). According to the clinical trial watch website CenterWatch, (2014), another promising treatment is the drug dimethyl fumarate approved by the FDA in March 2013. In clinical trials of more than 800 people, the drug reduced relapses from about 46 per cent for those receiving a placebo down to 27 percent.

This kind of communication is critical not only to those providing appropriate health care, but patients themselves prefer improved access to information. Study results show that MS patients prefer to participate in their treatment by being better informed. Other websites go beyond merely providing information to the MS patient by additionally supporting self-monitoring of the disease (Hatzakis et al., 2006).

Patients reported that having information about MS contributed to helping them cope with the disease (Lejbkowicz et al., 2010). Hay, Strathman, Lieber, Wick, and Giesser (2008) found that most MS patients searched online for information before their first visit to an MS clinic. Research indicates this type of preparation promotes adherence to treatment.

Compared to patients with other chronic conditions, Hamann et al. (2007) found that MS patients demonstrated greater interest in participating in making medical decisions. The researchers studied patients with other chronic conditions, including schizophrenia, depression, hypertension, and breast cancer. The researchers hypothesized several possible explanations for

MS patients' higher scores on the Autonomy Preference Index (API) scale. One explanation may be the increased fear of loss of control that MS patients feel. Another explanation may be that MS patients believe their treatment options are less effective. A third explanation may be the MS trial setting in a specialized out-patient unit resulted in possible selection bias toward more patients desiring more active involvement in medical decision-making.

Research also indicates an association between duration of MS and disability with information preferences of MS patients. Recently diagnosed MS patients tended to search more for information online. As the disease grew worse, patients with longer disease duration also tended to search more (Lode et al., 2007; Wallin, Spense & Walsh, 2000). Patients with higher disability also preferred interaction over the Internet with specialists and support groups. These patients were concerned with reading about coping approaches used by other MS patients, indicating that the Internet served a social role for them (Lejbkowicz et al., 2010). These findings highlight the importance of accessibility to online information for MS patients.

A 2014 survey of patients ( $n = 1,272$ ) and neurologists ( $n = 258$ ) highlights the difficulties of MS patients in obtaining health care communications. The survey determined that healthcare providers could help people with MS to better manage their conditions when providers better understand what their patients know or believe to be true about MS. However, survey results indicated a disconnect between patients and doctors on significant issues such as the causes of MS, adherence to treatment, and what can be done to better manage the effects of living with the disease (Strauch, 2015).

## Methods

This study used a self-reporting survey as the data collection instrument, the Comparison of Patient Perceptions of MS Communications Questionnaire with the assistance from MS Association of Michigan in publishing the survey (see Appendix). The survey consisted of eight closed-end questions, two of which required yes or no answers, while the remaining questions asked respondents to rate items on a 5-point Likert scale. The survey was distributed using the SurveyMonkey platform. Survey items evaluated patient perceptions of communications with health care professionals compared with accessing information online using social media and the Internet. The dependent variable under investigation was patient satisfaction, while the independent variables were health care communication from health care professionals and from the Internet and social media.

Survey data was collected from MS patients on March 2, 2015 using the web-based data collection platform by SurveyMonkey. This researcher conducted a survey of individual MS patients ( $n= 24$ ) to evaluate their perceptions of MS communications. Because of the need to reach a specific population, the study used convenience sampling to access MS patients from the SurveyMonkey database. This sampling strategy, as well as the small sample size, limits the ability to generalize results to a wider population.

The intent of this study was to analyze the impact of health care communication by studying patient perceptions. The study was subject to limitations involving geographical location, population size, and trustworthiness of responses provided by the participants. Limitations may also include improper data gathering and individual judgment of survey participants regarding the quality of information they have accessed. Any of these factors may

limit the ability to generalize study findings to the larger population. The survey collected 24 responses. Study delimitations include the scope of survey items which may not comprise the entire patient perspective on satisfactory health care communication.

## Results and Data Analysis

This researcher summarized study data using descriptive statistics. The data analysis consists of a discussion of each study question to examine correlations between patient satisfaction with health care communication and the sources of those communications, health care professionals and the Internet and social media. This researcher manually analyzed survey data because extensive statistical analysis was not needed to understand the relationships between study variables. The following discussion presents survey data.

**Question 1:** How significant to you is communication with health care professionals regarding MS? Possible responses were Significant, Somewhat significant, neither significant nor insignificant, somewhat insignificant, and Insignificant. All 24 respondents, or 100%, selected Significant. These responses confirmed the significance to MS patients of being able to communicate with health care professionals.

**Question 2:** How significant to you is obtaining information on MS from social media and the Internet? Possible responses were Significant, Somewhat significant, Neither significant nor insignificant, Somewhat insignificant, or Insignificant. There were 24 respondents who answered this question as follows:

- 9 or 37.5% answered Significant.
- 13 or 54% answered Somewhat significant.
- 2 or 8.3% answered Neither significant nor insignificant.
- 0 answered Somewhat insignificant, or Insignificant.

These responses showed that nearly 91% of the respondents considered social media and Internet information on MS was significant or somewhat significant to them.

**Question 3:** How likely do you believe it is to get misinformation or insufficient information on MS from health care professionals? Possible responses were Unlikely, Somewhat unlikely, Neither likely nor unlikely, Somewhat likely, or Likely. There were 24 respondents who answered this question as follows:

- 4 or 16.7% answered Unlikely.
- 5 or 20.1% answered Somewhat unlikely.
- 4 or 16.7% answered Neither likely nor unlikely.
- 10 or 41.67 answered Somewhat likely.
- 1 or 4.2% answered Likely

These responses indicate the number of MS patients, almost 46%, who believe communications with health care professionals involves miscommunication or insufficient information.

**Question 4:** How likely do you believe it is to get misinformation or insufficient information on MS from social media and the Internet? Possible responses were Unlikely, Somewhat unlikely, Neither likely nor unlikely, Somewhat likely, or Likely. There were 24 respondents who answered this question as follows:

- 1 or 4.2% answered Unlikely.
- 0 answered Somewhat unlikely.
- 7 or 29.2% answered Neither likely nor unlikely.
- 7 or 29.2% answered Somewhat likely.
- 9 or 37.5% answered Likely

Two-thirds or nearly 67% of respondents believe it is likely or somewhat likely that they may receive incomplete or inaccurate information from an Internet or social media source.

**Question 5:** Do you believe you have received misinformation or insufficient information on MS from health care professionals? Possible responses were Yes or No. Of the 24 respondents,

- 12 or 50% answered Yes
- 12 or 50% answered No

These responses indicate that half of MS patients believe they have received inadequate or inaccurate information from health care professionals.

**Question 6:** Do you believe you have received misinformation or insufficient information on MS from social media and the Internet? Possible responses were Yes or No.

- 18 or 75% answered Yes
- 6 or 25% answered No

These responses indicate that three-quarters of MS patients believe they have received inadequate or inaccurate information from online sources.

**Question 7:** How satisfied are you with MS treatment and access to health-related information from health care professionals? Possible responses were Satisfied, Somewhat satisfied, Neither satisfied nor dissatisfied, Somewhat dissatisfied, or Dissatisfied. There were 23 respondents who answered this question as follows:

- 9 or 37.5% answered Satisfied.
- 12 or 50% answered Somewhat satisfied.
- 1 or 4.2% answered Neither satisfied nor dissatisfied.

- 1 or 4.2% answered Somewhat dissatisfied.
- 0 answered Dissatisfied.
- 1 or 4.2% answered to skip this question.

These responses indicate that nearly 88% of respondents were satisfied or somewhat satisfied with information received from health care professionals. It is unknown from the survey data why one respondent skipped this question.

**Question 8:** How satisfied are you with MS treatment and access to health-related information from social media and the Internet? Possible responses were Satisfied, Somewhat satisfied, Neither satisfied nor dissatisfied, Somewhat dissatisfied, or Dissatisfied. There were 24 respondents who answered this question as follows:

- 1 or 4.2% answered Satisfied.
- 11 or 45.8% answered Somewhat satisfied.
- 10 or 41.7% answered Neither satisfied nor dissatisfied.
- 1 or 4.2% answered Somewhat dissatisfied.
- 1 or 4.2% answered Dissatisfied.

These responses indicate that 50% of respondents were satisfied or somewhat satisfied with information received from social media and the Internet.

## **Discussion**

The results showed that MS patients are critical to some extent of health care communication in general. Patients were likely to report that obtaining information about MS was a significant concern, whether that communication occurred with health care professionals or through the use of social media and online content. The fact that 100% of respondents indicated they want such communication with health care professionals, while a slightly lower number or just under 91% seek this information from the Internet, highlights the value MS patients place on keeping informed. This preference would seem consistent with studies showing that patients favor more participatory disease management options. However, responses to other questions showed that MS patients' efforts to educate themselves are being thwarted. These findings support the hypothesis that MS patient satisfaction is related to the patient's ability to obtain health-related information from health care professionals and social media and the Internet.

MS patients clearly are aware of the potential for dissemination of poor quality health care information online and in social media. Two-thirds of the respondents believe they have already received inaccurate or incomplete information from online sources, while three-quarters believe they are likely or somewhat likely get such misinformation. Given that half the respondents believed they received misinformation from health care professionals, these responses would indicate a high degree of skepticism related to any health care communication for MS patients, regardless of the source.

Clearly, in addition to desiring health care communication, MS patients also would prefer that the information they receive from medical professionals be more accurate and complete.

Nearly 46% of patients were critical of information they might receive from health care professionals. This high level of dissatisfaction may occur for a number of reasons which this study does not evaluate, but clearly this perception is cause for concern. Given that 50% of the respondents believe they have received misinformation or incomplete information in the past, these responses indicate that there is significant room for improvement. Similarity of responses to Questions 3 and 5 show consistency between the two items.

In spite of believing they have received inaccurate or incomplete information from health care professionals, nearly 88% indicated they were either satisfied or somewhat satisfied with MS treatment and access to health care information provided by health care professionals. This number is significantly higher than those respondents, 50%, indicating satisfaction with treatment and access to health care communication using social media and the Internet. It is possible that the two sources of information are best viewed as complementing each other, with MS patients benefitting from using both. While these results do not seem to indicate a strong correlation between healthcare communication and patient satisfaction, a number of other important variables that this study did not address may also mediate patient satisfaction. Patient satisfaction with communication from health care providers may be explained by access to treatment or perceived reasonableness of healthcare costs. Patient satisfaction with Internet and social media health care communication may be explained by satisfaction with access to support groups or social needs being met. This information provides health care professionals, patients, and providers of Internet content with data they can use to help positively affect MS patient care.

## Conclusions

The results of this survey provided insights into MS patient satisfaction with health care information available from different sources. Lejbkowicz et al. (2010) suggests that patients experience better health outcomes when they are more involved and actively participatory in choices that affect their illness and well-being. With increasing numbers of Internet users in recent years searching online for health information, it is not surprising that MS patients also seek information from the Internet and social media, as well as from health care professionals. This study showed that MS patients want more accurate and complete information not just from Internet and social media sources, but from health care professionals as well. These results highlight the importance of reliable, high quality information from all sources if MS patient needs are to be met.

While the study design does not indicate causality, the findings suggest a correlation between MS patient satisfaction and health care communication. The results of the study showed several variables for future investigation that will better explain this correlation: patient interactions with health care teams, and other benefits provided by interaction on social media and with support groups are two possible variables to be examined. Additional studies with larger numbers of participants will promote the development of a better understanding of the role that health care communication plays in contributing to patient satisfaction and health management.

Survey respondents overwhelmingly favored being able to obtain MS information from multiple sources, health care professionals as well as the Internet. The study identified the relative importance of these information sources and showed whether they believe they were

provided misinformation or miscommunication. If indeed more positive outcomes are to be achieved for MS patients, then physicians, patients, and Internet content providers should use this survey data to assess whether patient needs for accurate and reliable health information are being met.

## References

- Barcellos, L.F., Oksenberg, J.R., Green, A. J., Busher, P., Rimmier, J. B. Schmidt, S., ...& Hauser, S.L. (2002). *Brain*, 125(1), 150-158. doi: 10.1093/brain/aw1009.
- Butler, C. (2009, November 10). Googling can mislead people seeking health information. Retrieved from *The Washington Post* <http://www.washingtonpost.com/wp-dyn/content/article/2009/11/06/AR2009110603473.html>
- CenterWatch. (2014). Tecfidera (dimethyl fumarate). Retrieved from <http://www.centerwatch.com/drug-information/fda-approved-drugs/drug/1257/tecfidera-dimethyl-fumarate>
- Deshpande, A., & Jadad, A. R. (2009). Trying to measure the quality of health information on the Internet: Is it time to move on? *Journal of Rheumatology*, 36(1), 1-3.
- Doheny, K. (2013, December 30). FDA rejects MS drug lemntrada. Retrieved from the WebMd website <http://www.webmd.com/multiple-sclerosis/news/20131230/fda-rejects-ms-drug-lemntrada>
- Foley, F. W. (2010). Psychosocial impact of multiple sclerosis: Challenges and solutions. *Medscape Education Neurology and Neurosurgery*. Retrieved from <http://www.medscape.org/viewarticle/734647>
- Fox, S., & Jones, S. (2009). Report: Health, mobile, Web 2.0, The social life of health information. Retrieved from <http://www.pewinternet.org/Reports/2009/8-The-Social-Life-of-Health-Information.aspx?r=1>.

- Haines, J.L., Terwedow, H. A., Burgess, K., Pericak-Vance, M. A., Rimmier, J. B., Martin, E. R., ... & Hauser, S. L. (1998). Linkage of the MHC to familial multiple sclerosis suggests genetic heterogeneity. *Human Molecular Genetics*, 7(8), 1229 – 1234. doi: 10.1093/hmg/7.8.1229
- Hamann, J., Neuner, B., Kasper, J., Vodermaier, A., Loh, A., Deinzer, A., ... Harter, M. (2007). Participation preferences of patients with acute and chronic conditions. *Health Expectations*. Blackwell Publishing. doi: 10.1111/j.1369-7625.2007.00458.x.
- Hatzakis, M. J., Allen, C., Haselkorn, M., Anderson, S. M., Nichol, P., Lai, C., & Haselkorn, J.K. (2006). Use of medical informatics for management of multiple sclerosis using a chronic-care model. *Journal of Rehabilitation Research and Development*, 43(1)1-16.
- Hay, M. C., Strathman, C., Lieber, E., Wick, K., & Giesser, B. (2008). Why patients go online: Multiple sclerosis, the Internet, and physician-patient communication. *Neurologist*, 14(6), 374-381.
- Holland, K. (2013). Multiple sclerosis support groups. Retrieved from <http://www.healthline.com/health-slideshow/multiple-sclerosis-support-groups#1>
- Klauer, T., & Zettl, U. K. (2008). Compliance, adherence, and the treatment of multiple sclerosis. *Journal of Neurology*, 255(6), 87-92.
- Lejbkowicz, I., Paperna, T., Stein, N., Dishon, S., & Miller, A. (2010). Internet usage by patients with multiple sclerosis: Implications to participatory medicine and personalized healthcare. *Multiple Sclerosis International*, Volume 2010, Article ID 640749, 1-7.
- Lode, K., Larsen, J. P., Bru, E., Klevan, G., Myhr, K. M., & Nyland, H. (2007). Patient information and coping styles in multiple sclerosis. *Multiple Sclerosis*, 13(6), 792-799.

National Institute of Neurological Disorders and Stroke. (2015). Multiple sclerosis: Hope through research. Retrieved from

[http://www.ninds.nih.gov/disorders/multiple\\_sclerosis/detail\\_multiple\\_sclerosis.htm](http://www.ninds.nih.gov/disorders/multiple_sclerosis/detail_multiple_sclerosis.htm)

National Multiple Sclerosis Society. (n.d.). Frequently asked questions about multiple sclerosis.

Retrieved from the National MS Society website

<http://www.nationalmssociety.org/about-multiple-sclerosis/what-we-know-about-ms/faqs-about-ms/index.aspx>

Sarasohn-Kahn, J. (2008). The wisdom of patients: Health care meets online social media.

Oakland, CA: California HealthCare Foundation.

Sospedra, M. & Martin, R. (2005). Immunology of multiple sclerosis. *Annual Reviews in*

*Immunology*. Retrieved from <http://www.direct-ms.org/sites/default/files/Martin%20Immuno%20MS%20Review.pdf>

Strauch, I. (2015). Survey: MS patients and doctors don't see eye to eye. Retrieved from

<http://www.everydayhealth.com/news/survey-ms-patients-doctors-dont-see-eye-eye/>

Thorne, S., Con, A., McGuinness, L., McPherson, G. & Harris, S. R. (2004). Health care

communication issues in multiple sclerosis: An interpretive description. *Qualitative Health Research, 14*(5), 5-22. doi: 10.1177/1049732303259618

Trisolini, M., Honeycutt, A., Wiener, J., and Lesesne, S. (2010). Global economic impact of

multiple sclerosis. Retrieved from [http://www.msif.org/wp-content/uploads/2014/09/ExecSummary\\_English.pdf](http://www.msif.org/wp-content/uploads/2014/09/ExecSummary_English.pdf)

Wollin, J., Spense, N., & Walsh, A. (2000). What people with newly diagnosed MS (and their families and friends) need to know. *International Journal of Multiple Sclerosis Care*, 2(3), 29-38.

White, R. & Horvitz, E. (2008). Cyberchondria: Studies of the escalation of medical concerns in web search. Retrieved from the Microsoft Corporation website  
<http://research.microsoft.com/apps/pubs/default.aspx?id=76529>

## Appendix

### **The Comparison of Patient Perceptions of MS Communications Questionnaire**

(1) How significant to you is communication with health care professionals regarding MS?

1. Significant
2. Somewhat significant
3. Neither significant nor insignificant
4. Somewhat insignificant
5. Insignificant

(2) How significant to you is obtaining information on MS from social media and the Internet?

1. Significant
2. Somewhat significant
3. Neither significant nor insignificant
4. Somewhat insignificant
5. Insignificant

(3) How likely do you believe it is to get misinformation or insufficient information on MS from health care professionals?

1. Unlikely
2. Somewhat unlikely
3. Neither likely nor unlikely
4. Somewhat likely
5. Likely

(4) How likely do you believe it is to get misinformation or insufficient information on MS from social media and the Internet?

1. Unlikely
2. Somewhat unlikely
3. Neither likely nor unlikely
4. Somewhat likely
5. Likely

(5) Do you believe you have received misinformation or insufficient information on MS from health care professionals?

1. Yes

2. No

(6) Do you believe you have received misinformation or insufficient information on MS from social media and the Internet?

1. Yes

2. No

(7) How satisfied are you with MS treatment and access to health-related information from health care professionals?

1. Satisfied

2. Somewhat satisfied

3. Neither satisfied nor dissatisfied

4. Somewhat dissatisfied

5. Dissatisfied

(8) How satisfied are you with MS treatment and access to health-related information from social media and the Internet?

1. Satisfied

2. Somewhat satisfied

3. Neither satisfied nor dissatisfied

4. Somewhat dissatisfied

5. Dissatisfied