Mediators of Employment Status and Depression in Multiple Sclerosis

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Abstract

The current study examined possible reasons underlying the relationship between depression and job status in MS patients. Given that prior work has shown that stress, maladaptive coping strategies, and low levels of social support are associated with depression in MS, differences between work status groups on these variables was explored. Participants for the proposed study were thus divided into three groups: patients who work full-time, cut back on their work hours because of MS, and had to quit working due to MS symptoms. Differences between groups on measures of stress, coping, and social support were explored.

Mediators of Employment Status and Depression in Multiple Sclerosis

Multiple Sclerosis is a disease that affects the central nervous system (CNS), which consists of the brain, spinal cord, and optic nerves. Everything we do, whether it is taking a step, solving a problem, or simply breathing, rely on the proper functioning of the CNS. In the brain, millions of nerve cells, called neurons, continually send and receive signals. Normally, the path in which the nerve signal travels is protected by a type of insulation called the myelin sheath. The myelin sheath is a fatty substance that surrounds and protects the nerve fibers. This insulation is essential for nerve signals to reach their target. In MS, the myelin sheath is destroyed, scar tissue forms (sclerosis) and the underlying wire-like nerve fiber is also damaged. This leads to a breakdown in the ability of the nerve cell to transmit signals. It is believed that the loss of myelin is the result of mistaken attack by immune cells. Immune cells protect the body against foreign substances such as bacteria and viruses but in MS, something goes wrong. Immune cells infiltrate the brain and spinal cord, seek out the myelin, and attack. As ongoing inflammation and tissue damage occurs, nerve signals are disrupted. This causes unpredictable symptoms such as numbness or tingling to blindness or paralysis. These symptoms may be temporary or permanent (http://www.nationalmssociety.org/about-multiple-sclerosis/index.aspx).

People with MS can experience one of the four disease courses, ranging from mild and moderate, to severe. The first type of MS is Relapsing-Remitting MS. People with this type of MS experience an alteration between attacks (relapses) which progressively worsen each time, to partial or complete recovery (remissions). It is estimated that approximately 85 percent of MS patients experience this type of MS; therefore, it is the most common type of MS. The second type of MS is called Secondary-Progressive MS. This type of MS usually follows Relapsing-Remitting MS within ten years and is the second most common type of MS. People with this type of MS experience a steady, worsening progression of neurologic function with minor recoveries or plateaus. The third type of MS is called Primary-Progressive MS. People with this type of MS experience a slow, worsening progression of the disease from the beginning of disease onset without any relapses or remissions. It is approximated that ten percent of patients develop this type of MS. The fourth and rarest type of MS is Progressive-Relapsing MS. In this type of MS, people experiences a steady and progressive worsening of the disease but with clear attacks of worsen neurologic functioning (http://nationalmssociety.org/index.aspx).

Because MS symptoms are also common in depression, clinicians often overlook the diagnosis of depression in MS patients. People with MS have a higher risk of developing depression than the general population. It is estimated that the lifetime prevalence of clinical depression in MS is 50% (Beeney & Arnett, 2008). Prior research (Arnett, Barwick, & Beeney, 2008) has demonstrated that depression is associated with fatigue, cognitive dysfunction, physical disability, and pain, all of which are symptoms of MS. In one study (Beeney & Arnett, 2008), it was found that individuals with depression showed a memory bias for negative information. In addition, it was also found that there is a positive association between negative life events and depression. As a result, we can understand why people with MS have a greater risk of developing depression after the onset of MS disease as they would experience more negative outlook on life.

Vickrey et al. (1995) developed a self-report measure of health-related quality of life (HRQOL) for MS that compares HRQOL in MS with that in other diseases and with the general population. Health-related quality of life includes physical, mental and social health. Examples of the variables studied were general health perceptions, energy/fatigue, and social function, role limitations due to emotional and physical health problems, pain, health distress, overall quality of life and cognitive function. Findings from this study indicated that 23% of the patients needed help completing the questionnaire booklet, 13% missed between one and fifteen work or school days in the past month, and 25% missed between sixteen to thirty work or school days. When comparing between the MS group and the general population, MS patients scored lower overall on physical function and role limitations due to physical problems, social function, energy/fatigue, health perceptions, and role limitations due to emotional problems.

Benedict et al. (2005) performed a similar study on the quality of life in MS that accounts for physical disability, fatigue, cognition, mood disorder, personality, and behavior change. Findings indicated that MS patients reported lower quality of life than healthy controls and that depression and fatigue were the primary contributors to poor quality of life in MS. Moreover, it was also found that cognitively impaired patients were less likely to be employed or to be socially active.

Beatty et al. (1995) studied the demographic, clinical, and cognitive characteristics of MS patients who continue to work and tried to determine the factors that contribute to maintaining employment by MS patients by comparing thirty-eight patients who were still working to sixty-four patients who retired prematurely. Factors that have been known to contribute to the loss of employment include sensory and motor disturbances associated with the disease, physical disability, and cognitive impairments. Results of this study showed that patients who continue to work were younger, better educated, and less severely disabled than patients who had retired. In addition, patients who were still working were diagnosed at an earlier age and had MS for fewer years as well as having less impairment in cognitive performance. In conclusion, the study found that cognitive deficits, physical disability and age contribute to the premature retirement of MS patients from the work force. This study did not find a difference in the level of depression between patients who were working and those who had retired. However, we cannot assume that this finding is reliable because the most severely depressed MS patients may be the ones who did not volunteer to participate in the study. Therefore, this leads us to investigate further into the relationship between depression and job status in MS patients.

An interesting prior study (Blazer et al., 1994) looked at employment and depression in the general population. In this study, there was an unexpected finding that in the general population (non-MS), unemployment had a positive association with depression. Normally, we would think that unemployment causes depression as a result of loss of income to support the self and the family, but depression in MS seems to give just the opposite outcome. Factors that have been associated with depression in prior work may account for increased depression in employed MS patients. The unexpected result of previous findings warrants further investigation with our current study.

The current study examined possible reasons underlying the relationship between depression and job status in MS patients. Prior work has shown that MS patients working full-time report higher levels of depressed mood than patients who are working part-time versus those who are not working at all (Smith & Arnett, 2005). Given that prior work has shown that stress, maladaptive coping strategies, and low levels of social support are associated with depression in MS, differences between work status groups on these variables were explored. Mirroring Smith and Arnett (2005), participants for the proposed study were divided into three groups: patients who work full-time, patients who had to cut back on their work hours because of MS, and patients who have had to quit working due to MS symptoms. Differences between groups on measures of stress, coping, and social support were explored. It was predicted that the MS group that was still working would report higher stress levels, more maladaptive coping, and lower levels of social support.

Method

Participants

The participants were recruited from the Northwestern part of the USA and from a local MS support group based on referrals by neurologists. Participants with any history of one of following were excluded from the study: substance abuse, nervous system disorder other than MS, learning disability, severe physical or neurological impairment, and severe motor or visual impairment (Smith & Arnett, 2005). All participants were diagnosed with definite MS or probable MS by a board-certified neurologist.

Of the original 101 total participants, 4 were eliminated due to the following reasons: 1 had an unclear diagnosis, 1 had an extensive history of Electroconvulsive Therapy that was not evident at the time of the initial screening interview, 1 had a prior history of stroke, and 1 had a past history of head trauma from moving vehicle accident that resulted in 10-15 minutes loss of consciousness and also a possible history of learning disability. All participants were Caucasian. There were 17 (16.8%) males and 80 (79.2%) females in the study overall. The mean age was 47.34 years (SD = 8.95). The average level of education was 14.28 years (SD = 2. 01). There were 35 (34.7%) participants in the working (W) group, 18 (17.8%) in the cut back (CB) group, and 28 (27.7%) in the not working due to MS (NWMS) group. An additional group (n = 16 (15.8%)) was identified that included participants who quit working for reasons other than MS. Their data were not included in the present study.

Measures

The Social Support Questionnaire (SSQ)

SSQ is a set of 27 questions which asks about people in the participants' environment who can provide them with help or support. Each question has two parts. The first part asks the participants to list up to nine people in their lives whom they can count on for help and/or support in ways described in each question. The second part asks the participants to rate their level of satisfaction with the support they have for each question on a scale of 1 to 6 with 1 being "very dissatisfied" and 6 being "very satisfied." If participants have no support, they can choose "no one." This measure yields two key indices: number of supports and satisfaction with support. Additionally, a summary index that combines these two indices can be derived. The summary index was used for the data analyses in the present study.

The Hassles & Uplifts Scale (HSUP)

The HSUP is a set of 53 questions which measures how things in daily life can be a negative (hassles) or positive (uplifts) event. Hassles are things that make one irritable, upset, or angry. Uplifts are things that makes one happy, joyful, or satisfied. In each item, participants are to make a rating on the degree to which it is a hassle and then make another rating on the degree to which the item is an uplift within the last month. The rating scale ranges from 0 (none or not applicable) to 3 (a great deal) (Beeney & Arnett, 2008).

The COPE

The COPE (Carver et al., 1989) is a self-report survey which measures how people respond to certain situations or how people confront difficult and stressful events in life. The COPE is used to measure situational or dispositional coping tendencies. For the current study, we used it to measure dispositional coping tendencies. There are 52 items in the survey which are divided into four different categories, each with thirteen items. The COPE is also broken down into adaptive (Active Coping) and maladaptive (Avoidance Coping) clusters. Each cluster is again broken down into subscales. The Active Coping index includes the Active Coping, Planning, and Suppression of Competing Activities subscales. The Avoidance Coping index includes Mental Disengagement, Behavioral Disengagement, and Denial subscales. In each item, participants must rate how likely they are to do what is stated in the item on a scale of 1 to 4 with 1 being “I wouldn’t do this at all” and 4 being “I would do this a lot” (Arnett et al., 2002). In addition to examining the Active and Avoidance coping indices, we compared groups on a combination of the two indices that provided an overall summary of adaptiveness of coping used. This was referred to as the “Active-Avoidance Composite score.”

Chicago Multiscale Depression Inventory (CMDI)

The CMDI (Rabinowitz & Arnett, 2009) is a 42-item self-report depression questionnaire that measures different types of depression symptoms via three subscales: vegetative, mood, and evaluative. The CMDI was specifically designed for MS and other medical patient groups. Participants are asked to rate the extent to which each word or phrase describes them during the past week on a scale of 1 to 5, with 1 being “not at all” and 5 being “extremely.” For the present study, we only looked at mood and evaluative scale of depression to avoid potential confound involved in vegetative symptoms of depression with MS disease symptoms.

Expanded Disability Status Scale (EDSS)

The EDSS is a rating scale that measures the level of disability in MS patients. The scale measures the physical and neurological aspects of patients’ level of functioning, usually based on determination at a face-to-face meeting with a board-certified neurologist. The scale ranges from 0 to 10 with 0 being “normal neurologic exam and no disability” and 10 being “death due to MS.” In the present study, we used a self-report version of the EDSS that was developed in consultation with a board-certified neurologist with expertise in MS. Participants had to rate themselves on the EDSS questionnaire a week prior to the testing. Once the self-report questionnaire was completed, an experienced neuropsychologist in MS made the EDSS rating after receiving instructions from a neurologist specializing in MS (Arnett et al., 2001).

Procedure

Participants were called for a screening procedure over the phone; those who met inclusion criteria were scheduled for an appointment to come into the office. Participants were administered a series of measures as part of an ongoing neuropsychological battery. All participants gave informed consent and the study was approved by the Institutional Review Board (IRB) at Penn State University. Participants were debriefed after the completion of the study. Each participant was reimbursed $75 and also received written and oral feedback on their neuropsychological test performance.

Results

After analyzing data using the Statistical Package for the Social Sciences (SPSS), we found five variables that were significantly associated with employment group status: age, symptom duration, diagnosis duration, EDSS, and FIS. Table 1 displays the means and standard deviations of all the variables that were analyzed.

In contrast to predictions, the groups did not differ on levels of depression, social support, or stress levels. However, the groups did differ in their coping strategies. Specifically, the “Cut Back” group used significantly more maladaptive coping compared with the other groups. Figure 1 displays the mean active-avoidance COPE composite score for the three job status groups.

Compared with the “Working” group, the “Not Working” group was older, had a longer duration of disease, more neurological disability, and higher fatigue levels. Figures 2 and 3 illustrate these results graphically. Although one psychosocial variable (coping) proved to be significantly associated with work status, overall, demographic and illness variables were most important. Because there were no significant relationships between stress, level of depression, and social support with job status, these variables were not shown in the figure.

After performing analyses of variance (ANOVA), we performed additional analyses using the Tukey Post Hoc test to explore differences between subgroups of the sample. The subgroups were compared using the Post Hoc test on age, symptom and diagnosis duration, FIS, and EDSS, all of which were found to have a significant relationship with job status in MS patients. Table 2 displays the significance of the each of the three groups compared to each other. Comparison of the three groups showed that the “not working” group differed significantly from the “working” and “cut back” group in the severity of disability. Similarly, the “working” group also differed significantly from the “cut back” and “not working” groups in level of fatigue and disease duration. One interesting finding from the Post Hoc test was that only the “working” group differed from the “not working” group in terms of age.

Table 1. Participant Characteristics

Variable	Working M (SD)	Cut Back M (SD)	Not Working M (SD)	significance
Age**	43.97 (9.07)	47.33 (6.74)	51.82 (8.17)	0.002
Years of Education	14.60 (2.10)	14.44 (2.03)	13.79 (1.93)	0.272
Symptom Duration***	9.34 (6.86)	16.72 (8.43)	19.00 (7.47)	0.000
Diagnosis Duration**	6.71 (6.15)	11.72 (7.77)	12.82 (6.69)	0.001
IQ Score	105.88 (8.39)	106.00 (10.0)	104.28 (9.79)	0.751
Hassles	42.97 (21.52)	49.22 (21.17)	43.28 (19.12)	0.543
Uplifts	62.77 (24.04)	57.27 (20.91)	54.82 (17.15)	0.321
Hassles minus uplifts	-19.80 (30.98)	-8.05 (25.02)	-11.53 (18.82)	0.239
Ave supports listed per Q	3.45 (1.61)	4.33 (2.29)	3.46 (1.94)	0.247
Ave satisfaction ranking per Q	5.27 (0.83)	5.52 (0.61)	5.55 (0.55)	0.255
Composite support variable	19.03 (10.15)	25.82 (13.26)	19.66 (11.96)	0.133
CDMI Mood and Evaluative combined t-score mean	51.44 (11.40)	54.69 (15.39)	51.57 (12.08)	0.640
EDSS***	3.84 (1.43)	4.25 (1.49)	5.55 (1.45)	0.000
Education	14.6 (2.10)	14.44 (2.03)	13.79 (1.93)	0.272
FIS total score**	50.71 (27.56)	72.66 (31.38)	73.44 (23.31)	0.002

Note: CDMI = Chicago Multiscale Depression Inventory Mood and Evaluative Subscales; EDSS = Expanded Disability Status Scale; FIS = Fatigue Impact Scale.
*p < .05; **p < .01; ***p < .001

Figure 1. Mean active-avoidance composite score by job status

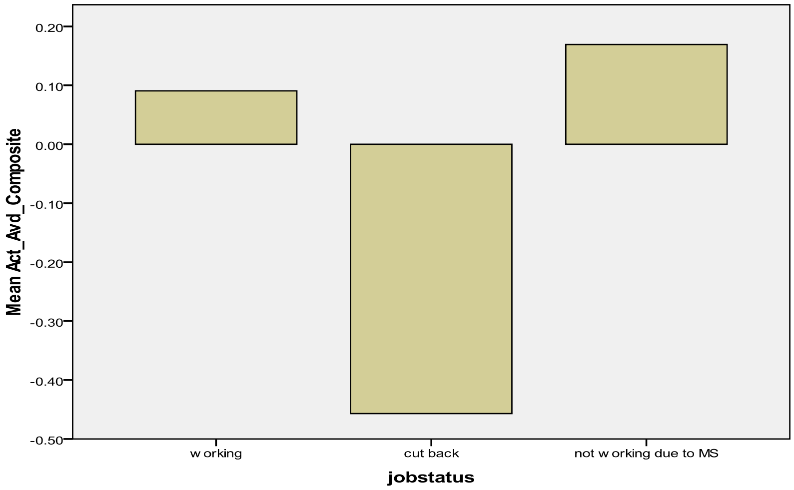

Figure 2. Mean Fatigue Impact Scale Score

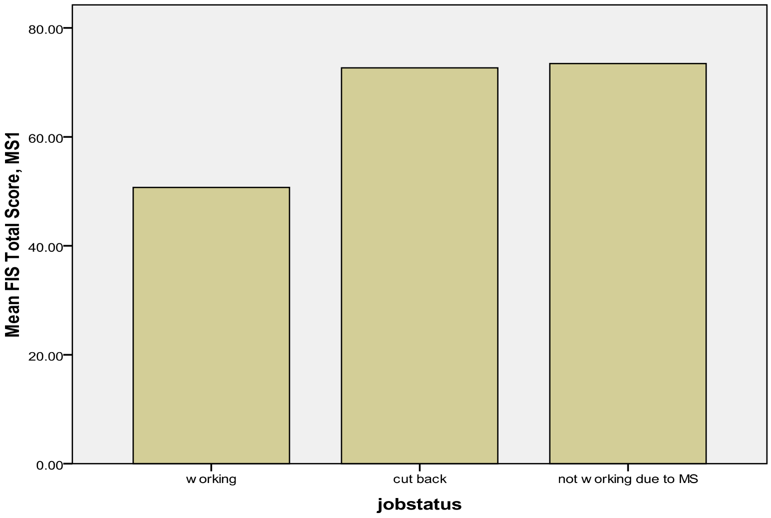

Figure 3. Mean Expanded Disability Status Scale

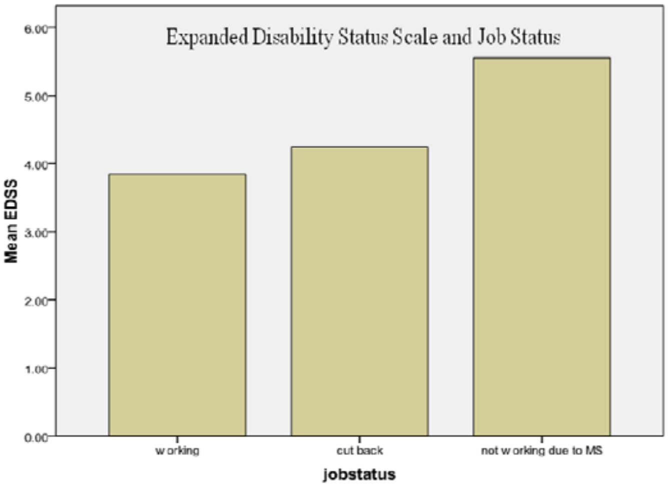

Table 2. Post Hoc test of significance between “working,” “cut back,” and “not working” groups

Variable	**Job Status**
EDSS	NW →W, CB
FIS	W → CB, NW
Age	W → NW
Symptom Duration	W → CB, NW
Diagnosis Duration	W → CB, NW

Discussion

MS affects individuals as young as 5 and as old as 75 with patients most typically experiencing their first symptoms in the 20’s and 30’s. Approximately 400,000 people in America have MS, with 200 people diagnosed each week and 2.5 million people worldwide affected (http://nationalmssociety.org/index.aspx). Although MS is not considered a fatal disease as people can still live with the disease, MS can affect people's daily functioning and decrease their life satisfaction tremendously. Some of the effects of MS include blurred or even loss of vision, fatigue, memory and concentration deficits, stress, and paralysis. All of these can lead to a decrease in the ability to perform daily activities such as caring for loved ones, going to work and caring for themselves.

Another important symptom of MS is depression. There are numerous studies that have shown that the prevalence of depression in MS is approximately 50% (Beeney & Arnett, 2008), which is a very high rate compared to only about 15% in the general population (http://cdc.gov/). The current study examined the employment status in MS patients and its relation to depression, stress, coping, and social support to explore possible contributors to and consequences of job status in MS. It was hypothesized that the MS group that was still working would report higher stress levels, more maladaptive coping, and lower levels of social support. Demographic variables in relation to job status were also examined.

In contrast to predictions, the groups did not differ on levels of depression, social support, or stress. However, the groups did differ in their coping strategies. Specifically, the "Cut Back" group used significantly more maladaptive coping compared with the other groups. One explanation for this could be that the "cut back" group was denying the fact that they have MS or they could be denying the fact that they need to stop working in order to manage their symptoms more effectively.

Some interesting demographic and illness differences between groups emerged. Compared with the "Working" group, the "Not Working" group was older, had a longer duration of disease, more neurological disability, and higher fatigue levels. In order to better understand how employment status affects these variables, we needed to control some of the variables that could change the results of the data by using Analyses of Covariance (ANCOVA) to test for between-subjects effects. The two variables that were analyzed using ANCOVA were FIS and EDSS. In the analyses of EDSS on job status, we found that group differences on the EDSS were significant even when we controlled for disease duration and age. In the second analysis of FIS on job status, we found that the FIS was not significant when we controlled for disease duration and age. This suggests that symptom duration and diagnosis duration might account for some of the differences in the job status group.

After controlling variables by ANCOVA analyses, we performed additional analyses in order to find out which of the three groups were actually significantly different from one another. To do this, we used the Tukey Post-Hoc test to explore differences among the "working," "cut back," and the "not working" groups. Analyses of these variables showed that there were group differences. In the analysis of the relationship between job status and EDSS, a significant difference between the "not working" group and the "working" and "cut back" groups was found. These results may reflect the fact that individuals with higher levels of disability ultimately had to quit working. In analysis of the FIS, it was found that the "working" group was significantly different from the "cut back" and "not working" group. As shown in Figure 2, the "working" group experienced significantly less fatigue compared to the "cut back" and "not working" groups. Lastly, analyses of the disease duration and job status showed that the “working” group had significantly longer disease duration compared with both the “cut back” and the “not working” groups.

One interpretation of why the “not working” and “cut back” groups reported higher levels of fatigue is that fatigue may be a reflection of core disease burden and patients with greater disease burden were less likely to be working full time. In brief, their more advanced disease progression may have interfered with their ability to continue working full-time, or at all. Such an interpretation is consistent with the fact that the “working” group had lower EDSS scores and longer disease duration compared with the other groups.

Although one psychosocial variable (coping) proved to be significantly associated with work status, overall demographic and illness variables were most important. Awareness of these important demographic and disease factors associated with work status should help clinicians assist MS patients in making vocational decisions.

One implication of these research findings is that individuals’ coping strategies can potentially have a great influence on their health and wellbeing. As explained earlier, the “cut back” group was shown to report the use of more maladaptive coping compared with those who were still working full-time and those who were not working at all. One reason for this could be that individuals in the “cut back” group were denying their illness or denying the fact that they could not work. However, we do not know exactly what they were denying, and this is therefore speculative. Therefore, future research could invest in exploring why individuals in the “cut back” group report the use of more maladaptive coping compared to the working group.

Finding the root causes of the differences between job status groups across these variables can help prevent individuals with MS from having to quit working and it may help to improve their quality of life.

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