

Sex Differences in Depression in Patients with Multiple Sclerosis

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Abstract

Multiple Sclerosis (MS) is a demyelinating disorder of the central nervous system. Approximately 50% of MS patients experience clinical depression at some point during their lifetime, a rate that far exceeds what is found in the general population. This study examined sex differences in depression in 80 female and 17 male MS patients. The following four inventories for measuring depression were used: The Beck Depression Inventory-2 (BDI-2), Beck Depression Inventory- Fast Screen (BDI-Fast Screen), Depression Proneness Rating Scale (DPRS), and the Chicago Multiscale Depression Inventory (CMDI). A statistical trend ($p < .10$) was found for male patients to show greater depression proneness than female patients. Males also showed significantly ($p < .05$) greater use of avoidance coping strategies compared with females. Because avoidance coping has been found to be maladaptive in MS patients and associated with depression, greater use of avoidance coping in males may underlie their differential proneness to depression.

Introduction

Many individuals with MS experience a secondary consequence of the disease—depression. Fifty percent of MS patients experience clinical depression at some point during their lifetime, a rate that far exceeds the 10-15% found in the general population (American Psychiatric Association, 1994; Sadovnik et al., 1996). There is an abundance of literature covering cognitive functioning and depression in individuals with MS. However, there is very little literature covering sex differences in patients with MS. The purpose of this study was to investigate whether there are sex differences in depression in MS patients.

In one of the few studies examining sex differences and depression in MS, Hickey and Greene (Hickey & Greene, 1989) found no significant differences between men and women with MS in depression as measured by The Focus of Coping Scale. Men and women with MS were not different on The Hopelessness Scale. However, men and women were found to have a mean depression and hopelessness score above the general population. One limitation of their study, however, is that the sample size of 45 (22 males and 23 females) was somewhat small and thus possibly not large enough to be representative for the MS population or to have adequate statistical power. Another limitation of this study was its lack of a homogeneous sample. Hickey and Greene point

out in their study a large variation of scores obtained for males and females (Hickey & Greene, 1989). This variation could be a result of the diversity of physical symptoms in the patients within their study. Hickey and Greene (Hickey & Greene, 1989) also point out that a patient who has had a longer remission may be less psychologically traumatized than a patient who has had frequent relapses. In fact, Randolph and Arnett (Randolph & Arnett, 2005) found that relapsing-remitting patients with a history of more variability in symptoms were more likely to be depressed than patients with less variability.

In a study examining the prevalence and correlates of depression among veterans with MS, Williams and colleagues (Williams et al., 2005) administered a self-report measure of depression to 451 participants, 86.6% of whom were males. The Patient Health Questionnaire is an abbreviated version of the Primary Care Evaluation of Mental Disorders, which is designed to give diagnoses of high prevalence psychiatric disorders, was one of the measurements used for this study (Williams et al., 2005). Williams and colleagues found that males and females with MS had equivalent rates of depression. Although males and females with MS were shown to have similar rates of depression, when compared to the general population females exceeded males with having higher rates of depression. According to the Diagnostic and Statistical Manual of Mental Disorder-4th Edition (DSM-IV), major depressive disorder is twice as common in adolescent and adult females as in adolescent and adult males (American Psychiatric Association, 1994). The DSM-IV features for major depressive disorder supports the results found in the study by Williams and colleagues (Williams et al., 2005).

Related to depression, some research has examined sex differences on locus of control (Hickey & Greene, 1989). Locus of control reflects the internal or external characteristics of a person's personality or strategy for coping. Using the Multidimensional Health Locus of Control Scale to measure locus of control, Hickey and Greene found that men with MS had statistically significant higher scores ($X^2=6.9$, $p<.01$) on the powerful health locus of control (PHLC) subscale than women with MS (Hickey & Greene, 1989). This subscale reflects the extent to which patients feel they have control over health-related issues.

Also related to depression is coping, in that adaptive coping in response to stress is associated with low levels of depression whereas maladaptive coping is associated with high levels. Coping and stress theorists have identified two broad forms of coping—problem-focused and emotion-focused. Lazarus (Lazarus, 1993) noted that people who use problem-focused coping strategies attempt to alter the source of their stress, whereas people who use emotion-focused coping strategies attempt to reduce the emotional distress of their situation. Within the literature on coping, depression has been associated as a major factor. In particular, the literature has shown that emotion-focused coping is associated with high levels of depression, whereas problem-focused coping is associated with lower levels of depression (Revenson & Felton, 1989; Thompson, Gil, Abrams, & Phillips, 1992).

Although the problem-focused and emotion-focused conceptualizations of coping have proven to be useful constructs, Carver and colleagues (Carver, Scheier, & Weintrub, 1989) found that these conceptualizations were too broad. In particular, they found that the subscales comprising these broad coping factors were often not correlated or even sometimes inversely correlated with one another. In response to such limitations they

provided a narrower, though more unitary conceptualization of these coping domains to capture a better representation of coping—avoidance and active scales (Carver, Scheier, & Weintraub, 1989). Carver and colleagues (Carver, Scheirer, & Weintraub, 1989) found that the avoidance coping scales were related to less adaptive responses such as anxiety and depression, whereas active coping scales were related to more desirable personality qualities such as self-esteem and optimism. In a study examining depression with MS patients, Arnett and colleagues (Arnett, Higginson, Voss, & Randolph, 2002) used the Chicago Multiscale Depression Inventory (CMDI) Mood and Evaluative scales and found that a greater use of avoidance coping and less use of active coping were associated with high levels of depression. Arnett and colleagues' (Arnett, Higginson, Voss, & Randolph, 2002) study illustrates that the active and avoidance scales may be better indices for measuring coping in MS.

As an aside to the present focus on depression and coping in MS, research in biological psychology has found sex differences in men and women in diseases and health. Research by Kudielka and Kirschbaum (Kudielka & Kirschbaum, 2005) suggests that the hypothalamic-pituitary-adrenal (HPA) axis may be responsible for the variability in diseases in men and women. The HPA axis is located in the CNS and is responsible for regulating hormones in this region—mostly triggered by stress (Kudielka & Kirschbaum, 2005). According to these investigators, major depression is often found to be associated with hyperactivity in the HPA in men and hyporeactivity is associated with MS and often found to be associated with depression in women.

With these considerations in mind, the current study was conducted to further explore possible sex differences in depression in MS. Given the well-established association between coping and depression in MS and other populations, a secondary goal of the study was to examine possible sex differences in coping with the notion that such differences may underlie differences in depression in these patients. The present study improves upon past research by Anne Hickey and Sheila Greene's article *Coping with Multiple Sclerosis* (1989) in which they examined sex differences and coping in MS groups by using a larger overall sample and one in which there is likely to be greater variability in symptom manifestations. Because of the paucity of studies published in this area, the present study was exploratory and as such did not have specific hypotheses.

Methodology

Participants and Procedure

Participants for this study included 80 women and 17 men with MS. The participants were recruited for the PSU-MS1 study which was conducted by The Pennsylvania State University neuropsychology research lab. The Penn State neuropsychology lab recruited participants from an ad placed in a newsletter distributed to individuals with MS in Western Pennsylvania, MS support groups in Central Pennsylvania Region, and flyers distributed in the State College, Pennsylvania community. Those who contacted the study team were administered a telephone screening interview designed to review exclusionary criteria; participants who were not excluded from screening were then scheduled for testing. Participants who had a history of drug or alcohol abuse, neurological disease other than MS, learning disability, or

visual or motor impairment that significantly interfered with questionnaire and test completion were excluded from the study. Participants were administered a variety of measures assessing depression described below. After participating in this study, participants were given 75 dollars and a brief neuropsychological report of their cognitive functioning.

Measures

Chicago Multiscale Depression Inventory

The Chicago Multiscale Depression Inventory (CMDI) is a self-report measurement, which is designed to assess depression in MS groups. The CMDI is a 42-item Likert-style measure, which consists of three subscales: Mood, Evaluative, and Vegetative. The CMDI subscales each consists of 14 items and participants are then asked to rate themselves on a scale 1-5 to which each word or phrase describes them during the past week, including today. A rating of “1” indicates “Not at All” and “5” indicates “Extremely”. A high CMDI score thus indicated a higher level of depression. For this study the subscale “vegetative” was excluded from analysis because its characteristics closely resemble symptoms of MS, making interpretation of them vis-à-vis depression difficult.

Beck Depression Inventory

The Beck Depression Inventory-2 Edition (BDI-II) is a self-report measure assessing the severity of depression in adolescents and adults. Among psychiatric self-reported depression measures, the BDI-II is the most commonly used (Beck et al., 1996). It consists of 21 groups of statements on which participants rate themselves on a 0-3 scale. Participants are asked to pick the one statement which best describes the way they have been feeling the past two weeks, including today. A high BDI-II score indicated a higher level of depression. All 21 items were used in this study.

Beck Depression Inventory-Fast Screen for Medical Patients

The Beck Depression Inventory-Fast Screen for Medical Patients (BDI-Fast Screen) is a self-report measure assessing the severity of depression in adolescents and adults. The BDI-Fast Screen consists of 7-items extracted from the BDI-II. The BDI-Fast Screen identifies symptoms of depression in patients reporting somatic and behavioral symptoms. It does not include the latter symptoms because of their overlap with a variety of common medical symptoms. A high BDI-Fast Screen score indicated a high level of depression. All 7-items were used in this study.

Depression-Proneness Rating Scales

The Depression-Proneness Rating Scales (DPRS) is a two factor self-report measure assessing depression proneness. The first self-report index of the DPRS has three questions: (1) “Compared to most people you know, how often did you get depressed?” (2) “Compared to most people you know, how long did your depressions last?” and (3) “Compared to most people you know, how deeply depressed did you become?” Each question is followed by the parenthetical phrase “over the past 2 years”. The index has a seven-point scale which lists descriptors “much less often” (1), “about

the same” (4), and “much more often” (7). The total score on the first DPRS index is the sum of the three scale scores. The first DPRS index could thus range from 3 (low depression-proneness) to 21 (high depression-proneness). All items were used in this study.

The second self-report index of depression proneness consists of 10 of the most frequently assessed symptoms of depression and also asks examinees to rate on the same scale of 1-7 the extent to which each symptom describes their feelings or attitude over the past few years. The total score on this DPRS index is the sum of the 10 scale scores. The DPRS scores for this index could thus range from 10 (low depression prone) to 70 (high depression prone). For the present study, the two DPRS indices were combined to form a total score, which was analyzed.

COPE

The COPE is a 52-item scale designed to measure coping styles used in response to stressful events. The COPE is divided into 4-item clusters consisting of 13 scales. The COPE can be used to measure situational and dispositional coping tendencies. For the present study, situational tendencies were evaluated by creating a stressful scenario relating to MS that participants were asked to imagine themselves experiencing and then responding to the COPE items with this particular situation in mind. Following an approach suggested by Carver and colleagues (Carver, Scheier, & Weintrub, 1989), the COPE inventory was divided into adaptive (Active Coping) and maladaptive (Avoidance Coping) scales. The Active Coping index included subscales for Active Coping, Planning, and Suppression of Competing Activities. The Avoidance Coping index included the subscales Mental Disengagement, Behavioral Disengagement, and Denial.

Results

The statistical analyses used for this study were performed using SPSS computer software. The first statistical analysis performed evaluated participants' demographic data (table 1) using t-tests to compare the means and standard deviation for males and females.

Table 1

Means and Standard Deviations of Participant Demographics.

| Males | Mean | Std. Dev. | Females | Mean | Std. Dev. | t-value | p-value |
|-----------------------|----------|-----------|-----------------------|----------|-----------|---------|---------|
| Age | 44.82 | 7.812 | Age | 47.88 | 9.131 | -1.281 | .203 |
| Education | 14.53 | 2.452 | Education | 14.23 | 1.922 | .564 | .574 |
| WAIS-R IQ | 101.0000 | 11.34681 | WAIS-R IQ | 105.0625 | 9.30271 | -1.572 | .119 |
| Symptom Duration | 11.4706 | 7.53424 | Symptom Duration | 15.5000 | 8.88178 | -1.740 | .085 |
| Diagnosis Duration | 9.1176 | 7.99126 | Diagnosis Duration | 11.2125 | 7.78459 | -1.003 | .318 |

As seen in table 1, males and females had relatively similar means on all demographic variables, an observation supported by the lack of significant differences between sexes on any of the demographic variables.

The second set of statistical analyses performed compared the means for males and females on the depression inventories using t-tests. Table 2 shows the means and standard deviations for males and females on the depression inventories, in addition to the t-tests performed for the inventories, specifically comparing the means of males and females.

Table 2

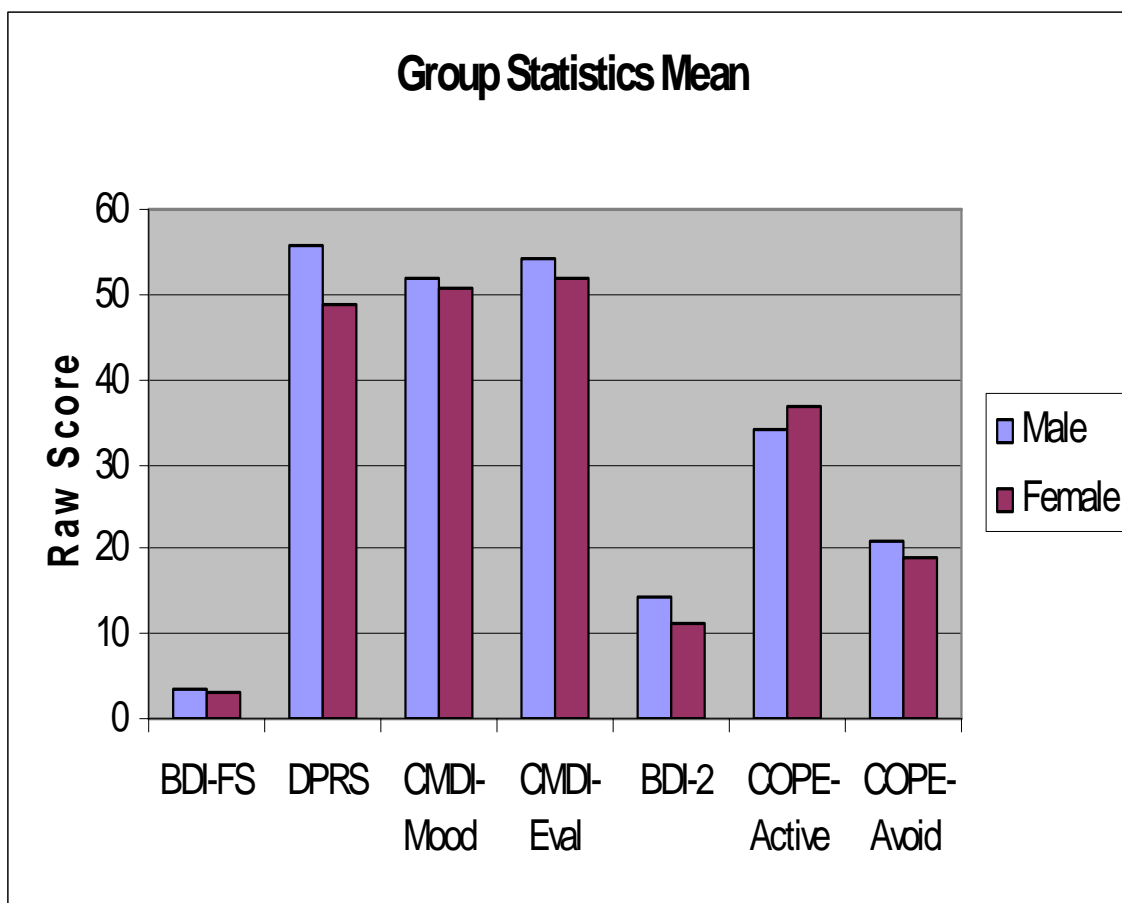
Mean and Standard Deviation of depression inventories.

| Males | Mean | Std. Dev. | Females | Mean | Std. Dev. | t-value | p-value |
|------------------------------|---------|-----------|------------------------------|---------|-----------|---------|---------|
| BDI- Fast Screen | 3.5294 | 3.20386 | BDI-Fast Screen | 2.9750 | 2.59002 | .768 | .444 |
| DPRS | 55.6875 | 14.00818 | DPRS | 48.6375 | 13.61611 | 1.882 | .063 |
| CMDI-Mood | 51.7154 | 11.95262 | CMDI-Mood | 50.5756 | 10.09435 | .409 | .683 |
| CMDI- Evaluative | 54.3728 | 18.22228 | CMDI- Evaluative | 51.6843 | 13.58960 | .696 | .488 |
| BDI-2 | 14.2941 | 9.37260 | BDI-2 | 11.3125 | 6.65914 | 1.553 | .124 |
| COPE- Active Coping Index | 34.2353 | 5.86866 | COPE- Active Coping Index | 36.7875 | 5.43009 | -1.736 | .086 |
| Cope- Avoidance Coping Index | 21.0588 | 5.47118 | Cope- Avoidance Coping Index | 18.8875 | 3.71447 | 2.001 | .048 |

Of the seven inventories analyzed, the BDI-Fast Screen (.444), BDI-2 (.124), CMDI-Mood and CMDI-Evaluative scales, as well as both BDI scales, were statistically non-significant, with p-values > .10. However, there were statistical trends found for the DPRS (p = .063) and the COPE-Active (p = .086). Furthermore, the COPE-Avoid (.048) was statistically significant (p < .05). To have a better understanding of the depression inventory mean comparison for males and females I have provided a figure (bar graph) below which depicts the difference further.

Figure 1

Bar graph of Depression Inventory Means.



In regards to figure 1, it can be seen that on the DPRS, male patients showed a greater depression proneness level than female patients. On the COPE-Avoidance and COPE-Active it can be seen that males also showed a significantly greater use of avoidance coping strategies and the use of fewer active strategies compared with females. Because avoidance coping has been found to be maladaptive in MS patients and associated with depression, greater use of avoidance coping in males may underlie their differential proneness to depression. Furthermore, less use of more adaptive active coping strategies may also increase males' proneness to depression.

Discussion

The purpose of the present study was to investigate whether there are sex differences in depression in MS patients. This study was exploratory and as such did not have specific hypotheses. The results indicate that male MS patients showed a tendency toward greater depression proneness than females based on DPRS scores. Furthermore, males showed greater use of avoidance coping strategies and a trend toward fewer active coping strategies than females on the COPE Active and Avoidance scales. Hickey and Greene (Hickey & Greene, 1989) examined sex differences in MS patients and found no differences between men and women. One explanation for the inconsistent results in Hickey and Greene (Hickey & Greene, 1989) study and my study may stem from the different coping measures used. Hickey and Greene used the problem-focused and emotion-focused coping scales, whereas I used the COPE active and avoidance coping scales. As noted earlier, Carver and colleagues (Carver, Scheier, & Weintrub, 1989) found that problem-focused and emotion-focused scales were too broad and sometimes not psychometrically sound. In particular, they found that the subscales comprising these broad coping factors were often not correlated or even sometimes inversely correlated with one another.

Consistent with Carver and colleagues' (Carver, Scheier, & Weintrub, 1989) findings, males in my study were found to use greater avoidance coping strategies and were found to have a high level of depression. Because avoidance coping has been found to be maladaptive in MS patients and associated with depression, males greater use of avoidance coping may underlie their differential proneness to depression.

Of the seven inventories measured, five depression inventories and two coping inventories, only three were found to be statistically significant or trending toward significance—DPRS ($p < .063$), COPE-Active ($p < .086$) and COPE Avoidance ($p < .048$). Furthermore, of the three inventories found to be statistically significant, only one was a depression inventory—the DPRS. In a future study, I plan to conduct another SPSS t-test on the DPRS and examine its two factor measures separately. I hope to explain why the DPRS was the only significant depression inventory and explore the difference between the DPRS and the other depression measures.

The results for the current study are significant for MS treatment because they may imply that differences between men and women do exist in regards to depression and coping styles. My results are also significant because they could help in improving future treatment of depression in MS, such as creating clinical therapy methods for effectively treating men and women and teaching men and women with MS effective coping strategies.

An important limitation of the current study is the small number of males used. A future study should include an increased sample size with relatively equal number of male and female participants.

To summarize, the results suggest that male MS patients show greater depression proneness than females and that males show a greater use of avoidance coping strategies and fewer active coping strategies than females. The present study may help in our understanding of depression in MS. Again, my findings are significant for MS treatment because they imply a difference between men and women in regards to depression and coping styles, and my results improves upon the literature and treatment of clinical methods for MS patients. The results also suggest a possible mechanism underlying the sex differences in depression proneness, in that the latter may be mediated by relatively poorer coping strategies employed by male MS patients in response to stress. Differentially focusing treatment on helping male MS patients improve their coping strategies may help them to decrease their future likelihood of depression and, ultimately, improve their quality of life while living with what can be a devastating disease.

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