Screening for Depression in Adult Patients with Multiple Sclerosis

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Abstract

Major depression and suicide are high among patients with MS. Despite the high prevalence of depression among persons with MS, only half of patients are screened and depression often remains undetected.

Objective: To determine the correlation between the Beck Depression inventory-II (BDI-II) and the Beck Depression Inventory Fast Screen (BDI-FS), and to determine if the degree of disability as measured by the Expanded Disability Status Scale (EDSS) and the number of MS relapses were correlated with depression as measured by the BDI-II, and the BDI-FS.

Methods: A sample of 34 persons with MS was selected from an urban neurological outpatient clinic in the Northeast United States. Descriptive, Chi-Square and Pearson correlations were used to analyze the data.

Results: The sample was primarily female (71%), Caucasian (73.5%), married (56%), educated (67%), and lived with a partner or their family (68%). There was a significant positive correlation between the BDI-II and BDI-FS (r = 0.82, p = 0.01). The BDI-FS identified significantly more depressed persons than the BDI-II (X²=22.61, df=1, p<0.001). There was no correlation between the extent of disability or number of MS relapses and depression as measured by either the BDI-II or BDI-FS.

Conclusions: The study supports the ability of both tools to identify depressive symptoms among individuals with MS. The BDI-FS may be more efficient in identifying depression in the clinical setting among MS patients since it contains no items that assess symptoms commonly associated with MS.

Introduction

Depression is a major health problem affecting quality of life of patients with multiple sclerosis (MS) and is a risk factor for suicide [1,2]. The lifetime prevalence of depression in patients with MS is estimated at 50%, and major depression in MS ranges between 37 to 54% [3,4]. Approximately 50% of patients with MS will experience an episode of major depression by the age of 59, compared to 5-15% in the general population [5]. Depression is under diagnosed in patients with MS and they are not routinely screened [6,7]. Further, persons with MS are at high risk for suicidal ideation and attempts [8]. Depressive disorders occurring in individuals with MS are treatable; therefore early detection is an important objective. Early diagnosis and treatment of depression in MS may lead to better emotional control, a higher quality of life and minimize the risk of suicide [3,9]. Therefore, the purpose of this correlational study was to determine the correlation between two forms of the Beck Depression Inventory measuring depression in adult patients with MS and to explore the relationship between disability, MS relapses, and depression.

Literature review

MS is a chronic progressive and unpredictable disease that may lead to depression and suicidal ideation. Depression is a disabling illness and has a huge impact on disability-adjusted life-years [10]. The rates of major depression in MS are significantly high when compared with rates of depression reported among the general population in the United States [11]. Major depression affects one in two patients with MS during the course of their lifetime [12]. Others found that 41% of respondents with MS had depression with a subgroup of 30% having moderate or severe depression [13]. Furthermore, studies report higher rates of depression among patients with MS than among patients with other types of chronic illnesses, including other neurological disorders [14,15].

Suicide is also more frequent in patients with MS than in the general population, especially within the first five years of diagnosis [5,8,16]. The suicide rate in MS is 7.5 times higher than the general population suicide rate [15]. Patients with MS have an approximately 28.6% lifetime prevalence of suicidal intent [12]. The presence of clinical depression is the most powerful determinant of suicidal intent in patients with MS, although social isolation is a co-determinant [15].

The relationship between depression and functional disability in MS has been widely investigated, but the relationship remains controversial [13,15]. Higher levels of disability have been associated with more severe depressive symptoms in several chronic illnesses. Some studies suggest that patients with MS that have greater disability are more likely to experience depression [15,17]. Other studies report that the frequency or severity of depressive episodes in MS is independent of the severity of the disease, as reflected by the patient’s score on the EDSS [18,19]. In most studies, the duration of illness or the occurrence of MS relapses has not been associated with depression [13,20].

The pathophysiology of depression in patients with MS has not yet been established, but the origin is probably multifactorial, involving both psychosocial and biological factors [15,21]. A recent consensus statement issued by experts assembled by the National Multiple Sclerosis Society (NMSS) stated that the pathogenesis is most likely multifactorial, including psychologic, social, neurobiologic, immunologic, and genetic factors [22-24] (Figure 1).

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Methodology

A descriptive correlational design was used to explore the relationship between disability and MS relapses and the severity of depression as measured by the BDI-II, and by the BDI-FS in a group of MS adult patients in an academic outpatient setting. The hypotheses were 1) the BDI-FS is more significant in identifying depression than the BDI-21, 2) the higher the disability and relapse rate, the higher the depression. The sample consisted of a total of 34 adult subjects diagnosed with MS. Within the parameters of power of 0.80, effect size of 0.45, and alpha level of a 0.05 one-tailed test, a sample of 34 subjects was needed for this study. Subjects were included if they were on any of the disease modifying therapies (DMTs) for MS or if they were not on any DMT. Subjects were English speaking, ≥ 18 years of age, and were without other chronic diseases that were associated with secondary depression, such as hypothyroidism, diabetes, or cardiac disease. Patients were excluded if they were currently having a MS relapse, taking antidepressants, diagnosed with a psychiatric illness, or had another chronic illness. Statistical analysis used in this study included Pearson correlation and Chi square analysis.

Instruments

The Beck Depression Inventory-II (BDI-II) is a self-administered questionnaire that contains 21 questions that assess specific symptoms common among people with depression. The total score of 63 for the BDI-II provides an estimate of the severity of depression with cutoff score ≥ 14 represents depression [25,26]. The BDI-II has demonstrated high internal consistency (Cronbach alpha=0.92) [27].

The Beck Depression Inventory Fast-Screen (BDI-FS) is embedded in the BDI-II and is a shorter version of the tool consisting of seven items with a maximum score of 21 using a cutoff score ≥ 4 for depression. The BDI-FS reflects the degree of depression, not the diagnosis of depression [26]. The coefficient alphas of the BDI-FS for the family practice, internal medicine, pediatric, and consultation liaison patients were 0.85, 0.85, 0.88, and 0.86, respectively [26]. The correlation between the 21 item BDI-II total score and the 7 item BDI-FS total score was 0.91 (p<0.001) for both the outpatients and the college students [27].

The Expanded Disability Status Scale (EDSS) is a 20-point scale that measure disability by half points, ranging from 0 (normal examination) to 10 (death). The EDSS has a fair to substantial inter-rater reliability reported as kappa coefficient score of 0.32 to 0.76. The validity of the EDSS as a measure of combined impairment and disability was confirmed by its high correlation with the Scripps Neurological Rating Scale (SNRS) at 0.92, and with the Functional Independence Measure at 0.87 [28]. The EDSS has moderate to good reliability and its validity is supported as a measure of impairment and disability, but it is not useful in detecting small clinical changes.

The Demographic form, was developed by the investigator and assessed personal characteristics such as age, race and gender and characteristics about their MS disease including duration, type of MS, use of disease modifying agent for MS, progression of disease and number of relapses of MS.

Participants have completed the two questionnaires (BDI-II and demographic form) during their follow-up visit. It took them approximately 20 minutes to complete both questionnaires.

Results

The sample consisted of 34 people with MS, the majority of whom were female (70.6%), Caucasian (73.5%), married (55.9%), and lived with a partner or their family (67.6%). Subjects had a mean age of 41.9 years (SD =12.5, Range=19-74) and a mean education of 16.97 years (SD = 2.82, Range=10-23). All the participants had health insurance and 70.6% worked full-time. Eighty-Five percent had a diagnosis of relapsing remitting multiple sclerosis (RRMS) with about 60% having been diagnosed with multiple sclerosis during the past four years. Nearly 65% of patients had no MS relapse within the past year. Over one-third of patients (35.5%) reported having a relapse in the last 12 months and most patients (91.2%) reported having at least 1 relapse within the previous 3 years. Half of the subjects (50%) were treated with glatiramer acetate (Copaxone®) and the other 50% were prescribed interferon-β (Avonex® or Betaseron® or Rebif®). The majority of patients (82.4%) were naïve to their current disease modifying agent that is, they had no previous history of any disease modifying agents (Table 1).

Correlation between the BDI-II and BDI-FS

There was a significant positive correlation between the BDI-II and the BDI-FS (r= 0.816, p = 0.01). The mean score on the BDI-II scale was 6.62 (SD = 5.89, R = 0-21) and the mean score on the BDI-FS scale was 1.82 (SD = 2.34, R = 0-9). Cronbach alpha for the BDI-II was 0.86 and for the BDI-F Sit was 0.79.

Prevalence of depression in patients with MS

The prevalence of depressive symptoms as assessed by the BDI-FS using cutoff score ≥ 4 was 20.59% (n = 7) while the prevalence of depressive symptoms as assessed by the BDI-II using cutoff score ≥ 14 was 14.7% (n = 5). Nine percent of subjects (n = 3) had moderate to severe depression (cutoff score ≥ 9) as assessed by the BDI-FS while only 6% (n = 2) had moderate to severe depression (cutoff score ≥ 20) based on the BDI-II (Table 2). The BDI-FS identified a significantly higher number of individuals who were depressed (X² = 22.61(1), p < .001).

Correlation between disability and depression

Scores on the EDSS ranged from 0-6.5, with 85% of the sample scoring in between no disability to mild disability. There was no significant correlation between disability as measured by the EDSS and depression as measured by the BDI-II (r = .126, p = .239) and the BDI-FS (r = .268, p = .063). Mild and moderate depression as measured by the BDI-FS had higher score on the EDSS especially those with mild depression as compared with minimal and no depression.
### Demographic Characteristics

| Characteristic | $f$ | $P$ | Cum. $P$ |
|---------------|-----|-----|---------|
| **Age**       |     |     |         |
| 19 to 29      | 6   | 17.6% | 17.6%  |
| 30 to 39      | 10  | 29.1% | 47.1%  |
| 40 to 49      | 8   | 23.5% | 70.6%  |
| 50 to 59      | 8   | 23.5% | 94.1%  |
| 60 to 69      | 1   | 2.9%  | 97.1%  |
| ≥ 70          | 1   | 2.9%  | 100.0% |
| **Gender**    |     |     |         |
| Male          | 10  | 29.4% | 29.4%  |
| Female        | 24  | 70.6% | 100.0% |
| **Race**      |     |     |         |
| Caucasian     | 25  | 73.5% | 73.5%  |
| African-American | 3  | 8.8%  | 82.4%  |
| Hispanic      | 1   | 2.9%  | 85.3%  |
| Other         | 5   | 14.7% | 100.0% |
| **Marital status** |   |     |         |
| Married       | 19  | 55.9% | 55.9%  |
| Single        | 12  | 35.3% | 91.2%  |
| Divorced      | 2   | 5.9%  | 97.1%  |
| Widow         | 1   | 2.9%  | 100.0% |
| **Education** |     |     |         |
| High school education | 2 | 5.9% | 5.9% |
| College education | 6 | 47.1% | 52.9% |
| Post graduate education | 4 | 41.2% | 94.1% |
| Other         | 2   | 5.9%  | 100.0% |
| **Social Status** |   |     |         |
| Lives alone   | 9   | 26.5% | 26.5%  |
| Lives with partner | 10 | 29.4% | 55.9%  |
| Lives with family | 13 | 38.2% | 94.1%  |
| Other         | 2   | 5.9%  | 100.0% |
| **Health Insurance** |   |     |         |
| Yes           | 34  | 100.0% | 100.0% |
| No            | 0   | 0.0%  | 0.0%   |
| **Work status** |   |     |         |
| Employed full time | 24 | 70.6% | 70.6%  |
| Employed part time | 2 | 5.9%  | 76.5%  |
| Unemployed    | 2   | 5.9%  | 82.4%  |
| House wife / stay at home mom/dad | 1 | 2.9% | 85.3% |
| Other         | 5   | 14.7% | 100.0% |
| **Multiple Sclerosis Type** |   |     |         |
| Relapsing-Remitting | 29 | 85.3% | 85.3% |
| Secondary Progressive | 1 | 2.9% | 88.2% |
| Primary Progressive | 3 | 8.8% | 97.1% |
| Other         | 1   | 2.9%  | 100.0% |
| **Onset Year** |     |     |         |
| Prior to 1990 | 1   | 2.9%  | 2.9%   |
| 1990-1994     | 5   | 14.7% | 17.6%  |
| 1995-1999     | 7   | 20.6% | 38.2%  |
| 2000-2004     | 8   | 23.5% | 61.8%  |
| 2005-2009     | 13  | 38.2% | 100.0% |
| **Diagnosis Year** |   |     |         |
| Prior to 1990 | 1   | 2.9%  | 2.9%   |
| 1990-1994     | 2   | 5.9%  | 8.8%   |
| 1995-1999     | 4   | 11.8% | 21.2%  |
| 2000-2004     | 7   | 21.2% | 42.4%  |
| 2005-2009     | 19  | 57.6% | 100.0% |
| Missing       | 1   |       |        |

| Disease Modifying Agent Type | $f$ | $P$ | Cum. $P$ |
|------------------------------|-----|-----|---------|
| None                         | 5   | 14.7% | 14.7%  |
| Avonex® (Interferon beta-1a) | 2   | 5.9%  | 20.6%  |
| Betaseron® (Interferon beta-1b) | 1 | 2.9%  | 23.5% |
| Rebif® (Interferon beta-1a)  | 9   | 26.5% | 50.0%  |
| Copaxone® (Glatiramer Acetate) | 17 | 50.0% | 100.0% |

| History of Disease Modifying Agent | $f$ | $P$ | Cum. $P$ |
|------------------------------------|-----|-----|---------|
| None                               | 28  | 82.4% | 82.4%  |
| Avonex® (Interferon beta-1a)       | 0   | 0.0%  | 82.4%  |
| Betaseron® (Interferon beta-1b)    | 1   | 2.9%  | 85.3%  |
| Rebif® (Interferon beta-1a)        | 1   | 2.9%  | 88.2%  |
| Copaxone® (Glatiramer Acetate)     | 3   | 8.8%  | 97.0%  |
| Rebif and Betaseron                | 1   | 2.9%  | 100.0% |

| # Relapses in the last 12 months | $f$ | $P$ | Cum. $P$ |
|----------------------------------|-----|-----|---------|
| No relapses                      | 20  | 64.5% | 64.5% |
| 1 relapse                        | 8   | 25.8% | 90.3% |
| 2 relapses                       | 1   | 3.2%  | 93.5% |
| 3 relapses                       | 2   | 6.5%  | 100.0% |
| Missing                          | 3   |       |        |

| # Relapses in the previous 3 years | $f$ | $P$ | Cum. $P$ |
|------------------------------------|-----|-----|---------|
| No relapses                        | 3   | 8.8%  | 8.8% |
| 1 relapse                          | 12  | 38.7% | 48.4% |
| 2 relapses                         | 10  | 32.3% | 80.6% |
| 3 relapses                         | 2   | 6.5%  | 87.1% |
| 4 relapses                         | 3   | 9.7%  | 96.8% |
| 6 relapses                         | 1   | 3.2%  | 100.0% |
| Missing                            | 3   |       |        |

| Relapse Year                      | $f$ | $P$ | Cum. $P$ |
|-----------------------------------|-----|-----|---------|
| 2002                               | 2   | 6.3%  | 6.3% |
| 2003                               | 0   | 6.3%  | 6.3% |
| 2004                               | 2   | 6.3%  | 12.6% |
| 2005                               | 4   | 12.5% | 25.1% |
| 2006                               | 6   | 18.7% | 43.8% |
| 2007                               | 12  | 37.5% | 81.3% |
| 2008                               | 6   | 18.7% | 100.0% |
| Missing                            | 2   |       |        |

| Steroids treatment | $f$ | $P$ | Cum. $P$ |
|--------------------|-----|-----|---------|
| No treatment       | 19  | 57.6% | 57.6% |
| Solumedrol         | 7   | 21.2% | 78.8% |
| Prednisone         | 1   | 3.0%  | 81.8% |
| Other              | 6   | 18.2% | 100.0% |
| Missing            | 1   |       | 100.0% |

| Expanded Disability Status Scale | $f$ | $P$ | Cum. $P$ |
|----------------------------------|-----|-----|---------|
| No disability (score=0)          | 7   | 20.6% | 20.6% |
| Signs of disability (score=1)    | 7   | 20.6% | 41.2% |
| Signs to Mild disability (score=1.5) | 8 | 23.5% | 64.7% |
| Mild disability (score=2)        | 7   | 20.6% | 85.3% |
| Mild/moderate Disability (score=2.5) | 1 | 2.9% | 88.2% |
| Mild/moderate Disability (score=3.0) | 1 | 2.9% | 91.2% |
| Ambulatory with assistance (score=6.0) | 2 | 5.9% | 97.1% |
| Ambulatory with assistance to    | 1   | 2.9%  | 100.0% |
| Wheelchair bound (score=6.5)     | 2   |       |        |

| Hand dominance | $f$ | $P$ | Cum. $P$ |
|----------------|-----|-----|---------|
| Right          | 26  | 78.8% | 78.8% |
| Left           | 7   | 21.2% | 21.2% |
| Missing        | 1   |       |        |

Table 1: Demographic Characteristics.
Correlation between number of relapses and depression

Sixty-five percent of subjects had no relapse of MS within the past year and 25% had one relapse. Within the past 3 years nearly 10% had no relapse, 40% had one relapse and 30% had two relapses. There was no significant correlation between the number of relapses of multiple sclerosis within the past year and depressive symptoms as measured by the BDI-II (r = 0.053, p < 0.390) or the BDI-FS (r = 0.091, p = 0.313). Only 5 (14.7%) subjects who had a relapse within the past year were depressed, i.e. score of ≥ 14 on the BDI-II and 6 subjects (17.65%) on the BDI-FS. There was also no correlation between number of MS relapses within the past 3 years and depressive symptoms as measured by the BDI-II (r = 0.014, p = 0.471) or as measured by the BDI-FS (r = 0.017, p = 0.464). For relapses within the past three years, only 5 (14.7%) subjects who had a relapse within the past 3 years were depressed on the BDI-II and six subjects (17.65%) were depressed as measured by BDI-FS.

Additional analyses

There was no significant difference between scores for depression as measured by both instruments and demographic or medical history variables. Demographic characteristics included variables such as age, gender, race, social status, marital status, work status, family history of MS, years of education, type of disease modifying agent (glatiramer acetate or interferon), years since onset of symptoms, and years since diagnosis. There was a significant correlation between the BDI-II scores and social status (t = 2.33, p ≤ 0.05), and living with family (t = -4.77, p < 0.001), thus subjects with MS living with family and married had less depressive symptoms.

Suicide ideation

Caucasians reported significantly lower suicidal scores than other ethnic groups (t = -3.19, df = 32, p < 0.05) on both instruments. Married subjects and those living with family members reported significantly lower suicidal ideation scores (t = -2.55, p < 0.05 and t = 2.48, p < 0.05 respectively). The current study reported a suicidal ideation rate of 11.76% (n = 34) as measured by both BDI tools. There was a significant difference between no/minimal and mild/moderate depression and suicidal ideation as measured by the BDI-FS and the BDI-II (Table 3a). There was a significant difference between milder and moderate depression and suicidal ideation as measured by the BDI-FS but not as measured by the BDI-II (Table 3b).

Discussion

The study supports the literature on the ability of both tools to identify depressive symptoms among individuals with MS. The BDI-FS may be more sensitive in identifying depressive symptoms in MS patients. An advantage of using the BDI-FS in the clinical setting is its short time to administer, score and interpret the inventory is reduced as well as the patient burden for instrument completion. The BDI-FS was developed to eliminate items most sensitive to the neurologic symptoms associated with multiple sclerosis and has been previously validated in MS patients and is significantly correlated with other self-report depression scales, that is the CES-D (BDI r = 0.85, CES-D r = 0.86) [29]. This study was limited by the use of self-report questionnaires, which were not verified with clinicians rating, observation or other measures.

Table 2: Depression levels stratified by patients with suicidal ideation by scale type.

| Scale     | Suicidal Ideation | No Suicidal Ideation | X² (df)¹ |
|-----------|-------------------|----------------------|----------|
|           | n (% w/ideation)  | n (% w/ no ideation) |          |
| BDI - FS  |                   |                      |          |
| No depression | 0 (0.0%)     | 10 (33.3%)            |          |
| Minimal depression | 0 (0.0%)   | 17 (56.7%)            |          |
| Mild depression  | 1 (25.0%)    | 3 (10.0%)             | 4(11.8%) |
| Moderate depression | 3 (75.0%) | 0 (0.0%)              | 3(8.8%)  |
| BDI - II |                   |                      |          |
| No depression | 0 (0.0%)     | 3 (10.0%)             | 3(8.8%)  |
| Minimal depression | 1 (25.0%)   | 25 (83.3%)            | 26 (76.5%) |
| Mild depression  | 2 (50.0%)    | 1 (3.3%)              | 3 (8.8%)  |
| Moderate depression | 1 (25.0%) | 1 (3.3%)              | 2 (5.9%)  |

¹Chi-square analysis examined if the two categories (no to minimal depression vs. moderate depression) created by scale cutoff scores were significantly associated with patient reports of suicidal ideation.

** Highly Statistical Significant < 0.001

Table 3a: Categorization of patients with suicidal ideation as having no/minimal depression versus mild/moderate depression by scale type.

| Scale     | Suicidal Ideation | No Suicidal Ideation | X² (df)¹ |
|-----------|-------------------|----------------------|----------|
|           | n (% w/ideation)  | n (% w/ no ideation) |          |
| BDI - FS  |                   |                      |          |
| No to mild depression | 1 (25.0%)     | 27 (80.0%)            | 17.49 (1)** |
| Moderate depression  | 4 (100.0%)    | 3 (10.0%)             |          |
| BDI - II |                   |                      |          |
| No to mild depression | 1 (25.0%)     | 28(93.3%)             | 13.14 (1)** |
| Moderate depression  | 3 (75.0%)    | 2 (6.7%)              |          |

¹Chi-square analysis examined if the two categories (no to minimal depression vs. moderate depression) created by scale cutoff scores were significantly associated with patient reports of suicidal ideation.

** Highly Statistical Significant < 0.001

Table 3b: Categorization of patients with suicidal ideation as having no to mild depression vs. moderate depression by scale type.
of depression, as well as the small sample size. Feinstein (2007) noted that the BDI suffers problems similar to other self-report inventories, since scores can easily be exaggerated or minimized by the respondent. Since a convenience sample was used in one setting the results of this study cannot be generalized beyond the sample (n = 34). Another study limitation was that the BDI-II and the BDI-FS scores were determined based on one administration rather than using two separate measures.

Prevalence of depression

The BDI-FS identified significantly more subjects having depressive symptoms (21%, n = 7) with 3 of these having moderate to severe depression than the BDI-II (15%, n = 5) with 2 of these having moderate to severe depression. The difference between the two tools ability to detect depressive symptoms was significant. It is possible that the BDI-FS is more sensitive in identifying depressive symptoms among MS patients or, alternatively, has more false positive results. A few studies have found, however, that the BDI-II had higher false positive results for depression in MS patients due to the identification of somatic symptoms common to depression and MS, such as fatigue, cognitive deficits and others [30]. Therefore, the BDI-FS may be more sensitive in identifying depression among MS patients.

The prevalence of depression among MS patients as measured by the two Beck tools is similar to those reported in the literature. A few studies have reported a prevalence rate of 20% of major depression in adult patients with MS [30,31]. Thus, the results reporting a rate of depressive symptoms among patients with MS between 15% and 21% are consistent with the literature. Other studies in depression in MS patients reported a higher prevalence but these studies used different tools to screen for depression [13].

Disability and depression

There was no relationship between disability level as measured by the EDSS and depression as measured by the BDI-II and BDI-FS. Perhaps this is because most subjects had no or minimal disability or because the sample size was small. In addition, there is a controversy about the relationship between disability and depression showing conflicting results in previous studies. The lack of a clear relationship between disability and depression in the current study and others may be related to the different types of MS. It is also possible that the lack of a relationship between depression and disability may be due to unknown differences in sample characteristics or perhaps because most had been diagnosed within the last 5 years and had a few relapses and less accrued disability.

Number of relapses and depression

The lack of a relationship between the number of MS relapses and depression may be because the majority of subjects had a few relapses within the past 3 years. A few studies suggest that MS relapses are linked to symptoms of depression in MS patients [32].

Suicidal ideation

A suicidal ideation rate of 11.76% was associated with subjects who were not married, not Caucasian, and who lived alone. Suicidal ideation is a serious clinical problem in MS and the rate of suicide in patients with MS is 7.5 times higher than in the general population [33]. Suicidal intent is strongly associated with major depression, alcohol abuse, and social isolation [12]. Lack of social support, shorter disease duration and less education were all associated with increased odds of depressive symptoms [34]. Identifying patients who live alone, not married or not Caucasians should be monitored closely for any emotional symptoms.

Suicide ideation has a higher rate in MS demonstrated by the two tools in this study. Screening for suicidal ideation in clinical practice is vital. Both tools have shown a correlation between no or minimal depression and suicidal ideation but only the BDI-FS has demonstrated a correlation between mild or moderate depression and suicidal ideation (Tables 2, 3a and 3b). This might reinforce the importance of screening for suicidal ideation with the BDI-FS in clinical practice caring for adult patients with MS.

Strengths of this study

The study supports the literature on the ability of both tools to identify depressive symptoms among individuals with MS. The BDI-FS may be more likely to identify depressive symptoms in MS patients. The BDI-FS was able to significantly identify increased number of patients with depressive symptoms compared to the BDI-II. The clinical use of the BDI-FS, a measure with fewer items, may result in a reduced time for instrument completion burden for patients as well as for clinicians who have to score and interpret the test. However, when interpreting the scores of the BDI tool, clinicians not only have to focus on total scores but also on individual items such as suicidal ideation.

The limitations of this study

This study was limited by the use of self-report questionnaires and the small sample size. Feinstein (2007) noted that the BDI suffers from the same problems as other self-report inventories since scores can easily be exaggerated or minimized by the person completing them. The results of this study cannot be generalized beyond the sample because of the small sample size (n = 34). Furthermore, a clinician rating to diagnose depression was not used in the present study, and some investigators note that self-reported symptoms of depression on questionnaires primarily reflect emotional distress rather than clinical depression.

Another study limitation was that the BDI-II and the BDI-FS scores were determined based on items scored from one administration of the BDI-II rather than using two separate measures. Another concern is that somatic and cognitive symptoms (such as fatigue and concentration difficulties) secondary to MS disease may inflate the level of depression in the sample. Moreover, although the data was collected from one MS center, the demographic characteristics of the sample such as age, gender, ethnic background, type of MS were similar to the general MS population. Most persons with MS are White women, upper middle class, and well educated (NARCOM, 2009).

In addition, this study recruited subjects through a convenience sample and it can lead to a large unmeasured bias. The disadvantages of convenience sampling include sampling bias, a less representative sample of the population, and a limited ability to generalize the results (Yoon and Horne, 2004).

Implications for clinical practice

Depression in MS is under-diagnosed and undertreated [35,36]. None of the subjects has been previously diagnosed with depression and these findings support that depression among patients with MS frequently remains undiagnosed. Screening for depression and suicidal ideation in patients with a chronic illness, such as MS, is critical because the prevalence of depression is quite high and depression reduces quality of life and affects adaptation to the disease [15,37]. Formal screening for depression by health care providers facilitates management and referral to mental health providers as needed. Providers will be more likely to use the BDI-FS since it has good reliability and can be administered within a short period of time, and then facilitate referral for further assessment. Doing so will enhance MS patients quality of life, better
health outcomes and optimal emotional well being.

Conclusions

Replication of the study involving a larger number of subjects is needed. Larger studies may provide further insight into the impact of relapses and disability on depression in MS. Future research should also consider the influence of the inclusion of somatic symptoms in the longer BDI tool. Future depression screening research could employ the BDI-II, the BDI FS, the Fatigue Impact Scale (FIS) and quality of life (QOL) MS scale to provide insight into whether the effects of somatic symptoms in MS affects the scores of depression. The high prevalence of depression in MS and the fluctuation of depressive symptoms among patients with MS require an ongoing screening for depression and appropriate treatment. Further studies are needed with a larger sample size to clearly identify the prevalence of depression among patients with MS and to identify the influence of disability and relapses upon depression.

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