Psychological and physical predictors of illness intrusiveness in patients with multiple sclerosis

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ABSTRACT

Physical disability as well as psychological factors may contribute to illness intrusiveness. The aim of this study was to determine if level of disability, anxiety, and depression predicted illness intrusiveness in patients with multiple sclerosis (MS). A second aim of this study was to determine if anxiety and depression moderated the impact of disability on illness intrusiveness. MS (N = 185) patients were recruited from a MS outpatient clinic that was part of a major medical center in New Jersey. Hierarchical linear regressions demonstrated that disability, anxiety, and depression each independently predicted illness intrusiveness. Anxiety and depression were not shown to moderate the impact of disability on illness intrusiveness. Implications of results from the first aim suggest that reducing psychological distress such as anxiety and depression may also reduce illness intrusiveness in patients with MS.

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1. Introduction

Multiple sclerosis (MS) is a chronic autoimmune disease that is characterized by inflammation, demyelination, and axonal loss in the central nervous system [1]. The loss of myelin leads to a disruption of communication among the neurons of the brain and spinal cord [1]. MS symptoms may include motor symptoms, weakness, numbness, bladder and bowel problems, sexual dysfunction, visual and speech disturbances, fatigue, and cognitive impairment. Many MS patients experience psychological distress and past research estimates the prevalence of clinically significant depression to range from 18.5 to 43% and significant anxiety to range from 19.3 to 44.5% [2–4].

When one is diagnosed with an illness it results in illness-induced interference with valued activities, which has been defined as illness intrusiveness [5]. Devins proposed that illness intrusiveness is a mediator between disease and treatment factors and subjective well-being [5]. He also proposed that psychological, social, and contextual factors serve as moderating factors in the framework [5]. The construct of illness intrusiveness has been researched in several chronic conditions including rheumatoid arthritis, osteoarthritis, end stage renal disease, and multiple sclerosis [6,7]. In cardiac patients,

Franche et al. found that depression at baseline predicted illness intrusiveness one year after a cardiac event [8].

There is limited research on the determinants of illness intrusiveness in patients with MS. Illness intrusiveness may be influenced by physical characteristics as well as psychological status. Previous research has shown that burden of illness, functional deficits, fatigue, and physical disabilities were important determinants of illness intrusiveness in patients with MS [9]. Research has also shown a relationship between depression and illness intrusiveness. Higher illness intrusiveness was associated with higher levels of depression in people with multiple sclerosis and chronic fatigue syndrome [10,11]. No studies have been located that examined anxiety as a predictor of illness intrusiveness in MS.

Illness intrusiveness is an important determinant in quality of life [5]. Although there are mixed findings of the relative contributions of anxiety and depression on quality of life these psychological factors have been correlated with overall quality of life in patients with MS [12]. Other research found depression as an important predictor of both physical and mental scales of quality of life. Anxiety was a predictor of only the mental scale of quality of life in patients with MS [13]. Anxiety and depression may also be predictors of illness intrusiveness since illness intrusiveness is an important determinant of quality of life.

The purpose of the current study was to determine if disability, anxiety, and depression were predictors of illness intrusiveness in MS. It was hypothesized that higher levels of disability, anxiety, and depression would be associated with higher levels of illness

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intrusiveness. Another aim of the study was to determine if depression and anxiety moderated the relationship between disability and illness intrusiveness. We hypothesized that depression and anxiety would act as moderators and the impact of disability on illness intrusiveness will be stronger among those with higher levels of emotional distress.

2. Methods

2.1. Participants

Participants were recruited from an ongoing study at the multiple sclerosis outpatient clinic of a large medical center in New Jersey. All participants had a diagnosis of multiple sclerosis. All participants consented to participate in this study. The study was approved by the IRB of the Albert Einstein College of Medicine, Bronx, New York. The sample consisted of 185 participants. Although these 185 patients were included in all analyses, some patients had missing data; therefore, the sample size varies for each regression analysis according to the number of patients that had complete data for all variables in that regression.

2.2. Measures

Incapacity Status Scale (ISS) is a 16 item, 5 point (0–4) ordinal rating scale developed as part of the Minimal Record of Disability [14]. A MS specialty clinician made ratings of disability. A summary score across the 16 items was used to measure overall disability level.

Hospital Anxiety and Depression Scale (HADS) is a 14 item, 4 point scale, self-report measure of anxiety (7 items) and depression (7 items). The HADS anxiety (HADS-A) and depression (HADS-D) subscales each have scores that range from 0 (no symptoms) to 21 (most severe symptoms) [15]. The HADS has been validated for use with multiple sclerosis patients [16].

Illness Intrusiveness Rating Scale (IIRS) is a 13 item, 7 point scale, self report that asks respondents to rate the degree to which their "illness and/or its treatments" interfere with various life domains. The IIRS measures illness intrusiveness in the following life domains: health, diet, work, active recreation, passive recreation, financial situation, relationship with partner, sex life, family relations, other social relations, self-improvement/self expression, religious expression, and community and civic involvements. The IIRS total score was used. It is created by summing the ratings provided in each response to each of the 13 items, creating a score that ranges from 13 to 91. The IIRS is a reliable and valid instrument for use in patients with multiple sclerosis [5,6].

The following demographic information was also collected: years of education, age and gender.

2.3. Statistical analyses

Descriptive statistics were conducted to describe the sample. The data was inspected for deviations from normality and were found to be suitable for parametric data analysis. Pearson correlations examined the relationship between demographic variables, predictor variables (disability, anxiety, and depression) and the outcome variable (illness intrusiveness). Anxiety and depression were included in separate hierarchical regression since they were moderately correlated in order to examine the variables separately and reduce multicollinearity. Interaction terms were created by multiplying individual variables involved in the interaction. All variables that were used to create interaction terms were centered by subtracting the mean of the variable from each score in that variable in order to avoid problems with multicollinearity. We used a listwise approach for missing data for the regressions and pairwise approach for correlations.

Table 1
Demographic and psychological characteristics of sample.

Categorical variable	%	[n]	%	[n]
Gender Female	72.4	[134] Male	27.6	[51]
Continuous variables	N	Mean (SD)	Range	
Age (years)	174	48.61 (10.59)	14–77	
Education (years)	159	14.58 (2.58)	8–21	
Disability (ISS)	151	9.54 (6.89)	0–43	
Illness intrusiveness (IIRS)	153	39.52 (20.44)	13–85	
Depression (HADS-D)	163	5.16 (3.84)	0–17	
Anxiety (HADS-A)	160	6.56 (3.83)	0–17	

3. Results

Table 1 shows demographic and disease related information about the sample. The majority of the sample was female, which is consistent with MS populations. Severity of disability, anxiety, depression, and illness intrusiveness ranged widely among the sample and the range as well as average scores can also be found in Table 1.

Significant correlations between disability and illness intrusiveness are shown in Table 2. As shown, disability was significantly correlated with illness intrusiveness ($r = 0.494$, $p < 0.001$). Significant correlations between psychological variables (anxiety and depression) and illness intrusiveness are also shown in Table 2. Depression was significantly correlated with illness intrusiveness ($r = 0.586$, $p < 0.001$). Anxiety was also significantly correlated with illness intrusiveness ($r = 0.440$, $p < 0.001$).

To determine possible variables to control for we examined the correlations between demographic variables and illness intrusiveness. Age was not significantly correlated with illness intrusiveness. Education was approaching significance of being correlated to the outcome variable illness intrusiveness ($r = -0.157$, $p = 0.071$). So years of education would not confound the potential relationship between predictor variables and illness intrusiveness, education was selected as a control variable and entered in the first block of the initial hierarchical linear regression. Disability was entered in the second block, depression in the third block and the disability × depression interaction in the fourth block to predict illness intrusiveness.

The results indicate that the final model significantly predicted illness intrusiveness ($R^2 = 0.422$, $F_{(4,110)} = 20.095$, $p < 0.001$). Results shown in Table 3 indicate that disability was a significant predictor of illness intrusiveness and accounted for 18.8% of the variance after controlling for years of education. Furthermore, depression was a significant predictor of illness intrusiveness and accounted for 20.1% of the variance after controlling for other variables. The disability × depression interaction was not a significant predictor of illness intrusiveness when controlling for the other variables, therefore depression was not a moderator.

A second hierarchical linear regression was conducted which entered years of education in the first block as a control variable, disability in the second block, anxiety in the third block, and disability × anxiety interaction in the fourth block to predict illness intrusiveness. The results indicate that the final model significantly predicted illness intrusiveness ($R^2 = 0.343$, $F_{(4,111)} = 14.518$, $p < 0.001$). Results shown in Table 4

Table 2
Significant correlations between demographic, disability, psychological variables, and illness intrusiveness.

		ISS	HADS-D	HADS-A	Education	Age
IIRS	Coefficient	0.494	0.586	0.440	−0.157	0.050
	Sig. (2-tailed)	<0.001	<0.001	<0.001	0.071	0.548
	N	131	146	146	133	145