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The impact of sexual dysfunction on health-related quality of life in people with multiple sclerosis

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Abstract

Background: Sexual dysfunction is a prevalent symptom in multiple sclerosis (MS) that may affect patients' health-related quality of life (HrQoL).

Objective: The objective of this paper is to examine the impact of sexual dysfunction on HrQoL in a large national sample using The Multiple Sclerosis Intimacy and Sexuality Questionnaire-19 (MSISQ-19).

Methods: Participants were recruited from a large MS registry, the North American Research Committee on Multiple Sclerosis (NARCOMS) Registry. Participants self-reported demographic information and completed the Patient Determined Disease Steps (PDDS), MSISQ-19, and the Short Form-12 (SF-12).

Results: The study population included 6183 persons (mean age: 50.6, SD = 9.6; 74.7% female, 42.3% currently employed). Using multivariate hierarchical regression analyses, all variables excluding gender predicted both the physical component summary (PCS-12) and the mental component summary (MCS-12) of the SF-12. Scores on the MSISQ-19 uniquely accounted for 3% of the variance in PCS-12 scores while disability level, as measured by PDDS, accounted for 31% of the variance. Conversely, MSISQ-19 scores uniquely accounted for 13% of the variance in MCS-12 scores, whereas disability level accounted for less than 1% of the variance.

Conclusion: In patients with MS, sexual dysfunction has a much larger detrimental impact on the mental health aspects of HrQoL than severity of physical disability.

Keywords
Multiple sclerosis, quality of life

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Introduction

Sexual dysfunction in multiple sclerosis (MS) patients is a common but often overlooked symptom.[1–4] The estimated prevalence of sexual concerns in the MS population ranges between 40% and 80%;[5–13] however, relatively little research has evaluated the impact of sexual dysfunction on quality of life in comparison to other common MS symptoms.

Health-related quality of life (HrQoL) is increasingly being utilized to measure overall health, evaluate treatment, and manage care for MS patients.[14,15] It is also a useful tool to assess the relative impact of patients' symptoms on both the physical and mental aspects of their functioning. An understanding of the impact of sexual dysfunction on the HrQoL of MS patients can inform the value of increased screening efforts for sexual symptoms and may impact treatment decisions. Four previous studies have examined the impact of sexual dysfunction on HrQoL in MS,[8,16–18] and all found that sexual dysfunction was associated with

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decreased HrQoL. However, the four previously published studies all had at least one major methodological limitation, including small sample size, nonvalidated measures of sexual function, and the use of correlational designs. The present study seeks to build on the existing literature in this area by examining the impact of sexual dysfunction on HrQoL in a large United States (US) national sample using a validated sexual dysfunction measure that is specific to MS.

Methods

Participants

Participants were recruited from a large MS patient registry, the North American Research Committee on Multiple Sclerosis (NARCOMS) Registry. The NARCOMS registry was established in 1993 with data collection beginning in 1996. A validation study that evaluated primary-source medical records and/or interviewed patient physicians indicated that >98% of a random sample of patients in the registry had a definite diagnosis of MS.[19] Other studies have demonstrated the reliability and validity of the instruments utilized in NARCOMS to assess various aspects of patients' neurological status.[20,21]

The NARCOMS registry conducts semi-annual update surveys via Internet and mail. The current sample constituted respondents to the spring 2006 survey. Of the 9201 respondents who were residents of the US, 6300 (68.5%) were willing to answer the questions on sexuality and 2877 (31.3%) indicated that they were not sexually active or otherwise not willing to respond. Twenty-four respondents did not answer either way (0.3%). Data were checked and cleaned prior to analysis. Analysis comparing completers and noncompleters indicated that noncompleters were more disabled ($F(1,9163) = 597.8$, $p < 0.001$), older ($F(1,9173) = 875.4$, $p < 0.001$), more likely to be female ($\chi2\ (1) = 14.9$, $p < 0.001$), more likely to be unemployed ($\chi2\ (1) = 234.7$, $p < 0.001$), and were less educated ($F(1,8596) = 49.9$, $p < 0.001$).

The final sample included 6183 persons, which included only the participants who completed information for all the variables of interest in this study.

Measures

Demographic data were acquired including gender, age, employment status, and education.

The Multiple Sclerosis Intimacy and Sexuality Questionnaire-19 (MSISQ-19)

The MSISQ-19 is a disease-specific measure of sexual dysfunction. Items measure the frequency of each sexual symptom over the past six months, ranging from 1 (Never) to 5 (Always).The MSISQ-19 has demonstrated excellent reliability as well as construct, concurrent, and criterion validity in MS patients.[22,23] It also demonstrated sensitivity to change as the primary outcome measure in an MS clinical trial for sexual dysfunction in women.[24]

Patient Determined Disease Steps (PDDS)

The PDDS is a nine-point, ordinal-level patient self-report rating scale that evaluates severity of disability.[20] Scores range from 0 "Normal: I may have some mild symptoms, mostly sensory due to MS, but they do not limit my activity. If I do have an attack, I return to normal when the attack has passed" to 8 "Bedridden: Unable to sit in a wheelchair for more than 1 hour." In the original validation study, it correlated very highly ($r\ (787) = 0.94$, $p < 0.001$) with physician estimates of disability based on the Expanded Disability Status Scale (EDSS). It demonstrated highly similar sensitivity to change over time with EDSS scores.

Short Form-12 V2 (SF-12)

The SF-12 Version 2[25] is a shorter form of the SF-36 Health Survey, which is one of the most widely used generic quality of life surveys. Its 12 questions address both physical and mental health perceptions of quality of life, and it has been widely utilized in MS populations.[26,27] There are eight subscales, four that address physical components of quality of life and four that address mental health. The subscales are further summarized by the physical component summary (PCS-12) and the mental component summary (MCS-12), with scores ranging from 0 to 100 where higher scores indicate better HrQoL. The current study reports the PCS-12 and MCS-12 scores.

Statistical analysis

Data collected from the MSISQ-19, PDDS, and SF-12 were expressed as means and standard deviations (SDs). The two demographic binary variables, gender and employment status, were each coded as either 0 or 1 for the purposes of the data analysis. Specifically, for gender males were coded as 0 and females were coded as 1; for employment status, being unemployed was coded as 0 and being employed was coded as 1. Associations between all of the variables were analyzed using Pearson's correlation. All tests were two tailed. Statistical significance was defined as $p < 0.01$.

Multivariate analyses using hierarchical linear regression were performed to identify variables associated with HrQoL. Two separate regression models were performed. The first included the PCS-12 as the dependent variable, while the second regression model included the MCS-12 as the dependent variable. The predictor variables were the same in both analyses. The first block consisted of the three demographic variables. In the second block, PDDS score was added. In the third and final block, the MSISQ-

Table 1. Associations between demographic variables, MSISQ-19 total score, and SF-12 component summaries, $N = 6183$.

		Gender	Employment status	Overall disability level	MSISQ-19 Total	SF-12 PCS	SF-12 MCS
Age	Pearson correlation	–.203[a]	–.296[a]	.359[a]	.133[a]	–.301[a]	.071[a]
	Sig. (two tailed)	<.001	<.001	<.001	<.001	<.001	<.001
Gender	Pearson correlation		.053[a]	–.176[a]	–.046[a]	.118[a]	–.012
	Sig. (two tailed)		<.001	<.001	<.001	<.001	.179
Employment status	Pearson correlation			–.480[a]	–.262[a]	.453[a]	.150[a]
	Sig. (two tailed)			<.001	<.001	<.001	<.001
PDDS	Pearson correlation				.426[a]	–.732[a]	–.088[a]
	Sig. (two tailed)				<.001	<.001	<.001
MSISQ-19 Total	Pearson correlation					–.463[a]	–.370[a]
	Sig. (two tailed)					<.001	<.001
SF-12 PCS	Pearson correlation						.061[a]
	Sig. (two tailed)						<.001

MSISQ-19: Multiple Sclerosis Intimacy and Sexuality Questionnaire-19; SF-12: Short Form-12; PCS: physical component summary; MCS: mental component summary; PDDS: Patient Determined Disease Steps. [a]Correlation is significant at the 0.01 level (two tailed).

19 was added. The demographic variables and PDDS were added in the models before the main variable of interest, MSISQ-19, because they have previously been shown to have an impact on HrQoL in MS patients.[28,29] This allowed us to observe the impact of the MSISQ-19 on HrQoL scores while controlling for the variables in previous steps. The regression models produced standardized beta coefficients, R^2 and ΔR^2 for each step. Standardized beta coefficients represent a change in the SD of the dependent variable resulting from a change of one SD in the various predictor variables. Predictor variables with higher standardized beta coefficients are those with a greater relative effect on the dependent variable. ΔR^2 is a measure of how much of the variability in the dependent variable is accounted for by the predictor variables in each step of the equation. The assumption of no multicollinearity was tested by examining the correlations between predictor variables, and the Durbin-Watson test was used to test for independent errors. Statistical analyses were performed using PASW Statistics software (version 18.0; SPSS Inc, Chicago, IL, USA).

Results

The mean age of participants was 50.6 (SD = 9.6). A total of 74.7% of the participants were female and 42.3% were currently employed. The percentage of participants who completed less than 12 years of education was 1.4%, 28.5% earned a high school diploma, 20.8% earned an associate's degree, 26.6% earned a bachelor's degree, and 22.7% completed a post-graduate degree.

Univariate analyses

The median PDDS score in this sample was 3 (interquartile range (IQR) = 4). The mean total score on the MSISQ-19 was 43.7 (SD = 18.8). The mean PCS-12 score was 37.8 (SD = 11.7) and the mean MCS-12 score was 45.6 (SD = 11.4).

See Table 1 for the correlation matrix. Both the MSISQ-19 total score and the PCS-12 score were statistically significantly associated with all of the demographic variables, disability, and each other. Specifically, higher MSISQ-19 scores were associated with older age, male gender, unemployment, being more disabled, and lower PCS-12 and MCS-12 scores. Higher PCS-12 scores were associated with younger age, female gender, being employed, being less disabled, and higher MCS-12 scores. The MCS-12 score was statistically significantly associated with all variables except gender. Specifically, higher MCS-12 scores were associated with older age, being employed, and being less disabled. Age, gender, employment status, and disability level were all significantly associated with one another.

Multivariate analyses

In multivariate hierarchical regression analyses, all of the variables in the final model, excluding gender, were independent predictors of the PCS-12 score (Table 2). Gender was a statistically significant predictor in Step 1 but was no longer significant in the second and third steps. Collectively, the demographic variables (Step 1) accounted for 24% of the variance in the PCS-12. When disability level was

Table 2. Predictors of the SF-12 Physical Component Summary: Hierarchical multiple regression.

		B	SE B	β	*p* value
Step 1	Constant	41.34	1.03		< 0.001
	Age	–0.21	0.01	–0.17	< 0.001
	Gender	1.68	0.31	0.06	< 0.001
	Employment status	9.46	0.28	0.40	< 0.001
Step 2	Constant	49.54	0.80		< 0.001
	Age	–0.03	0.01	–0.03	.003
	Gender	–0.29	0.24	–0.01	.225
	Employment status	3.01	0.23	0.13	< 0.001
	Overall disability level	–3.36	0.05	–0.66	< 0.001
Step 3	Constant	53.48	0.80		< 0.001
	Age	–0.04	0.01	–0.03	< 0.001
	Gender	–0.18	0.23	–0.01	.440
	Employment status	2.68	0.23	0.11	< 0.001
	Overall disability level	–3.00	0.05	–0.59	< 0.001
	MSISQ-19 Total	–0.11	0.01	–0.18	< 0.001

SF-12: Short Form-12; MSISQ-19: Multiple Sclerosis Intimacy and Sexuality Questionnaire-19. R^2 = .24 for Step 1 (p < .001), ΔR^2 = .31 for Step 2 (p < .001), and ΔR^2 = .03 for Step 3 (p < .001).

Table 3. Predictors of the SF-12 Mental Component Summary: Hierarchical multiple regression.

		B	SE B	β	*p* value
Step 1	Constant	35.90	1.12		< 0.001
	Age	0.15	0.02	0.13	< 0.001
	Gender	0.11	0.33	0.00	.734
	Employment status	4.31	0.30	0.19	< 0.001
Step 2	Constant	36.63	1.13		< 0.001
	Age	0.17	0.02	0.14	< 0.001
	Gender	–0.06	0.34	0.00	.857
	Employment status	3.75	0.33	0.16	< 0.001
	Overall disability level	–0.30	0.07	–0.06	< 0.001
Step 3	Constant	45.13	1.09		< 0.001
	Age	0.15	0.02	0.13	< 0.001
	Gender	0.18	0.31	0.01	.574
	Employment status	3.03	0.31	0.13	< 0.001
	Overall disability level	0.48	0.07	0.10	< 0.001
	MSISQ-19 Total	–0.24	0.01	–0.40	< 0.001

SF-12: Short Form-12; MSISQ-19: Multiple Sclerosis Intimacy and Sexuality Questionnaire-19. R^2 = .04 for Step 1 (p < .001), ΔR^2 < .01 for Step 2 (p < .001), and ΔR^2 = .13 for Step 3 (p < .001).

added in Step 2, it accounted for an additional 31% of the variance. Adding MSISQ-19 scores in the final step contributed an additional 3% of the variance. The final model accounted for a total of 58% of the variance in PCS-12 score.

In the final regression model for the MCS-12 score, all of the variables excluding gender emerged as independent predictors (Table 3). Collectively, the demographic variables (Step 1) accounted for 4% of the variance in the MCS-12 score. When disability level was added in Step 2, it accounted for <1% of the variance. Adding MSISQ-19 scores in the final step contributed an additional 13% of the variance. The final model accounted for a total of 17% of the variance in the MCS-12 score, thus the MSISQ-19 accounted for most of the explained variance in the MCS-12.

Discussion

In this large national sample of people with MS, we found that sexual dysfunction had a relatively large detrimental impact on the mental aspects of HrQoL compared to disability level and demographic factors. We also found that sexual dysfunction has a smaller yet significant detrimental impact on the physical aspects of HrQoL. Although not the main focus of our study, another interesting finding that emerged was that demographic factors (with the exception of gender) as well as disability level had a very large impact on the physical health aspects of HrQoL. Disability level alone accounted for 31% of the variance in PCS-12 scores and when this factor was combined with the demographic variables, they accounted for more than 50% of the variance in PCS-12. However, the opposite was true for the mental aspects of HRQoL, with all demographic variables accounting for only 4% of the variance in MCS-12 scores and disability accounting for less than 1% of the variance.

Although there has been increased research interest in determining the factors that contribute to HrQoL in MS patients in recent years, these studies have largely focused on disability status, demographic characteristics, and nonsexual clinical symptoms.[29–31] The impact of sexual dysfunction on HrQoL has been examined in four other studies,[8,16–18] but these studies had methodological weaknesses. All but one of these studies either relied on nonvalidated measures of sexual dysfunction (often asking only one question about sexual functioning) or on measures that are validated but not specific to MS. Nortvedt et al. utilized the sexual subscale of the validated and disease-specific MSQoL-54,[8] an HrQoL measure that combines the SF-36 with 18 MS-specific items. This latter study represented an improvement in measuring sexual dysfunction, but did not utilize a well-validated measure that has the sole function of measuring sexual dysfunction in MS. A strength of our study was the use of the MSISQ-19 to measure sexual dysfunction, as it is validated and specific to the MS population.

In addition to the use of the MSISQ-19 instrument, our study has other strengths when compared to the other studies that have examined sexual dysfunction and HrQoL. Most studies have had relatively small sample sizes (*N* ranging from 56 to 194, with the exception of Forbes et al.,[17] with an *N* of 929), whereas our study has more than 6000 participants from across the US. Finally, two of the previous studies used correlational designs,[8,18] whereas our study utilized regression models to statistically control for variables that are known to affect HrQoL.

Previous studies have found that level of disability plays a substantial role in lowering HrQoL in MS.[31–33] However, the relationship between disability and HrQoL may be more complex than previously assumed. Studies have shown that physical aspects of HRQoL decline with increasing disability but other aspects of HrQoL do not. For example, The Canadian Burden of Illness Study Group[30] found that mental health areas of HrQoL actually stabilize or improve with increasing disability. This is hypothesized to be due to increases in ability to cope with illness over time. Our findings related to disability are consistent with this literature, as we found that disability had a large detrimental impact on the physical aspects of HrQoL but had very little impact on the mental aspects.

Our findings on the impact of sexual dysfunction on HrQoL are mostly consistent with the previous studies, with one exception. In Nortvedt et al.'s initial study, sexual dysfunction was associated with a decrease in HrQoL on all eight subscales of the SF-36 (including the physical health subscales).[16] This first study is consistent with our findings in that we did find a statistically significant relationship between sexual dysfunction and both mental health and physical health components of HrQoL. However, although there is a statistically significant relationship between sexual dysfunction and the PCS-12 in our study, we don't believe that the relationship is large enough to be clinically meaningful. Given this, it is interesting that with the improved methodology of the follow-up study by Nortvedt et al., negative associations were found between sexual functioning and all of the mental health subscales of the SF-36, but there was no association between sexual functioning and three of the subscales related to physical health.[8] This fits well with our finding that sexual dysfunction has a higher impact on the mental aspects of HrQoL than on the physical aspects. In the Forbes et al.[17] study, the only two SF-36 subscales that were not negatively affected by sexual dysfunction were bodily pain and general health, which both are subscales that factor in to the PCS-36. However, Tepavcevic et al.[18] found a similar pattern in women but not in men, in contrast to the current study, in which gender was not related to HrQoL in the final regression models.

Our study has several limitations. First, we did not assess whether any of the participants who have sexual dysfunction have undergone any kind of treatment, thus these findings do not consider possible treatment effects. Second, our HrQoL measurement would be improved if we had utilized one of the disease-specific measures that have been developed for the MS population. Third, although our sample is large it is limited to patients in the US and may not reflect the experience of MS patients in other countries. Fourth, almost one-third of the survey responders opted out of the section on sexuality. Because of this, it is possible that our results are not fully representative of the experience of people with MS in the US. This may especially be true for those who are more disabled, older, less educated, unemployed, and female, as nonresponders were more likely to fall into these categories. Furthermore, we do not have the HrQoL data on the nonresponders, so we were unable to compare the scores in this area. There also isn't an available age- and sex-matched non-MS sample that we can compare our nonresponder data with to determine if the percentage of nonresponders in our study is comparable. However, many people may have simply not responded because they are not sexually active, which was a requirement to complete the sexuality section. Fifth, disability status was self-reported. However, the instrument used to measure disability has been validated (see Measures section). Finally, as this study was an initial investigation into the relationship between MSISQ-19 and HrQoL scores, we chose to use the total score of the MSISQ-19.

Future studies should evaluate the subscales of the MSISQ-19 and their relation to HRQOL.

This study has demonstrated the importance of sexual dysfunction as a symptom in MS patients and the negative impact that it has on the mental aspects of HrQoL. It highlights the need for clinicians to inquire about the sexual concerns that their patients have. Clinicians can use the MSISQ-19 in their practice as a quick screen for sexual dysfunction. Any score of 3 or higher on a symptom should be queried for further intervention. Additionally, because of the large impact that sexual dysfunction has on the mental health aspects of HrQoL, clinical trial investigators who measure HrQoL as a secondary outcome measure should be aware of the possible impact of sexual dysfunction on these scores and may consider including the MSISQ-19 as an additional outcome measure. Finally, treatments that specifically address the unique struggle of sexual dysfunction in MS patients should be developed and studied to determine their effectiveness in improving HrQoL.

Conflict of interest

None declared.

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