

Hospital-based Psychiatric Service Utilization and Morbidity in Multiple Sclerosis

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ABSTRACT: Background: Despite the common association of psychiatric morbidity and multiple sclerosis (MS), population-based prevalence estimates of these disorders are limited. Such estimates are of particular importance to those conducting trials of interventions for the treatment of MS. This study examined the prevalence of bipolar disorder, depression, and attempted suicide among hospital service utilizers in Nova Scotia and compared these measures for the MS and non-MS population. **Methods:** Data regarding diagnosis and utilization were extracted from two linked databases which included all hospital separation records for Nova Scotia over a 3 year period (1992/93-1994/95). **Results:** The prevalence of bipolar disorder in hospitalized MS patients was 1.97% and depression was 4.27%. These rates were significantly higher than the 0.92% and 2.04%, respectively, for the non-MS hospital utilizers. These diagnoses also accounted for more than half of the primary diagnostic codes for psychiatric service separations by MS patients. The proportion of total hospital utilization which was accounted for by psychiatric services did not differ between MS and non-MS utilizers. While suicide attempts were rare, the estimated frequency of suicide attempts in the total MS population was more than three times that of the general population. **Conclusions:** Bipolar disorder and depression were twice as prevalent in hospitalized MS patients as in the general population of hospital utilizers while the estimated frequency of suicide attempts was at least three times greater. These results illustrate that psychiatric morbidity and service utilization are important considerations in the care of MS patients.

RÉSUMÉ: Utilisation des services psychiatriques hospitaliers et morbidité dans la sclérose en plaques. Introduction: En dépit de l'association fréquente de la morbidité psychiatrique et de la sclérose en plaques (SEP), il existe peu d'études évaluant la prévalence de ces affections dans la population. Ces données sont particulièrement importantes pour ceux qui font des études d'intervention pour le traitement de la SEP. Cette étude a examiné la prévalence de la maladie bipolaire, de la dépression et des tentatives de suicide parmi les utilisateurs de services hospitaliers en Nouvelle-Écosse et comparé ces données pour la SEP à celles de la population non atteinte de SEP. **Méthodes:** Les données concernant le diagnostic et l'utilisation de soins ont été extraites de deux bases de données qui incluaient tous les dossiers concernant les congés hospitaliers pour la Nouvelle-Écosse sur une période de 3 ans (1992/93 - 1994/95). **Résultats:** La prévalence de la maladie bipolaire chez les patients atteints de SEP hospitalisés était de 1.97% et celles de la dépression de 4.27%. Ces taux étaient significativement plus élevés que les taux de 0.92% et 2.04% respectivement pour les utilisateurs hospitaliers n'étant pas atteints de SEP. Ces diagnostics constituaient plus de la moitié des codes diagnostiques primaires pour les congés psychiatriques chez les patients atteints de SEP. La proportion d'utilisation hospitalière totale qui était des services psychiatriques n'était pas différente entre les patients atteints de SEP et les non atteints. Bien que les tentatives de suicide soient rares, la fréquence estimée des tentatives de suicide dans la population totale des patients atteints de SEP était plus de trois fois celle de la population en général. **Conclusions:** La maladie bipolaire et la dépression étaient deux fois plus fréquentes chez les patients atteints de SEP qui étaient hospitalisés que dans la population hospitalière en général alors que la fréquence estimée des tentatives de suicide était au moins trois fois plus grande. Ces résultats démontrent que la morbidité psychiatrique et l'utilisation des services sont des considérations importantes dans le soin des patients atteints de SEP.

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Affective disturbances have been associated with multiple sclerosis (MS)¹ and may be one of the most disabling aspects of the disease.^{2,3} Diverse symptoms of disturbed affect have been noted in MS including: pathological laughter and crying, euphoria, bipolar disorder, and depression. Of these, bipolar disorder and depression are those most often discussed in association with psychiatric service utilization.⁴⁻¹² The point and lifetime prevalence of bipolar disorder in MS has been reported to range from 2% to 13%,^{4,5,13,14} figures higher than the 0.4% to 1.2% estimated for the general population.¹⁵ The point and lifetime prevalence of depression in MS have been estimated to range from 14% to 72%.^{4,6-10,16,17} In all studies, the prevalence rates for depression in MS have been reported to be higher than those of the general population^{6,7} and for other disease groups.^{6,11,13,18}

Suicide, suicide attempts, and suicidal ideation have recently begun to receive attention in MS patients.^{6,19-25} Studies have consistently suggested that MS patients have a higher rate of suicide than the general population. Stenager et al.,¹⁹ estimated the prevalence of death by suicide to be 3% in a population of MS patients. However, most other studies have estimated it to

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be approximately 15%.^{10,12,20,25} Two studies that have examined suicide attempts in MS patients have reported lifetime prevalence to be 3.3%,¹⁰ and 12%⁶ while lifetime prevalence of suicidal ideation in MS has been reported to range from 10%⁶ to 40%.²¹

Establishing population-based estimates of prevalence rates for depression, bipolar disorder, and suicide attempts in MS is particularly important to those conducting pharmaceutical trials for the treatment of MS. A study by the IFNB study group²⁴ using Interferon-beta-1b has reported the rates of "depression" in various study arms to range from 4.8% to 16.9% and the annual rates of suicide attempts to range from 0.8% to 1.6% during the 5 year trial period. However, without population-based rates for comparison, it is difficult to put even statistically significant group differences into the context of clinical significance. Almost all studies examining the prevalence of bipolar disorder, depression, and suicide have suffered from methodological problems that include: small sample sizes, selection bias, inadequate control groups, and retrospective patient reports.^{26,27} Despite the limitations and inconsistencies of the available studies, however, it is clear that affective disorders are of significant concern for patients with MS.

Although patients could be expected to require mental health services for such issues, there have been even fewer studies that have examined whether or not MS patients are more likely to use formal psychiatric services than the general population. In Dutch and British studies, psychiatric service utilization by MS patients in the form of admissions to psychiatric facilities has been reported to be 11.5% of the estimated MS population over 12 years²⁸ and 12% over an unspecified time (presumably lifetime).¹³ The two studies that have included psychiatric outpatient referrals, which were conducted in United States and New Zealand, have reported utilization of psychiatric services by MS patients to be 19.3% over 13 years¹¹ and 32% over an unspecified time (up to 30 years for at least one subject).²² The reported rates of psychiatric hospital utilization by MS patients have been considerably less than many of the reported lifetime prevalence rates of psychiatric morbidity. Studies by Minden et al.,⁶ and Sullivan et al.,⁹ have suggested that depression in MS may be under-treated. Once again, however, given the paucity of research examining the utilization of psychiatric services by MS patients, this cannot be adequately determined. In addition, no population-based study of psychiatric service utilization by MS patients in Canada has been conducted to date. In examining health care utilization, Canada offers a system in which health care services are free at point of entry, an important factor since loss of employment and income due to MS may limit access to health care in some countries.

In this study, we examined and compared the utilization of hospital services by persons with, and without MS in Nova Scotia, over a 3 year period (1992/1993 to 1994/1995). As well, the prevalence of bipolar disorder, depression, and suicide attempts were compared for this same time interval.

METHODS

All data were extracted from two databases available to the Population Health Research Unit at Dalhousie University. These databases were generated by the Nova Scotia Department of

Health and the Dalhousie Multiple Sclerosis Research Unit (DMSRU) for the years 1992/1993 to 1994/1995. To ensure confidentiality, the identification numbers of all patients were scrambled by the Department of Health before release of the data sets. The two databases used in this study were linked by the scrambled identification numbers such that no unique identifying information was available to the investigators.

The Admissions, Separations, and Day Surgery (ASD) database included all inpatient hospital separation records for residents of Nova Scotia for the three year period from 1992/1993 to 1994/1995. Separation records are generated by all hospital facilities within the province at the time of patient discharge and are included in the database of the provincial Department of Health. The information extracted from this database for the current study included the type of hospital facility (i.e., psychiatric versus non-psychiatric), and the discharge diagnoses. The discharge diagnoses are recorded for each hospital separation according to The International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM)²⁹ by the attending physician at time of discharge and include a primary diagnosis and up to six secondary discharge diagnoses. It was rare, however, to have more than four secondary codes recorded. From the ICD-9-CM codes, formal psychiatric diagnoses of those admitted to a hospital were obtained. The DMSRU database was initiated in 1979 and contained the clinical records and demographic information for 708 MS patients who were current residents of Nova Scotia at the time of this study and who had attended the DMSRU at least once in the period 1979-1995. All patients in the DMSRU database met the diagnostic criteria for clinically probable or definite MS.³⁰

Persons with MS who utilized hospital-based psychiatric and other services in the period 1992-95 were identified in two ways. First, patients from the DMSRU database were identified and linked to the ASD utilizations data for 1992-95. Second, ASD utilization data for 1992-95 were searched for "other" MS patients. These were patients with an ICD-9-CM diagnostic code for MS who were not part of the DMSRU database. Thus, two groups of MS patients were identified: DMSRU MS patients who met diagnostic criteria for clinically probable or definite MS, and "other" MS patients who may or may not have met clinical criteria. Hospital utilization rates of persons with MS were compared to the general population. The group of non-MS patients utilizing hospital services during the study period was comprised of all hospital utilizers except those identified as DMSRU or "other" MS patients.

The estimates of MS prevalence in Nova Scotia given below were based on the number of unique persons ($n = 2,542$) identified through linkage of the DMSRU clinical database, ASD utilization data and physician services utilization data for the period 1989/90-1993/94. Nova Scotia's 1991 census population (918,100) was used in calculating both MS prevalence rates in Nova Scotia and hospital utilization rates for the general population. This yielded a prevalence estimate of MS of 277/100,000. While this estimate is higher than that of earlier Canadian studies of Newfoundland,³¹ Ontario,³² and British Columbia,³³ it is more consistent with that of a more recent Canadian study from Alberta,³⁴ as well as with the trend toward increasing prevalence estimates for MS that have been reported for other samples.³⁵

The physician services utilization database includes all physician billing claims for Nova Scotia, thereby documenting all outpatient office visits. Each claim form includes fields for ICD-9-CM diagnostic codes although they are not necessarily completed with each claim. While the validity of the diagnoses in the DMSRU database was assured through adherence to standard diagnostic criteria,³⁰ the validity of the diagnoses obtained through the physician services database was undoubtedly subject to error. Sources of this error include: data entry errors, data coding errors, and failure to use accepted diagnostic criteria. Although the extent of these errors is unknown, it seems unlikely that they introduce a systematic bias toward overrepresentation of MS patients in the population. Data entry and coding errors are unlikely to be systematic and, since it may take a number of years for symptoms of MS to be recognized as such, it also seems unlikely that family physicians and other specialists would overuse this diagnostic category in a systematic manner on billing records.

ASD database fields were searched to determine the total number of hospital admissions for MS patients and non-MS patients to both psychiatric and non-psychiatric hospital facilities. ICD-9-CM codes for primary and secondary diagnoses of all psychiatric hospital admissions by MS patients were extracted and collated. The frequency of codes for bipolar disorder, depression, and attempted suicide (see Appendix) were also extracted and collated for all admissions. The order of search was to first examine the primary diagnoses for ICD-9-CM codes for depression and bipolar disorder. Next, secondary diagnoses were checked. Those who did not have a primary diagnosis of bipolar disorder or depression were first scanned for bipolar disorder in the secondary codes. If they did not have a secondary code of bipolar disorder, the secondary codes for depression

were then searched. This order of search was done to eliminate any overlap in diagnoses and to ensure that those with bipolar disorder (who may have been depressed during their hospitalization) were categorized appropriately. Codes for attempted suicide were scanned independently of other diagnostic codes. In order to investigate the possibility of deaths due to suicide, the death certificates of 36 patients from the DMSRU who died during the study period were examined.

RESULTS

Hospital Service Utilization

The total number of hospital separations in Nova Scotia during the 3 year period of this study was 579,190, or about 21% per year, based on the 1991 census data. Of these, 3,099 (0.54%) were by MS patients. Fifty-four persons with MS (88 separations) and 8,436 persons without MS were psychiatric service utilizers (15,115 separations). There was a total of 1,212 persons with MS who were utilizers of other hospital services (3,011 separations) and 286,765 persons without MS who were utilizers of other hospital services (560,976 separations). The proportion of total service utilization (i.e., separations) that was accounted for by psychiatric services did not differ between the MS (88/3,099 = 2.84%) and the non-MS hospital utilizers (15,115/576,091 = 2.62%) ($\chi^2 = .56, p > .50$). Table 1 summarizes the hospital service utilization patterns using both a per utilizer, and a per population at risk perspective.

Of the 54 MS patients who were psychiatric service utilizers, 12 were from the DMSRU group (23 separations) and 42 were from the "other" MS group (65 separations). Of the 1,266 MS patients who were utilizers of other hospital services, 241 were from the DMSRU group (667 separations) and 971 were from the

Table 1: Psychiatric and Other Hospital Separations by Persons with Multiple Sclerosis (PwMS) and Other Nova Scotians During a Three Year Period, 1992/93-1994/95, on a per Utilizer and a per Population at Risk Basis.

Hospital Separations	Nova Scotians with MS				Other Nova Scotians				
	PwMS by source of diagnostic data	persons with ≥1 separation	separations	separations per utilizer	separations per population at risk (%)	persons with ≥1 separation	separations	separations per utilizer	separations/populations at risk (%)
Psychiatric separations	DMSRU	12	23	1.9	3.2				
	"Other"	42	65	1.5	3.3				
	Total	54	88	1.6	3.4	8,436	15,115	1.8	1.7
Other separations	DMSRU	241	667	2.8	94.2				
	"Other"	971	2,344	2.4	117.5				
	Total	1,212	3,011	2.5	118.5	286,765	560,976	2.0	61.3
Total separations	DMSRU	253	690	2.7	97.5				
	"Other"	1,013	2,409	2.4	120.8				
	Total	1,266	3,099	2.4	121.9	295,201	576,091	2.0	62.9

Population at risk estimates. The number of persons with MS in Nova Scotia during the 1992/93- 1994/95 study period is estimated at about 2,542. Of these, 708 were identified from Dalhousie MS Research Unit (DMSRU) data. The remainder were identified from diagnostic codes for MS contained in hospital ASD records and physician services records of health services utilization funded under Nova Scotia's universal and comprehensive Medicare program. The number of "other Nova Scotians" is estimated to be 915,558, the 1991 census population minus the estimated number of persons with MS (2,542) in the study period.

“other” MS group (2,344 separations). The proportion of separations from psychiatric services did not differ between the DMSRU (23/690 = 3.33%) and the “other” MS utilizer groups (65/2,409 = 2.70%) ($\chi^2 = .78$, $p > .50$). Moreover, the proportion of individuals making up the separations from psychiatric services did not differ between the DMSRU (12/253 = 4.74%) and the “other” MS groups (42/1,013 = 4.15%) ($\chi^2 = .18$, $p > .70$). Given these findings, both MS groups were combined for the remainder of the analyses.

Psychiatric Morbidity

The prevalence of diagnostic codes for bipolar disorder and depression were compared for the MS and non-MS hospital utilizers. While this provides an extremely conservative estimate of psychiatric morbidity for the total population, it has the advantage of employing a standardized coding system in a study of a total population. When all hospital separations were examined, a total of 25 individual MS patients and 2,720 non-MS hospital utilizers were identified who had received an ICD-9-CM diagnostic code for bipolar disorder during the three year study period. Based on these data, the estimated prevalence rate for bipolar disorder was 1.97% for hospitalized MS patients and 0.92% in the non-MS hospital utilizer population, ($\chi^2 = 15.25$, $p < .005$). In a similar manner, 54 individual MS patients and 6,031 non-MS hospital utilizers were identified who had received a diagnostic code for depression during the 3 year period of this study. Based on these data, the estimated prevalence rate for depression was 4.27% for hospitalized MS patients and 2.04% in the non-MS hospital utilizer population, ($\chi^2 = 30.97$, $p < .005$).

In order to examine the psychiatric morbidity associated with psychiatric service utilization among MS patients, all primary diagnostic codes for the 88 psychiatric service separations by MS patients were examined. These were grouped according to major diagnostic categories and are summarized in Table 2. As illustrated in this table, for the majority of psychiatric service separations by MS patients the primary diagnoses were either bipolar disorder (29.54%) or depression (26.13%). No other diagnostic category accounted for more than 7% of the primary diagnoses at the time of separation from a psychiatric service.

Table 2. Primary ICD-9-CM Codes for 88 MS Psychiatric Service Separations.

Code Description	Number	(%) Admissions
Bipolar Disorder	26	(29.54%)
Depression	23	(26.13%)
Personality disorder	6	(6.82%)
Drug abuse	6	(6.82%)
Schizophrenia	5	(5.68%)
Alcohol abuse	5	(5.68%)
Adjustment reaction	3	(3.41%)
Organic brain disease/dementia	3	(3.41%)
Panic/anxiety	3	(3.41%)
Physical disorders only	2	(2.27%)
Psychotic disturbance	2	(2.27%)
Post Traumatic Stress Disorder	1	(1.14%)
Unspecified neurotic disorder	1	(1.14%)
Poisoning	1	(1.14%)
Conduct disturbance	1	(1.14%)

We assumed that a suicide attempt was equally likely to lead to a hospitalization regardless of whether a person had MS or not. Therefore, we felt that the prevalence of ICD-9-CM codes for attempted suicide, extracted from the ASD database, would provide a reasonable estimate of the prevalence of individuals who attempt suicide in the total population. Seventeen individuals with MS and 1,670 individuals without MS made a suicide attempt serious enough to warrant hospitalization during the three years of this study. Thus, while only 0.67% of our estimated population of MS patients in Nova Scotia had a hospital admission and an ICD-9-CM code for suicide attempt within the three year study period, this was true for only 0.18% of the non-MS population ($\chi^2 = 7.74$, $p < .01$). Information regarding cause of death was available from clinic records for 36 patients of the DMSRU but no deaths were attributed to suicide.

DISCUSSION

Although it was not surprising to find that persons with MS were more likely to utilize hospital services than the general population, it was perhaps more surprising to find that persons with MS utilized a similar proportion of psychiatric hospital services as did non-MS hospital utilizers. Thus, on a population-at-risk basis, persons with MS were twice as likely to utilize hospital-based psychiatric services as the general population during the three year study period. These findings indicate that the psychiatric morbidity associated with MS cannot be overlooked as a significant source of health care service utilization. The use of non-psychiatric hospital services was slightly lower for the DMSRU group on a population-at-risk basis, possibly reflecting more effective management of MS in a specialty clinic. However, this was not the case for psychiatric hospital services. Thus, even within specialty clinics, there is a need for vigilance regarding psychiatric morbidity. Since the ASD database did not provide us with an estimate of the number of MS utilizers who may have received a consultation by psychiatry while admitted under another medical service, our data are likely to underestimate the total hospital-based psychiatric service utilization by persons with MS.

This study, which restricted its analysis to hospital service utilizers, nevertheless supports previous research which has found that psychiatric morbidity in the form of bipolar disorder,^{4,5} depression,^{6,7} and attempted suicide^{10,12,20,25} is higher in the MS population than in the general population. The prevalence rates for psychiatric morbidity for MS patients in this study were much lower than those reported previously by others. These findings undoubtedly reflect our data sources and methods which, in turn, reflect our provincial health care system and physician practice patterns in our province. Since, in our study, the identification of psychiatric morbidity required hospital admission, the rates would be expected to be much lower than prevalence rates based on surveys of patients attending specialized MS clinics or rates based on the return of mail-out surveys. However, it is noteworthy that when examining psychiatric morbidity in terms of the primary diagnoses of those MS patients admitted to psychiatric services, the prevalence rates were 29% for bipolar disorder and 26% for depression, (see Table 2), figures closer to those noted in

previous research which has used samples subject to possible selection and/or referral biases, small sample sizes, inadequate control groups, and retrospective patient reports.^{26,27} Although limited to conservative estimates, our data have the distinct advantage of providing population based estimates. Thus, while our conservative estimates of psychiatric morbidity in MS patients are low in relation to some other reports, they illustrate the significance of this problem as both bipolar disorder and depression were approximately twice as prevalent in MS hospital utilizers as in non-MS hospital utilizers. Moreover, persons with suicide attempts were almost 4 times as prevalent in the MS population as in the non-MS population.

Table 2 illustrates that bipolar disorder and depression accounted for over 55% of primary diagnoses for MS psychiatric service separations, suggesting that affective disorders represent the greatest proportion of psychiatric morbidity in MS. However, the remaining 45% of psychiatric service separations had a primary diagnosis other than that of bipolar disorder or depression. Thus, while less common, other psychiatric disorders should not be overlooked when examining the mental health care needs of MS patients or when conducting clinical trials for the treatment of MS. Interestingly, adjustment reactions were rarely indicated as the primary diagnoses for psychiatric service separations. While these may not be uncommon, they would appear to be rarely associated with hospital-based psychiatric service utilization.

One obvious limitation of our findings is our use of hospital service utilization data only. Thus, our data are clearly an under-representation of the total psychiatric service utilization of persons with MS. With the trend toward increased delivery of health care services through ambulatory care programs, hospitalization has become a less frequently used method of health care delivery for most health problems, including MS. Nevertheless, our data illustrate that hospital service utilization remains much more common for MS patients than for the population at large and thus, remains a significant factor in the overall cost of health care service delivery to persons with MS.³⁶

One of the advantages of our study, which used a Canadian health care perspective, is that ability to pay is not a direct determinant of access to hospital services. Thus, our population based study of hospital utilizers in Nova Scotia provides relatively unbiased estimates of the rates of psychiatric morbidity and suicide attempts in both the MS and general population-at-risk. Such estimates are particularly important for those conducting therapeutic trials for MS since they can contribute to the development of models of cost-effectiveness of new treatments for MS.³⁶ Our study illustrates the importance of incorporating measures of psychiatric morbidity in such trials. Depression, and its appropriate treatment, has been recognized as an important factor in the adherence to newly developed treatments for MS.^{37,38} Nevertheless, while depression, bipolar disorder and suicide attempts remain of most obvious importance, our findings also point out that other psychiatric disorders should not be overlooked in the clinical management of MS or in studies of the effectiveness of new treatments.

APPENDIX

ICD-9-CM Codes

Bipolar Disorder

293.83
 296.0, 296.00 to 296.06
 296.1, 296.10 to 296.16
 296.2, 296.20 to 296.26
 296.3, 296.30 to 296.36
 296.4, 296.40 to 296.46
 296.5, 296.50 to 296.56
 296.6, 296.60 to 296.66
 296.7
 296.8, 296.80, 296.81, 296.82, 296.89

Depression

292.84, 300.4, 309.0, 309.1, 311.

Suicide Attempt

E950.0 to E950.9
 E951, E951.0, E951.1, E951.8,
 E952, E952.0, E952.1, E952.8, E952.9
 E953, E953.0, E953.1, E953.8, E953.9
 E954
 E955, E955.0 to E955.5, E955.9
 E956
 E957, E957.0, E957.1, E957.2, E957.9
 E958, E958.0 to E958.9
 E959

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