Cross-National Comparisons of Antidepressant Use Among Institutionalized Older Persons Based on the Minimum Data Set (MDS)

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RÉSUMÉ

On a examiné l'usage des antidépresseurs dans des échantillons provenant d'établissements de soins de longue durée de Toronto (Canada), Sapporo et Naie (Japon), Reykjavik (Islande) et Prague (République tchèque). C'est seulement en Islande que la majorité des résidents souffrant de dépression recevaient des antidépresseurs. Le taux de dépression et l'usage des antidépresseurs sont généralement faibles au Japon. On a constaté un écart important entre le diagnostic de dépression et le comportement dépressif en République tchèque. Dans tous les pays examinés, environ la moitié des utilisateurs d'antidépresseurs ne présentent pas de symptômes évidents de dépression. Dans certains pays, l'usage des antidépresseurs était moins élevé chez les résidentes, chez les aîné(e)s plus âgés ou plus handicapés. La dépression est clairement sous-diagnostiqué en République tchèque mais les faibles taux de dépression au Japon sont plus difficiles à interpréter. Étant donné l'opinion largement répandue voulant que la dépression passe souvent inaperçue et soit donc mal soignée, les résultats de l'étude laissent entendre que l'on pourrait améliorer les mesures prises dans les cas de dépression grâce à des outils comme le MDS.

ABSTRACT

Antidepressant use was examined with samples from long-term care facilities in Toronto (Canada), Sapporo and Naie (Japan), Reykjavik (Iceland) and Prague (Czech Republic). Only in Iceland did the majority of residents with depression

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receive an antidepressant. Rates of depression and antidepressant use were uniformly low in Japan, and there was a great discrepancy between diagnosed depression and behavioural signs of depression in the Czech Republic. In all countries, about half the recipients of antidepressants have no clear indication of depression present. For some countries, antidepressant use was lower among residents who were female, older and more disabled. Depression is clearly under-diagnosed in the Czech Republic, but low rates of depression in Japan are somewhat more difficult to interpret. Given the widespread consensus that depression is under-detected and under treated, these results suggest that responses to depression could be improved through instruments like the MDS.

Introduction

Pharmacoepidemiological research in elderly populations has typically focussed on the overuse of certain types of medications (e.g., benzodiazepines), inappropriate selection of dose, duration or type of drugs (e.g., barbiturates) or adverse drug related events (e.g., falls). However, at least in some instances, the under use of certain drugs may be an important consideration. For example, the failure to recognize and diagnose depressive disorders among older persons and to treat them accordingly is a common problem in long-term care (Abrams, Teresi, & Butin, 1992; Burrows, Satlin, Salzman, Nobel, & Lipsitz, 1995; Fogel, 1997; Gelenberg, 1999; Lyness et al., 1996). Some studies estimate that as many as one third of nursing home residents are affected by depression (Ames, 1991), but a National Institute of Health (NIH) consensus panel suggested a range of 15 to 25 percent for minor and major depression in nursing homes (NIH, 1991).

The under-utilization of antidepressants can have important consequences at the individual, family and health care system levels (Hirschfeld et al., 1997). At the individual level, failure to treat depression unnecessarily prolongs a modifiable form of suffering and reduces quality of life. At the family level, depression among frail older persons may increase the level of burden and stress experienced by caregivers. At the health care system level, untreated depression may result in increased costs if individuals are unresponsive or non-compliant with treatment in other areas. This can lead to institutionalization of community-based individuals and prolonged stay for nursing home residents. Therefore, the failure to treat depression appropriately can have consequences that affect quality of life, outcomes of service provision and the costs of health care. Indeed, depression without treatment is considered a marker of poor quality of care in nursing home settings (Heston et al., 1992; Phillips, Zimmerman, Bernabei, & Jonsson et al., 1997; Zimmerman et al., 1995).

It is also the case that not every individual showing signs of depressed mood necessarily needs a pharmacological intervention (Ames, 1991). There may be some individuals for whom a psychosocial approach, for

example, may be more appropriate. Some cases of minor depression may not require clinical intervention for their resolution. Therefore, it is not possible to assess the degree of under-utilization simply by identifying all persons with signs of depression who are also not receiving antidepressants. A more useful approach to population level comparisons is to compare rates of antidepressant use in different jurisdictions, in order to establish relative standards of antidepressant use. This approach is used for a number of indicators in quality of care (Karon & Zimmerman, 1996). Cross-national comparisons can be useful in establishing these types of relative comparisons, because they provide a broader context for comparison (Hirdes, Mitchell, Ljunggren, & Schroll, 1999). That is, there may be a relatively low variance in the prevalence of antidepressant use within a country if they are uniformly underutilized. Individual facilities may feel that their performance is appropriate given the performance of peer facilities in their country. However, cross-national comparisons allow for the identification of variance in drug utilization at the health care system level. One might expect greater diversity between countries because of the relative independence of service providers, whereas within countries a higher frequency of interaction among service providers is likely to lead to greater commonalties in practice patterns.

The aim of the present paper is to examine patterns of antidepressant use in long-term care facilities in four countries representing different regions of the world, including North American (Canada), Pacific Rim (Japan), Nordic (Iceland), and former East Bloc (Czech Republic) countries. Data from standardized assessments using the Minimum Data Set (MDS) done in each country are available through the University of Michigan Assessment Archives Project (UMAAP). The rationale for choosing these four countries is that they represent regions likely to differ in culture and, at least to some extent, approaches to service delivery. The MDS was originally developed to serve as a comprehensive clinical assessment of nursing home patients in the United States and to support care plan development in 18 domains through its Resident Assessment Protocols (RAPs). A detailed discussion of the history, development and purpose of the MDS is provided elsewhere (Ikegami, 1995; Morris et al., 1997).

In each of the countries examined, a program of research involving the MDS has been underway for some time as part of the activities of an international consortium of researchers known as inter*RAI*. The MDS is being implemented or used province-wide in two Canadian provinces (Ontario and Saskatchewan), Iceland and regions of Japan. A large-scale study of Resource Utilization Groups (RUG-III) based on MDS data was recently completed in the Czech Republic. Therefore, it is possible to compare patients in each of these countries directly using the same measures from the MDS.

The primary purpose of this study is to determine the degree of cross-national variability in the identification and treatment of depression with

antidepressants. This is an important first step in identifying different practice patterns that may serve as models of care to be emulated by other jurisdictions.

Method

MDS data are obtained through direct assessment of patients by nurses with the aim of identifying social, psychological, and medical needs. The Japanese and Icelandic data are based on the MDS+ (an expanded version of the original MDS) and the Canadian data are based on the more recent MDS 2.0. The Czech data are based only on the MDS items that are used in the RUG-III funding algorithm. Therefore, this four-country analysis is constrained to variables available in the Czech data set, even though a broader range of MDS variables is available in the other countries.

Sample

The Canadian data were obtained through a study of all 14 chronic care hospitals in Metropolitan Toronto providing continuing care services to a predominantly elderly population (n = 929). Chronic care hospitals differ from nursing homes and homes for the aged in Ontario, because they tend to provide services to a more severely disabled and clinically complex population. Chronic hospitals serve about one-seventh of the institutionalized older persons in Ontario. This study was done as part of a hospital restructuring initiative under the mandate of the Metropolitan Toronto District Health Council. A non-proportional stratified random sampling methodology was used to allow for analysis at the facility and regional levels. Although it is possible to apply a sampling weight to individuals in the study in order to make generalizations at the Metropolitan Toronto regional level, these weights are not needed to do cross-national comparisons. The assessments were completed over a two week interval in May 1995 by nurses trained in MDS 2.0. The response rate for the study was approximately 80 per cent and previous analyses suggest non-response had no significant effect on sample representativeness in terms of age or gender distribution.

The Japanese data were obtained from 15 facilities (Ikegami, 1995), primarily for older persons, located in Sapporo and Naie in the northernmost main island of Japan (n = 1,225). The study sites represented the three types of facilities providing long-term care in Japan. Eight sites were hospitals focussed on providing long-term care for older persons, four were "Health Facilities for the Elderly" (the intermediate type of care medical facility first created in 1986), and three were nursing homes in the social service sector. These facilities were part of a validation study of the MDS. Hence, their quality of care should be above the average. The facilities are located in an area where there is a high concentration of long-term care (LTC) hospitals, but the data should be representative of the types of LTC facilities encountered in Japan. It should be noted that the hospitals in this

study are paid the same per diem rate as nursing homes and have a similar case mix, although they have higher nurse and physician staffing levels.

The Icelandic data are population based information derived through MDS+ assessments (n = 1,254). They include all of 11 nursing homes in the greater Reykjavik area in 1994, providing both unskilled and skilled levels of care. This would comprise about half of the institutionalized population of Iceland. However, it should be noted that Reykjavik has a lower rate of institutionalization than the national average for Iceland. The data collection was part of a pilot study in which each person participated on a voluntary basis. Overall, there was a 91 per cent participation rate for the study. Hence, the data can be assumed to be generalizable to the population of nursing home residents in Iceland.

The Czech data are based on a random sample of patients from 18 long-term geriatric facilities that agreed to participate in the project. Nine (out of a possible 70) of these were geriatric and chronic care hospitals/departments (n = 583) and the other nine (out of a possible 250) were residential homes/homes for older persons (n = 579). Residential facilities tend to serve a population with somewhat less disability and lower overall case mix scores compared with hospitals. However, they have similar levels of cases of depression, cognitive impairment and behaviour disturbances. Trained facility nurses and a study nurse completed the assessments using a subset of MDS items. A more detailed description of the study design and sample is available elsewhere (Topinková & Neuwirth, 1999). The original intent of the project was to design a new, uniform funding system based on validated case mix measures to address resource use in different types of continuing care facilities.

It is clear that the sampled facilities used in this cross-national comparison draw from a diverse range of facilities caring for older persons. Some facilities provide relatively light care (e.g., Czech residential homes), whereas others tend to serve relatively more clinically complex, heavy care patients (e.g., Ontario chronic hospitals). Therefore, simple facility-level comparisons of prescribing patterns and depression prevalence rates could be problematic. This concern has been noted elsewhere (Fries et al., 1997) and it is only remediable through the use of individual level data as is done here. That is, one may compare directly the experience of depressed individuals while taking into account differences in age or disability, for example. Carpenter, Challis, Hirdes, Ljunggren, and Bernabei (1999) provide a comprehensive overview of the health care systems, population aging, and policy initiatives in 16 countries, including Canada, Japan, Czech Republic and Iceland. The rates of institutionalization of older persons in these countries range from a low of 3.1 per cent in the Czech Republic to a high of 13 per cent in Iceland.

For each of the study countries, the data analysed were obtained from cross-sectional snapshots rather than as part of normal daily practice. Therefore, the prevalence estimates reported here describe an overview of

all patients in these facilities at one point in time, rather than reflecting their status on admission or during quarterly reassessments done as part of normal daily practice.

Measures

Detailed descriptions of the RAI instrument and item reliability and validity are available elsewhere (Hawes et al., 1995; Morris et al., 1997; Sgadari et al., 1997). Kappa values for inter-rater reliability for diagnosis of depression and bipolar disease in MDS 2.0 were 0.88 and 0.85, respectively (kappa 0.75 is considered excellent inter-rater reliability and 0.45–0.74 is considered adequate). The kappa for antidepressant use was 0.92. Among the 16 mood symptoms in MDS 2.0, all exceeded the minimum cut-offs for acceptable inter-rater reliability and five exceeded the 0.75 level for kappa. These more recent results represent important improvements in the measurement properties of the mood items compared with earlier versions of the MDS (Hawes et al., 1995; Morris et al., 1997).

Antidepressant use was based on the number of days during the last seven that patients received antidepressant medication. The MDS includes a detailed list of antidepressants, including SSRIs, tricyclic antidepressants and lithium. However, the drugs used will differ by country because of regulatory differences (e.g., SSRIs are not approved for use in Japan). This count was dichotomized into a binary variable based on no antidepressant use versus any antidepressant use.

The presence of depression was assessed by a physician's diagnosis of depression or bipolar disease noted in the patient's chart. There were some differences in the approach to recording psychiatric diagnoses on the chart. For the most part, diagnostic information in the four countries is provided by geriatricians, general internists or general practitioners. In the Czech Republic, psychiatrists are responsible for medical diagnosis of depression, but this is rarely formalized on the chart because they are not generally available or called for consultation. It is not possible to determine who made the diagnosis of depression in the Icelandic data, but it can be assumed that the diagnoses were not made by psychiatrists. It is likely that this is also the case in the Canadian data. In Japan, most physicians in long-term care come from an internal medicine background, and very few are psychiatrists.

The RUG-III (Fries et al., 1994) depression algorithm was also used as a behavioural indication of potential depression. In this algorithm, depressed mood is considered to be present when the patient is sad for most of the day in the last two weeks, the mood influences daily routines, and at least two of the following signs are present: tearfulness, restlessness, refusal of food or medication, withdrawal or loss of interest in social activities or personal care, repetitive thoughts of death or suicide, sleep disturbance and somatic complaints. The diagnostic information was then combined with the RUG-III depression measure to comprise a more sensitive measure of the presence of depression. This combined measure was

Table 1
Percentage (and number) distribution of selected sample characteristics

	Canada	*Japan*	*Iceland*	*Czech Republic*	*All Countries*	*Chi-Square; df; p value*
Diagnosis						
• Depression	10.0 (93)	3.5 (44)	18.6 (233)	0.7 (8)	8.2 (378)	
• Other	90.0 (836)	96.5 (1,211)	81.4 (1,021)	99.3 (1,154)	91.8 (4222)	306.8; 3; .0001
Behavioural Signs or Depression Diagnosis						
• Present	21.1(196)	6.2 (78)	22.0 (276)	47.8 (555)	24.0 (1105)	
• None	78.9 (733)	93.8 (1177)	78.0 (978)	52.2 (607)	76.0 (3495)	584.0; 3; .0001
Antidepressant Use						
• Yes	15.6 (145)	4.5 (56)	26.8 (336)	14.0 (163)	15.2 (700)	
• No	84.4 (784)	95.5 (1,199)	73.2 (918)	86.0 (999)	84.8 (3900)	244.2; 3; .0001
Sex						
• Male	39.6 (354)	28.3 (316)	33.0 (413)	25.6 (297)	31.2 (1380)	
• Female	60.4 (539)	71.7 (802)	67.0 (840)	74.4 (1,162)	68.8 (3046)	53.2; 3; .0001

Note: The total *ns* may vary as a result of missing values for some variables. Behavioural signs of depression are based on the RUG-III depression algorithm.

used in the multivariate analyses, since there was some inconsistency in the degree to which diagnosis of depression was noted on patient charts in some countries.

Dummy variables were created to compare the four countries using Canada as a main reference category. Disablement was assessed using the RUG-III ADL measure (Fries et al., 1994), which combines self performance in four functional areas (i.e. eating, transfer, toilet use and bed mobility). RUG-III ADL scores range from 4 to 18 with higher scores indicating higher level of disablement.

Analysis

Bivariate analyses are done to identify variations in prevalence rates of depression and antidepressant use across countries and to identify associations with signs of depression. T-tests are used to evaluate gender differences in age and ADL by country. Chi-square is used to evaluate the statistical significance of tables with categorical values. Odds ratios are also used as an indicator of the extent to which antidepressant use is responsive to the presence or absence of depression. Comparisons of confidence intervals for these odds ratios can be used to identify cross-national differences in responsiveness. Multiple logistic regression models are used to compare the cross-national differences after adjusting for age, sex, depression and disability. Models were derived for the total sample of four countries combined, and stratified models were also used to conduct analyses within countries. The final models were specified by reducing the set of variables to those significant at the .05 level for the combined analyses. In analyses stratified by country, two models include variables slightly in excess of the .05 cutoff. Interaction and curvilinear effects were also assessed, and only those significant at the .05 level of significance are retained. Instead of using automated stepwise procedures, various combination of variables were assessed prior to specification of the final model.

Results

Tables 1 and 2 report the univariate distributions of the variables of interest. There is substantial variation in the prevalence of diagnosed depression across countries. The lowest values are in the Czech Republic and Japan (0.7 and 3.5%, respectively) and the highest values are in Iceland (18.6%), with Canadian values falling in between those extremes (10%). When the information on the diagnosis of depression is combined with the RUG-III depression measure, a great deal of variability persists. The Japanese prevalence continues to be the lowest at 6.2 per cent; however, the Icelandic and Canadian values are much more similar at about 20 per cent. The previously low Czech values increased substantially to 47.8 per cent, more than double the rate of the Canadian and Icelandic data and eight times the rate of Japanese homes. There is also wide variation in the use of antidepressants. Consistent with its pattern of low

Table 2
Distribution of age and RUG-III ADL by sex and country

	Canada		*Japan*		*Iceland*		*Czech Republic*		*All Countries*	
	Mean (SD)	*Median (QI-Q3)*	*Mean (SD)*	*Median (QI-Q3)*	*Mean (SD)*	*Median (QI-Q3)*	*Mean (SD)*	*Median (QI-Q3)*	*Mean (SD)*	*Median (QI-Q3)*
Age										
Male	67.5(22.2)	74(63-81)	79.2(9.5)	81(74-86)	82.9(7.9)	84(77-89)	74.4(12.5)	75(68-84)	76.3(15.3)	79(72-86)
Female	76.4(18.5)	81(71-88)	81.5(8.7)	82(78-87)	84.6(8.0)	86(80-90)	81.5(9.4)	83(76-88)	81.5(11-4)	83(77-88)
Both	72.8(20.5)	78(68-86)	80.8 (9.0)	82(77-86)	84.1(8.0)	85(80-90)	79.7(10.7)	82(74-87)	79.8(13.0)	82(75-88)
T-test (*p* value)	-6.22(.0001)		-3.73(.0002)		-3.63(.0003)		-8.99(.0001)		-11.26(.0001)	
RUG-III ADL										
Male	13.7(4.4)	15(11-17)	8.9(5.3)	4(7-15)	7.4(4.9)	4(4-11)	9.4(5.1)	9(4-14)	9.8(5.5)	9(4-15)
Female	14.6(3.6)	16(14-17)	8.3(5.2)	4(4-13)	8.3(5.2)	6(4-13)	10.4(5.3)	11(4-15)	10.0(5.5)	10(4-16)
Both	14.3(4.0)	16(13-17)	8.3 (5.2)	4(4-13)	8.0(5.1)	4(4-12)	10.1 (5.2)	10(4-14)	9.9(5.5)	10(4-15)
T-test (*p* value)	-3.37(.0008)		1.73(.06)		-3.03(.003)		-2.67 (.008)		-1.31(.19)	

Table 3
Association between presence of any signs of depression and use of antidepressants

	Canada	*Japan*	*Iceland*	*Czech Republic*	*All Countries*
Depressed patients					
• Antidepressant Used	34.7 (68)[a]	30.8 (24)	59.1 (163)	16.2 (90)	31.2 (345)
• No Antidepressant	65.3 (128)	69.2(54)	40.9 (113)	83.8 (465)	68.8 (760)
Antidepressant Users					
• Depression	46.9 (68)	42.9 (24)	48.5 (163)	55.2 (90)	49.3 (345)
• No Depression	53.1 (77)	57.1 (32)	51.5 (173)	44.8 (73)	50.7 (355)
Odds Ratio	4.53	15.9	6.71	1.42	4.02
(95% CL)	(3.10-6.60)	(8.77-28.85)	(5.02-8.98)	(1.02-1.98)	(3.39-4.75)

[a] Values in the first four rows of the table refer to the percentage (number) of patients. Odds ratios are used to reflect the responsiveness of treatment by antidepressants given the presence of indications of depression.

diagnosis and detection of signs of depression, Japan had the lowest prevalence of antidepressant use at 4.5 per cent, whereas Iceland had highest use at about 27 per cent. Somewhat surprisingly, the Canadian and Czech values are relatively comparable even though the Czech rates of diagnosed depression were much lower than the Canadian rate and the Czech rates that include behavioural signs of depression were substantially higher.

Table 2 shows that the majority of patients in each country were female, but the Canadian patients were on average the youngest and the most disabled of the patients in the cross-national sample. This is not surprising considering that the Canadian data are based on chronic hospital patients rather than "nursing home" patients. In most cases, male patients were somewhat younger than female, but the differences in ADL between men and women were less pronounced. The correlation between age and ADL was examined by country and sex (results available on request) and in all cases the association was weak (i.e. p values were generally non-significant). This is not surprising given that admission criteria for long-term care will often decrease heterogeneity across age groups.

Table 3 shows the association of the combined measure of diagnosis and behavioural signs of depression with the use of antidepressants. The more sensitive measure of depression is used for two reasons. First, the low prevalence of diagnosed depression in the Czech data may be anomalous (Czech physicians tend not to record depression as a diagnosis in patient charts) and the broader definition may be more reliable for all four countries. Second, it may be the case that not all antidepressant use is contingent upon the presence of a written diagnosis of depression on the chart. Some clinicians may elect to respond to a set of signs of depression before a psychiatric diagnosis is formalized or physicians may fail to record their diagnoses. Therefore, the broader definition is more appropriate. Table 3 shows that among depressed patients Iceland has the highest prevalence of antidepressant use of the four countries. The Icelandic rate is almost double that of Canada and Japan and almost four times that of the Czech Republic. Indeed, Iceland is the only country where the majority of patients with depression diagnosis or signs of depression receive antidepressant treatment. A somewhat different picture emerges when one examines the users of antidepressants. There is less differentiation within the four countries with respect to the presence of diagnosis or signs of depression among users of antidepressants, and only in the Czech Republic did the majority of antidepressant users show signs of depression. This is not entirely surprising considering that other indications for antidepressant use (e.g., pain management, insomnia) have been identified (Salzman, 1992). An alternative means of describing the association between antidepressant use and depression is to compute an odds ratio for antidepressant use based on the binary depression variable. Table 3 shows that there is a rather weak association between antidepressant use and depression in the

Table 4
Parameter estimates (SE) from multiple logistic regression models for antidepressant use by country

	Canada	*Japan*	*Iceland*	*Czech Republic*	*All Countries*
Diagnosis/Signs of Depression	1.53 (0.20)****	5.33 (0.88)****	1.90 (0.15)****	0.40 (0.17)*	1.75 (0.17)****
Age (10-Year interval)	1.03 (0.29)***	-0.36 (0.15)*	—	—	0.60 (0.20)***
Age^2	-0.01 (0.00)****	—	—	—	-0.01 (0.00)***
Sex	0.38 (0.21)+	1.82 (0.74)*	—	0.36 (0.21)+	0.51 (0.13)****
ADL	-0.08 (0.02)***	—	0.02 (0.01)+	-0.33 (0.17)*	-0.02 (0.01)*
Depression and Sex	—	-3.06 (0.94)***	—	—	-0.46 (0.19)*
Country (ref. Canada)					
• Japan					-1.24 (0.18)****
• Iceland					0.65 (0.14)****
• Czech Republic					-0.71 (0.14)****

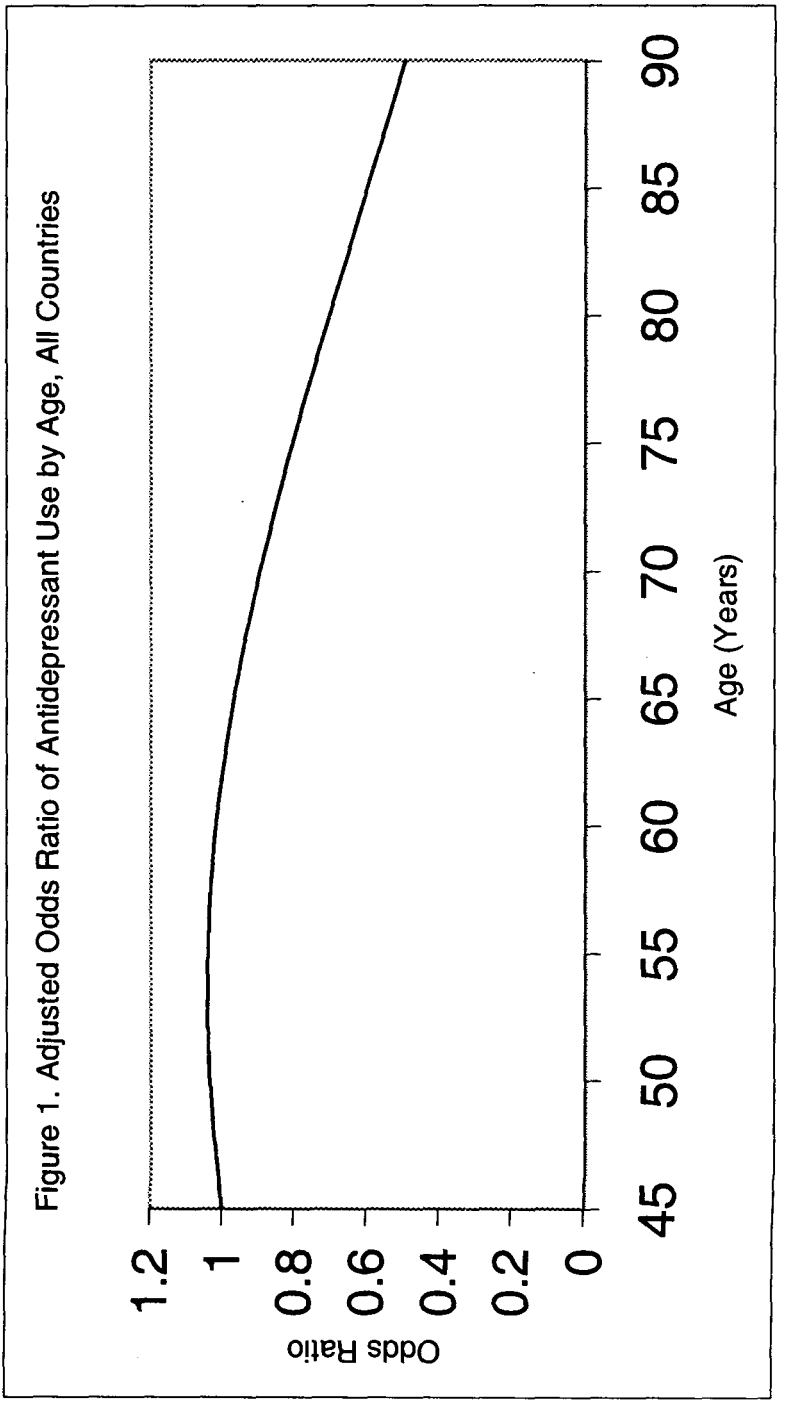
+ - $p < .10$; * - $p < .05$; ** - $p < .01$; *** - $p < .001$; **** - $p < .0001$
Dashed lines indicate the variable was not significant in the final model.

Czech data. That is, patients with a diagnosis or signs of depression are only 1.42 times more likely to receive antidepressants than those with no diagnosis or signs of depression. In contrast, there is a 16-fold difference between those with and without depression in their antidepressant use rates in Japan.

Table 4 reports the multiple logistic regression models for antidepressant use for all four countries combined, as well as stratified models for the four countries. The table reports only parameter estimates and standard errors because the presence of interaction terms and curvilinearity mean that the values of odds ratios are often dependent on a third variable. The aim of this analysis was to determine the nature of the association between the presence of depression and treatment with antidepressants after adjusting for potential confounding factors. For example, if there are biases present that increase or decrease identification of depression (e.g., gender, age), then cross-sectional differences in the prevalence of those factors could obscure findings in the likelihood that depression is identified and treated.

The combined model shows that, after adjusting for a variety of independent variables, antidepressants are least likely to be used in Japan (adjusted OR=0.29) and the Czech Republic (adjusted OR=0.49) and most likely to be used in Iceland(adjusted OR=1.92). In all countries, the presence of a diagnosis or signs of depression is strongly associated with an increased likelihood of antidepressant use. However, there was a significant interaction with gender such that men and women with a diagnosis or signs of depression present are equally likely to receive an antidepressant (OR=5.73 and OR=6.20, respectively), but women with no depression are 1.66 times as likely as men to receive antidepressants. Age has a significant curvilinear association with antidepressant use. Figure 1 shows that the odds ratio for antidepressant use peaks at about age 58 and declines consistently thereafter, so that the projected odds ratio for a 90 year old is approximately 0.50. Finally, higher levels of disability were associated with a slightly lower likelihood of antidepressant use in the all countries model (adjusted OR=0.98 for each one-point increment in the 16-point scale).

The analyses stratified by country show reasonably consistent associations, although some differences are of interest. In all four countries analysed separately, diagnosis or signs of depression were associated with antidepressant use, but the associations were strongest in Japan (adjusted OR=206.4 for depressed males) and weakest in the Czech Republic (adjusted OR=1.49) as noted earlier for the unadjusted analyses (see Table 3). Age was significantly associated with antidepressant use in Canada and Japan only, and the association was reasonably consistent with the all countries model illustrated in Figure 1. However, in Japan the decline in odds of receiving an antidepressant with age was linear (adjusted OR=.70 for each 10-year increment in age) rather than curvilinear. Sex had a



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marginally significant positive main effect so that women were more likely to receive antidepressants in Canada (adjusted OR=1.46) and the Czech Republic (adjusted OR=1.43), but the Japanese data showed a significant interaction with depression, consistent with the interaction for all countries. Higher levels of disability were negatively associated with antidepressant use in Canada and the Czech Republic, and there was a weak positive association in Iceland.

Discussion

Previously published epidemiological data suggested that between 15 and 33 per cent of elderly nursing home residents are clinically depressed and only about half are being treated. One study reported that as many as 69 per cent of depressed nursing home residents receive antidepressants (Conn & Goldman, 1992), but only Iceland approaches that level in these data. Our findings suggest that under-diagnosing and under-treatment are problems in at least some institutional settings.

The present cross-national comparisons show clearly that practice patterns with respect to antidepressant use are not uniform around the world. Moreover, the differences are not explained by cross-national variations in case-mix. Japan tends to be much less likely to identify depression and use antidepressants, whereas Iceland has a higher rate of diagnosis and use of antidepressants. The Czech data are surprising because they show that although signs of depression are widespread and antidepressants are used more commonly than in Japan, their use is not focussed on the treatment of depression.

These variations raise interesting questions with respect to the quality of care provided to depressed patients in these four countries. In the case of the Icelandic data, the majority of patients with depression received antidepressants, whereas this was true only for a small minority of patients in the Czech Republic and about a third of patients in Canada and Japan. In that sense, under-utilization of antidepressants appears to be less of a problem in Iceland than in the other three countries.

The low prevalence of diagnosed depression in the Czech Republic is the result of problems related to record-keeping patterns regarding psychiatric diagnoses. As seen elsewhere, there is evidence of under-diagnosis of depression in community settings (Vinar, 1996) and this carries over to Czech institutions. Psychogeriatricians are rarely available for consultation in these long-term care facilities to confirm a "psychiatric" diagnosis and a geriatrician's diagnosis of depression is typically not formalized on the chart. The discrepancy between diagnoses and behavioural signs of depression probably reflects, at least in part, differences in the ratings of depressive symptoms by nurses and physicians as reported in studies in other countries (Rovner et al., 1991).

It is also somewhat surprising that in all countries many patients with no signs of depression receive antidepressants. Perhaps a substantial number of residents on long-term antidepressant use are in remission from depression. That is, there may be some current users of antidepressants who no longer meet the criteria for depression because of appropriate drug treatment. If the formal diagnosis of depression is no longer on the chart, this type of resident would not be identified as depressed in the MDS. Recently, there has been a trend toward long-term treatment because of high relapse rates. This does beg the question, however, of when a patient previously diagnosed as depressed and no longer manifesting signs of depression should be considered to be "not depressed". There are a number of indications for the use of antidepressants aside from depression (e.g., pain management), but it is somewhat surprising to consider that only *half* the instances of their use are linked to current depression.

The Czech data lend themselves to a relatively straightforward interpretation of under-utilization of antidepressants whether one considers absolute prevalence rates of antidepressant use in depressed patients or the odds ratio in identifying the association between depression and antidepressant use. This is entirely consistent with other reports that show Czech antidepressant use in community settings to be less than one-third of typical rates for Scandinavian countries (Conn & Goldman, 1992). However, the Japanese data are somewhat more problematic because the rate of diagnosed depression and signs of depression are so low. The comparison of the odds ratios implies that the Japanese are particularly responsive to depression; however, those odds ratios are affected strongly by the large cell size of individuals with no depression and no antidepressants.

There are several reasonable explanations for the low rates of depression and antidepressant use in Japan. Indeed, one might argue that the primary issue of concern in Japan is identification of depression rather than treatment once it has been identified. First, the Japanese may be culturally predisposed against experiencing depression (e.g., they may have more effective social support networks). This would mean that the true rate of depression in Japan is indeed low and therefore the need for antidepressant use in Japan would also be low. One Japanese epidemiological study does not suggest a rate dramatically different from other studies (Fujihara, 1995), but a cross-national study of adults aged 18–64 did show rates in some Pacific Rim countries to be lower than in North American and European settings (Weissman et al., 1996). Some alternative explanations could include the failure to detect depression because of problems with the MDS instrumentation in the Japanese context or inadequate assessment of depression among Japanese nurses and physicians. Another explanation may be that depression is present in comparable levels to other countries, but stoicism among Japanese older persons or social stigmas attached to psychiatric illnesses make them less

likely to manifest recognizable signs of depression. Lastly, one cannot rule out absolutely the possibility that other countries are overly responsive to minor mood disorders.

In addition to the cross-national differences reported here, there are a number of other patterns in antidepressant use of interest. For example, women were much more likely to receive antidepressants than men, although this was sometimes contingent on an interaction effect with signs of depression. There is considerable literature on gender differences in prescribing patterns that shows that women are more likely to be recipients of other types of psychotropic medications. This may be the result of women being socialized to show signs of emotional upset, whereas men tend to be socialized to suppress emotional feelings. These differences could also reflect differential responsiveness among physicians to emotional disturbance in women compared with men. There are reports that the prevalence of depression is higher in women (Weissman, 1984), but the sex differentials in antidepressant use here persist after adjusting for diagnosis or behavioural symptoms of depression. Although there were some differences in the percentage of males and females, women comprise the majority of institutional residents in all four countries. In fact, the Canadian data overrepresent males because one of the largest Toronto facilities is a hospital serving exclusively a male veteran population.

The findings on age and disability are of interest because they suggest older and more disabled individuals are less likely to receive antidepressants. This is an important problem because these individuals are the most vulnerable in the long-term care settings and they experience a greater risk of not receiving appropriate treatment when needed. This interpretation would also hold in the case of the antidepressant use for syndromes other than depression such as pain, which is also under-treated in older persons (Bernabei et al., 1998). On the other hand, age differentials in antidepressant prescribing could reflect concerns over heightened problems with adverse consequences of their use (Nolan & O'Malley, 1992; Small et al., 1996) like anticholinergic effects in elderly patients or problems associated with comorbid conditions (e.g., heart disease).

Aside from its application to research of this type, the RAI/MDS is useful because it provides clinicians with valid and reliable information that can be used in a more deliberate application of treatment intervention. Hence, if subsequent more detailed analyses in the Czech Republic show in fact that there are no reasonable grounds for under-utilization of antidepressants in that country, clinicians may begin to target patients using RAI data to match need with antidepressant use. Canadian and Japanese clinicians may wish to undertake detailed reviews to identify why patients that do not have a diagnosis of depression and do not match the RUG-III criteria for depression are receiving antidepressants.

It is nonetheless important to consider the potential roles of different types of bias in this and other cross-national studies. If the comparisons

made here were done at the facility level or based on univariate results only, selection bias (i.e. comparison of different patient types) may have been a problem. However, the present analyses took into account individual level differences and continued to demonstrate cross-national differences in the case of antidepressants after adjusting for age, sex, disability, and presence of depression. Information bias would clearly be a concern when relying on diagnostic information alone, since there are marked differences in recording practices for psychiatric diagnosis. Again, this study benefits from the use of MDS because it employs a common methodology for identification of depression by nurses' observations of patient behaviour. A vigorous program of cross-national psychometric evaluation (Sgadari et al., 1997) is used to ensure good measurement properties for the MDS. That being said, ascertainment bias may be an on-going concern if some nurses are more persistent, diligent or skilled at detecting signs of depression. The best remedy for this concern is the use of thorough clinical training programs for use of the MDS.

There is a clear need for additional research within and between countries. Longitudinal data are needed to be able to understand fully the association between need for antidepressants and their actual utilization. The current cross sectional analyses provide a useful first step in delineating the problem, but longitudinal data will provide a more dynamic picture of changes in patient status and prescribing patterns. For example, it would be helpful to study the timing of identification and initiation of treatment after admission to the facility. It is important to know both *if* antidepressant therapy is used and *when* it is used. It is also important to conduct more detailed analyses of antidepressant use in countries that have a full range of the RAI data. This work must be done to determine what proportion of users of antidepressants with no signs of depression are receiving those medications for appropriate reasons and to examine the implementation of alternative strategies (e.g., use of other psychotropics for symptom management, behavioural therapies). The data available for this study do not provide information on the specific antidepressants used in different countries, but there are likely to be substantial cross-national variations. There is the potential to begin to address this issue by linkage of MDS data with national drug registries, but this capability is available only in a few countries at the moment. It would also be useful to begin to conduct longitudinal cross-national comparisons of outcomes relating to antidepressant use to determine the relative effectiveness of these medications among frail older persons across cultures and across health care systems. Given the widespread consensus that depression is under-detected and undertreated, these results suggest that detection of depression would be improved by the use of instruments like the MDS. The Icelandic experience bears closer scrutiny with respect to mobilizing clinicians to treat depression.

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