Monitoring mental health reform in a Canadian inner city

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Abstract

This ecological study investigated whether the relationship between social disadvantage and hospitalization for psychoses changed during a time of social and economic stressors in an urban setting. Hospital separation rates were compared in the census years 1991 and 1996. Rates were 66% higher in the lowest income areas compared to the richest areas; but this relationship did not change over time. Instead, rates for psychoses increased by about 15% over time. These findings may be due to an increase in the need, a change in the level of resources or in coding practices. As hospital separation data are collected systematically in many countries, they can be used to monitor the progress of mental health reform. Variations in an area may signify that resources need to be redistributed more equitably and/or at a faster pace.

Keywords: Psychotic disorders; Socioeconomic factors; Urban health; Mental health services

Introduction

As hospital separation data are collected systematically in many countries, they can be used to monitor the progress of mental health reform and provide feedback to concerned citizens and funding bodies. This study provides an example of a method to examine changes in hospital separation rates of psychoses over time according to an area-level measure of social disadvantage. In North America, the community mental health care system has been described as ‘defacto’ (Regier et al., 1978, 1993). Inpatient treatment, mainly for psychoses, has absorbed the bulk of mental health care budgets (Randhawa and Riley, 1996). Many communities are engaged in efforts to reform mental health care through shifting resources from inpatient to community-based settings with the philosophy of integrating care to help maintain individuals in their communities. Policies have focused specifically on meeting the needs of the severely mentally ill, in which psychoses predominate (Dorvil, 1997; Durbin et al., 2001; Lin et al., 2002; Narrow et al., 2000). Under ideal conditions, admission rates for psychoses would decrease over time, gradually and consistently in all communities with cost savings as an added benefit (Rothbard et al., 1999). However, well-intentioned plans do not always proceed as expected. Political and economic changes can curb these efforts. Monitoring service use over time using area-level data can be used as...
a tool for health care planners to identify whether some groups are faring better than others and form appropriate responses (Stuart, 2000).

The longstanding relationship between psychiatric admissions and social disadvantage in populations (Faris and Dunham 1939; Jarvis, 1851; White, 1903) has been used to predict the demand for mental health services (Croudale et al., 2000; Jarmen et al., 1992; Lesage et al., 1996; Miller et al., 1986; Stuart, 2000; Tweed and Jackson, 1981). This relationship is most pronounced among those treated for psychoses (Malmström et al., 1999; Dekker et al., 1997b; Harrison et al., 1995; Koppel and McGuffin, 1999) and living in urban areas (Dekker et al., 1997a; Tataryn et al., 1994; Thornicroft et al., 1993). For example, in urban Manitoba, Canada, the treated prevalence of psychoses is 3.15 times greater in the poorest 20% of the population as compared to the richest 20% (Tataryn et al., 1994).

At the individual level, such a difference may be attributed to the downward drift of the mentally ill into poorer areas and/or to the exposure to greater environmental adversity of people living in poorer areas (Dohrenwend et al., 1992; Dohrenwend, 2000). However, whole communities may experience environmental adversity. Economic downturns or social structural changes may lead to an increase in psychiatric admissions (Catalano et al., 1981; Trainor et al., 1986; Kiernan et al., 1989) depending upon the composition and resources of the community (Wandersman and Nation, 1998). Under stress, more advantaged communities may fare better in obtaining additional resources or maintaining their current level of resources. Less advantaged communities may not, and unwittingly experience an increase in psychiatric admissions. Put more simply, this is the ‘squeaky wheel’ hypothesis.

The purpose of this study is, therefore, to investigate whether the relationship between social disadvantage and admissions for psychoses in an urban setting changed during a time of social and economic change. A Canadian setting is advantageous as acute inpatient mental health services are tracked for essentially the full population and universally insured for medical services.

Methods

Study area and time frame

The setting for this study was the south-central portion of Toronto, including the city’s downtown core in Ontario, Canada. This site covers about 127.5 km² (49.2 square miles) with a population of 780,000 in 1996. During the study time frame (1991–1996), communities in Toronto were dealing with a number of social and economic stressors. At the municipal level, Toronto was undergoing amalgamations, and changes in the federal and provincial policies concerning responsibilities for social housing, social services and public health. The demand for affordable housing, particularly for those with low incomes outstripped the supply. Waiting lists for social housing grew along with the demand for hostel beds (Mayor’s Homeless Action Task Force, 1999). Based on policy directives, the number of inpatient beds in provincial psychiatric hospitals has been declining in Ontario potentially placing increased demands on existing acute care beds. In addition, during the study time frame in the Toronto region, the total number of acute care psychiatric beds staffed dropped by about 16% (The Ontario Ministry of Health and Long-Term Care, 2000). Also, beginning in October 1995, policies concerning welfare payments, family benefits, disability and unemployment insurance were implemented which effectively reduced one’s eligibility for public assistance or the absolute amount available.

Study design/unit of analyses

This is an ecological study in which the number of hospitalizations for psychoses within different populations were compared over time. Each population or unit of analysis was defined by its underlying age (20–44 and 45–64 years) and sex structure and level of social disadvantage according to 1991 and 1996 census data. This study was approved by the University of Toronto and Sunnybrook and Women’s College Hospital research ethics boards.

Social disadvantage

We selected one indicator of social disadvantage, the mean area level of household income as in previous Canadian studies (Mustard et al., 1996, 1997; Tataryn et al., 1994). In studies of psychiatric hospitalizations, social and economic area-level indicators tend to be highly correlated. Single measures have been found to perform as well or better than summary indices in predicting psychiatric hospitalizations (Boardman et al., 1997; Cotgrove et al., 1991; Kammerling and O’Connor, 1993; Koppel and McGuffin, 1999; Thornicroft, 1991).

Information about household income was drawn from the respondents to the 1996 census from the 2B census questionnaire for those living together in private dwellings and over 15 years of age. We created income quintiles based upon the mean household income according to census tract (CT) (Statistics Canada, 2000). In the study area, there were 176 CTs. Three CTs were excluded due to: small populations (<40); CTs in which the underlying population was largely institutional; and where the non-response to household income exceeded 24.9%. See Table 1 for a summary of characteristics of the CTs by income quintile.
Separations for psychoses

The number of separations that occurred within each of the populations in 1991 and 1996 were obtained from the Canadian Institute for Health Information (CIHI). CIHI collects discharge data for all acute care hospitals in the province of Ontario. These data contain the age, sex and residential characteristics of all individuals hospitalized according to ICD-9 diagnoses. ICD-9 mental disorders which accounted for the majority of the hospital length of stay were identified and classified in terms of the presence of psychoses. We grouped separations for psychoses as either: schizophrenia related (ICD-9: 295, 297–299) or affective (ICD-9: 296). Postal codes in CIHI were used to identify each individual who was discharged and lived in one of the study CTs, regardless of where the hospitalization took place. The 1996 postal code conversion file was used to assign an individual hospitalization to a CT (Wilkins, 1993). About 99% of CTs remained in the same income quintile between 1991 and 1996.

Statistical analyses

For descriptive purposes, crude and specific rates were compared for 1991 and 1996. To assess whether separation rates for psychoses remained constant over time, we conducted bivariate and multivariate analyses using Poisson regression for grouped data (Breslow and Day, 1987).

To correct for over dispersion in the Poisson models, we included a dispersion term (Agresti, 1990). In the multivariate analyses, a full model with main effects and all two-way interaction terms with year was initially fit. Statistical significance was set at an alpha level of 0.05. To depict the magnitude of significant relationships, rate ratios and corresponding 95% intervals were calculated from the model regression coefficients.

Results

Bivariate results

In 1991, the crude separation rate was 3.5/1000 compared to 4.3/1000 in 1996 indicating a 22.9% increase over time. The corresponding rate ratio and 95% confidence interval was 1.23 (1.16; 1.31). Age, sex and type of psychoses specific rates, corresponding rate ratios and 95% confidence intervals are shown in Table 2. Rates appeared to increase in all the subgroups shown except for those living in the highest income quintile. A decrease in rates was observed in those aged 45–64 years of age.

Multivariate results

The adjusted rate ratios and 95% confidence intervals based on the multivariate model are shown in Table 3. Once the effects of age, sex and type of psychoses were taken into account, an increase in rates over time was no longer evident according to income quintile. Instead, the relationship remained constant over time. Separation rates were 66% higher in the poorest area (Q1) compared to the richest area (Q5), RR: 1.66 (1.44; 1.91). Separations for psychoses were 25% more common in women than men, RR: 1.25 (1.15; 1.37). The results for age and type of psychoses are shown in Table 3. There was a statistically significant interaction between age and type of psychoses and between age and time. The rate ratios indicate that the rates for schizophrenia were always higher than affective psychoses. However, variations occurred by age and time. Rates were higher among younger age groups and in 1996 compared to 1991. The most obvious contrast is between schizophrenia-related psychoses, aged 20–44 in 1996 compared to affective psychoses, aged 45–64 in 1991. Rates were 4.5 times higher in the former than in the latter group. The last column of the table and Fig. 1 depict the changes in rates over time in each of the groups. Increases occurred in all groups. The increase

### Table 1

Population values for social and demographic factors by census tract by household income quintile, 1996

<table>
<thead>
<tr>
<th>Income quintiles</th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean household income ($)</td>
<td>35,751</td>
<td>40,911</td>
<td>46,949</td>
<td>54,224</td>
<td>85,743</td>
</tr>
<tr>
<td>Number of CTs</td>
<td>27</td>
<td>34</td>
<td>34</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Separation rate for psychoses per 1000</td>
<td>5.4</td>
<td>4.9</td>
<td>3.8</td>
<td>4.4</td>
<td>3.0</td>
</tr>
<tr>
<td>Study population</td>
<td>103,544</td>
<td>8625</td>
<td>105,205</td>
<td>110,315</td>
<td>108,025</td>
</tr>
<tr>
<td>% Female</td>
<td>51.7</td>
<td>50.4</td>
<td>49.5</td>
<td>52</td>
<td>53.2</td>
</tr>
<tr>
<td>% 20–44 years of age</td>
<td>48.7</td>
<td>46.8</td>
<td>49.3</td>
<td>47.0</td>
<td>42.0</td>
</tr>
<tr>
<td>% 45–64 years of age</td>
<td>20.4</td>
<td>20.6</td>
<td>21.6</td>
<td>23.1</td>
<td>25.5</td>
</tr>
</tbody>
</table>

*Three CTs were completely suppressed and therefore not included in the table.*
for schizophrenia-related psychoses were 13.5% and 16.1% for affective psychoses, slightly lower than found with the crude separation rates.

Discussion

This study found that the relationship between social disadvantage and acute care separations for psychoses in an urban setting did not change during a time of a number of social and economic pressures. Instead, hospital separation rates for psychoses increased by about 15% over time. In terms of absolute numbers, rates were highest among 20–44 year olds with schizophrenia-related psychoses in 1996.

Hospital separation data are routinely collected and of unknown validity. Previous work in Canada indicated that hospital separation data concerning psychoses were more consistent with chart-based records than other diagnoses (Rawson et al., 1997; Robinson and Tataryn, 1997). In addition, compared to other mental disorders, psychoses as a construct were predictive of greater service use (Mustard et al., 1996; Tataryn et al., 1994). Given the longstanding positive relationship between ecological measures of social disadvantage and psychiatric admissions, it seems unlikely that the direction of this relationship was mis-specified. Instead, the magnitude of this relationship may be attenuated due to the exclusion of persons living in collective dwellings as opposed to private dwellings and hospital separations from provincial psychiatric hospitals.

There are several possible reasons why hospital separations for psychoses increased over time but not according to the level of social advantage. Changes in housing and financial circumstances may have affected these individuals in their ability to manage their illness precipitating the need for a hospital admission. It is also possible that vulnerable people migrated into low-income areas. As they would only make up a small proportion of the communities in which they live, though, changes in their illness and need for hospitalization may not have been appreciated and prompted action that would alter the constant excess in poor neighbourhoods. For example, multiple admissions by a few persons, while costly, would probably not generate a public outcry for extra community-based resources. Also, if acute care beds in the poorer areas were at full complement, some of the wealthier communities may have shouldered these admissions offsetting the need for additional resources in poorer areas.

Alternatively, the increased rates observed may not have been due to people getting sicker or sicker people migrating into these areas but due to a shift in resources. Although 85% of separations for mental disorders are from acute care settings, the proportion of separations for schizophrenia is higher in provincial psychiatric hospitals.


Table 2
Hospital separation rates for psychoses per 1000 and crude rate ratios by time period

<table>
<thead>
<tr>
<th>Sex</th>
<th>1991</th>
<th>1996</th>
<th>Crude rate ratios (95% CIs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>3.23</td>
<td>3.94</td>
<td>1.22 (1.11; 1.35)</td>
</tr>
<tr>
<td>Women</td>
<td>3.74</td>
<td>4.68</td>
<td>1.25 (1.15; 1.35)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20–44</td>
<td>3.37</td>
<td>5.02</td>
<td>1.49 (1.38; 1.62)</td>
</tr>
<tr>
<td>45–64</td>
<td>3.79</td>
<td>2.68</td>
<td>0.71 (0.67; 0.76)</td>
</tr>
<tr>
<td>Income quintile</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>4.08</td>
<td>5.4</td>
<td>1.32 (1.16; 1.51)</td>
</tr>
<tr>
<td>Q2</td>
<td>4.0</td>
<td>4.91</td>
<td>1.24 (1.10; 1.41)</td>
</tr>
<tr>
<td>Q3</td>
<td>2.96</td>
<td>3.82</td>
<td>1.29 (1.11; 1.50)</td>
</tr>
<tr>
<td>Q4</td>
<td>3.76</td>
<td>4.43</td>
<td>1.18 (1.02; 1.37)</td>
</tr>
<tr>
<td>Q5</td>
<td>2.67</td>
<td>3.03</td>
<td>1.13 (0.96; 1.33)</td>
</tr>
<tr>
<td>Type of psychoses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schizophrenia related</td>
<td>2.66</td>
<td>3.12</td>
<td>1.17 (1.04; 1.34)</td>
</tr>
<tr>
<td>Affective</td>
<td>0.83</td>
<td>1.20</td>
<td>1.45 (1.29; 1.64)</td>
</tr>
</tbody>
</table>

Table 3
Adjusted rate ratios of hospital separations for psychoses over time

<table>
<thead>
<tr>
<th>Regression coefficient</th>
<th>Rate ratio</th>
<th>% Difference between years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizophrenia related, 20–44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>1.44</td>
<td>4.22</td>
</tr>
<tr>
<td>1996</td>
<td>1.50</td>
<td>4.50</td>
</tr>
<tr>
<td>Schizophrenia related, 45–64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>0.78</td>
<td>2.18</td>
</tr>
<tr>
<td>1996</td>
<td>0.84</td>
<td>2.32</td>
</tr>
<tr>
<td>Affective, 45–64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>−1.44</td>
<td>0.24</td>
</tr>
<tr>
<td>1996</td>
<td>−1.50</td>
<td>0.22</td>
</tr>
<tr>
<td>Affective, 20–44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>−0.78</td>
<td>0.46</td>
</tr>
<tr>
<td>1996</td>
<td>−0.84</td>
<td>0.43</td>
</tr>
</tbody>
</table>

*Each regression coefficient is the natural log of the hospital separation rate for the type of psychoses compared to its reference category. For example, the regression coefficient for schizophrenia-related psychoses in those aged 20–44 in 1996 is 1.50 in comparison to its reference category, affective psychoses among those aged 45–64 in 1991. Exponentiation of the regression coefficient yields a rate ratio of 4.50. In contrast, the regression coefficient for affective psychoses in 45–64 year olds in 1996 compared to those with schizophrenia-related psychoses in those aged 20–44 is −1.50 and the corresponding rate ratio is the reciprocal of 4.5.
hospital settings than in acute care settings (Randhawa and Riley, 1996). Accordingly, the closing of provincial psychiatric hospital beds concomitant with a shortage of affordable housing may have placed increased demands on acute care beds. While an urban increase seems unusual given there have been steady decreases in acute care separation rates for mental disorders overall (Statistics Canada, 2001), persons living with psychoses tend to be more concentrated in urban areas (Thornicroft et al., 1993). Thus, it is plausible that increases may not have been captured in urban areas. Even though separation rates are declining overall, costs may not. Unbeknownst to planners, higher rates in some areas may maintain or increase overall costs, especially if persons require longer lengths of stay.

Finally, some of the increase may be due to artifact. Financial incentives may have encouraged hospitals to ‘upcode’ separations for less severe mental illness to psychoses. Hospitals receive global funding from the provincial ministry of health according to a formula which incorporates the severity of the cases seen. Between 1991 and 1996 there were substantial changes in the grouping methodology (case mix groups or CMGs). In 1991, there were 13 mental health CMGs and 34 in 1996. These changes would have permitted more options for coding. If ‘upcoding’ did occur, though, it may have been in response to a greater need coupled with a shortage of beds and suitable housing. Women may have been particularly vulnerable.

In sum, a population-based method to track changes in separations for psychoses over time can offer valuable feedback to health care planners. Changes over time may be due to an increase in need, a change in the resources or in coding practices. Variations in areas may signify that resources need to be redistributed more equitably and/or at a faster pace.

References


