

CATCHMENT AREA DEMOGRAPHIC CHARACTERISTICS AND RATES OF STATE PSYCHIATRIC HOSPITALIZATION

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ABSTRACT: This study examines selected demographic characteristics for their associations with rates of state psychiatric hospitalization for each catchment area in Massachusetts. The extent of poverty in each catchment area explains much of the variability in admissions. State planners interested in reducing reliance upon state hospitals should give more attention to catchment area social indicators.

The literature is replete with studies that evaluate the effectiveness of mental health programs in keeping clients out of psychiatric hospitals. Little attention, however, is given to the impact that the demographic characteristics of catchment areas may have upon rates of hospitalization. Data of this type should receive more attention by researchers and planners (Peterson, 1987) because of the increasing recognition that the demand for mental health services is in part a function of social forces. (Lindsey, Paul, & Mariotto, 1989)

This exploratory study examines selected demographic characteristics for their associations with rates of state psychiatric hospitalization for each catchment area in Massachusetts. If this approach is found to be successful, planners at the state level could better anticipate the impacts of socioeconomic phenomena upon demand for psychiatric hospitalization.

REVIEW OF THE LITERATURE

Demography and Mental Illness

Social indicators have been shown in several pilot studies to be useful in need assessments conducted at the metropolitan or county level (Bell, 1982). These

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data provide planners an empirical basis for predicting service demand (Zautra & Simons, 1978) and for developing both intervention (Eaton, 1981) and prevention (O'Connell & Mayo, 1988) strategies. Although these data imply neither absolute necessity nor sufficiency in the causal chain, they indicate that the cause operates in a large enough proportion of cases to make intervention worthwhile (Eaton, 1981).

The Health Demographic Profile System's Inventory of Small Area Social Indicators identifies 175 demographic characteristics that may be associated with the increased incidence of physical and mental disorders (Goldsmith, 1984). Twenty-nine of these demographic characteristics are considered to be high risk indicators. Unfortunately few mental health professionals are aware of and use this relatively simple tool developed by the National Institute of Mental Health for need assessment (Wellington, 1982).

Jackson et al. (1982) reports using census tract social indicators within a county to explain differences in each census tract's rate of demand for psychiatric services. Using this approach he finds across census tracts that 67% of the variance in contacts with mental health professionals is explained by the percent of families in poverty, while median family income explains 47% of the variability. The percent black explains 28% of the variance in contacts and the percent of the population that recently moved explains 58%. The ratio of elderly to non-elderly explains 12% of the variance. On the basis of these and similar findings he concludes that social indicators can be successfully used to develop a statistical model to predict the rate of demand for psychiatric services.

Using conventional survey analysis, other authors also stress the importance of demography. Income is associated with both the incidence of mental illness and the demand for services (Jackson et al., 1982; Longest, Kovan, & Tweed, 1979; White, 1986). Numerous studies indicate that race may be related to the incidence and prevalence of mental illness and the need for public hospitalization (Bulhan, 1985; Lindsay, Paul, & Mariotto, 1989; Longest, Kovan, & Tweed, 1979; Rabkin, 1979; Robins et al., 1984; Rosenblatt & Mayer, 1974; Solomon, Gordon, & Davis, 1984; Sue, McKinnery, Allen, & Hall, 1974). Mental disorders and rates of hospitalization are also associated with place of residence (Eaton, 1981; Robins et al., 1984) and residential mobility (Appleby & Desai, 1987; Longest, Kovan, & Tweed, 1979). Age and widowhood may additionally be related to the incidence of mental illness and the demand for hospitalization (Bulhan, 1985; Green, 1988; Longest, Kovan, & Tweed, 1979; Milazzo-Sayre, Benson, Rosenstein, & Manderscheid, 1987; Rosenblatt and Mayer, 1974; Solomon, Gordon, & Davis, 1984).

Measures of Hospital Utilization

Hospitalization rates are commonly used as criteria for evaluating mental health programs; however, some authors (Erickson & Paige, 1973; Solomon & Doll, 1979) disagree with the validity of this approach. The methodological

characteristics of reliability and ease of quantification undoubtedly contribute to the common use of recidivism as a criterion in program evaluation studies (Rosenblatt & Mayer, 1974).

When using hospitalization rates as indicators of program success, Lerman (1982) cautions that measures for both admissions to and retention in institutions should be included. He believes that average daily census counts are incomplete indicators of institutional use. Lerman also recommends that a distinction be made between public and private hospitalization because of the different trends in their utilization.

METHODS

Attkisson and Broskowski (1981) have developed a concept of evaluation at the substate level, which is the unit of analysis in this study. They consider it ideally suited for the analysis of utilization patterns and social factors that are difficult to address at the state-level. Consistent with Attkisson's and Broskowski's framework, the 40 mental health catchment areas in Massachusetts are the units of analysis for this study.

Selected demographic characteristics for each catchment area are examined. The data set (Massachusetts Department of Mental Health, 1984) used consists of 12 demographic variables, which have been reduced through correlation analysis to seven: the percent white; the percent living in communities with populations less than 2,500; the percent age 65 and older; the per capita income for persons age 15 and older; the percent living in poverty; the percent widowed; and the percent living in the same house for five years or longer. Four measures of hospital utilization per 100,000 population are examined for each catchment area: total admissions; readmissions in less than one year after discharge; first admissions; and average daily census (Massachusetts Department of Mental Health, 1984).

Demographic data are available for 1980, whereas utilization data are available for fiscal year 1984. Greater concurrence in these two data sets would have been preferable. The validity of this type of research can be threatened if several years intervene between the census and service utilization periods (Rosen, 1982).

The stepwise multiple regression procedure is used to explore the differential impacts of variability in these catchment area demographic characteristics upon rates of state hospital admissions and census. This procedure selects for the regression of each measure of hospitalization those demographic characteristics that are statistically most related. A confidence interval of .95 probability is selected for this analysis. The beta weights (BETA WT), coefficients of multiple determination (R^2), coefficients of multiple correlation (R), F-ratios, degrees of freedom (df) and probabilities of chance (P) are presented for each regression (see tables).

Rates of Psychiatric Hospitalization

Rates of state psychiatric hospitalization per 100,000 population vary greatly for the 40 catchment areas in Massachusetts. The mean (M) total admissions per month for each catchment area is 15.75 with a standard deviation (SD) of 10.37. First admissions average 6.09 (SD 4.34) and the mean readmissions within one year after discharge is 7.07 (SD 6.49). The average daily census is 39 (SD 15).

Demographic Characteristics

Massachusetts residents are predominantly white (M 92.67, SD 13.51), although the percent white for the mental health catchment areas ranges from 37% to 99%. The poverty rate is 10% (SD 2.46) and the per capita income is \$7,402 (SD \$1,110). The percent rural ranges from 0% to 67% (M 16.56%, SD 18.61%). Most residents have remained in their residences for five years or longer (M 60.19, SD 7.35). Thirteen percent are elderly (SD 2.55) and 9% are widowed (SD 2.46).

RESULTS

Total Admissions, Readmissions and First Admissions

The stepwise multiple regression procedure selects poverty in each of the three different analyses of total admissions, readmissions and first admissions to state psychiatric hospitals. Knowledge of the poverty rate in each catchment area explains 56% of the variability in total admissions (Table 1), 52% of the variance in readmissions (Table 2), and 45% of the variance in first admissions

Table 1
Regression Statistics for Demographic Variables and Total Admissions

<i>Variables Selected</i>	<i>Beta WT</i>	<i>R²</i>	<i>R</i>	<i>F Ratio</i>	<i>df</i>	<i>P</i>
Poverty	0.75	0.56	0.75	48.07	1 & 38	0.00

Table 2
Regression Statistics for Demographic Variables
and Readmission < 1 Year After Discharge

<i>Variables Selected</i>	<i>Beta WT</i>	<i>R²</i>	<i>R</i>	<i>F Ratio</i>	<i>df</i>	<i>P</i>
Poverty	0.72	0.52	0.72	41.08	1 & 38	0.00

(Table 3). When catchment area poverty rates are known, the inclusion of the other demographic data does not add to the variance that can be explained. The higher the catchment area poverty rate, the higher the rate of total admissions, readmissions and first admissions.

Average Daily Census

The percent white is the only demographic variable selected for the regression equation to predict average daily census (Table 4). It explains 20% of the variance in average daily census. No other demographic variable meets the significance test for inclusion. The data for this sample show that the higher the percent non-white in each catchment area, the higher the average daily census.

DISCUSSION

Poverty is found to be a strong predictor of admission rates. High rates of poverty within catchment areas are associated with high rates of total admissions, first admissions and readmissions within one year of discharge. These relationships between poverty and state hospital admissions are consistent with the association between poverty and demand for mental health services that Jackson (1982) reports.

In attempting to understand the connection between poverty and state hospital utilization, it is important to realize that other demographic variables are also associated with poverty in this study. The following six catchment area characteristics are strongly related ($p < .05$) to poverty: percent white ($R = -0.80$); percent of female headed households ($R = 0.89$); percent of one person headed households ($R = 0.78$); and percent divorced ($R = 0.68$). Hence, persons most likely to be in poverty are those who are non-white, unemployed and

Table 3
Regression Statistics for Demographic Variables and First Admissions

<i>Variables Selected</i>	<i>Beta WT</i>	<i>R²</i>	<i>R</i>	<i>F Ratio</i>	<i>df</i>	<i>P</i>
Poverty	0.67	0.45	0.67	31.59	1 & 38	0.00

Table 4
Regression Statistics for Demographic Variables and Average Daily Census

<i>Variables Selected</i>	<i>Beta WT</i>	<i>R²</i>	<i>R</i>	<i>F Ratio</i>	<i>df</i>	<i>P</i>
White	-0.45	0.20	0.45	9.48	1 & 38	0.00

members of single parent, female-headed households. The percent in poverty is also associated with recent movers ($R\ 0.31$) and the percent living in non-rural areas ($R\ 0.31$).

Numerous studies have indicated that these social traits are associated with stress (Brown, Bhrolehain, & Harris, 1975; Lindblad-Goldberg, Dukes, & Lasley, 1988; Makosky, 1982; McLanahan, 1983; Miller, 1988). Persons in poverty may have fewer resources and fewer choices to prevent or help combat these stresses. Those with higher per capita income may be able to afford and even prefer private instead of public care (White, 1986).

The percent white is related to lower rates of average daily census. This finding is consistent with that of Jackson's (1982) study of psychiatric episodes using social indicators and that of other researchers using different approaches (Brown, Bhrolehain, & Harris, 1975; Lindsey, Paul, & Mariotto, 1989; Meinhardt, 1987). Areas with a high percent white may have lower average daily census because of their populations' abundance of resources for reducing stress, diverting admissions, and expediting discharges. Support for this explanation is derived from the strong inverse correlation found in this study between the variables for white and poverty ($R\ -0.80$, $p > .05$).

The relationship between the percent non-white and average daily census may also be related to the finding that blacks are more often diagnosed as schizophrenic at the time of admission and more frequently received guarded prognoses at the time of discharge (Solomon, 1988). These labelling phenomena may result in blacks having disproportionately high admissions because of their initial diagnoses and longer stays because of their poor prognoses. Higher admissions and longer lengths of stay for non-whites could in this way explain their higher rates of average daily census.

Widowhood, rural residence, being elderly and per capita income are not selected by any of the four stepwise regressions performed in this study. This observation is in part a function of the stepwise technique. Some relationships do exist, but they are not as robust as those for the demographic variables selected. Per capita income correlates at the 95% or greater confidence interval with lower readmissions ($R\ -0.33$) and lower first admissions ($R\ -0.35$).

CONCLUSION

Catchment area demographic characteristics are differentially associated with the rates of utilization for Massachusetts state psychiatric hospitals. These findings have implications for the differential planning of mental health services at the state level. The feasibility of using the approach presented here is enhanced by its reliance upon only a few social indicators, all of which are customarily available to state planners. This information may also allow for a better understanding of differences in hospitalization rates perhaps found during routine quality assurance and evaluation activities.

A sample size of 40 is small for the statistical analyses that have been conducted. Caution should, therefore, be exercised in generalizing the findings to other samples. All relationships studied are limited to state psychiatric hospitals that serve predominantly adult populations.

This study and other exploratory research using similar approaches have not controlled for catchment area differences in mental health funding and management strategies. These are factors that are related to the overall performance of mental health agencies (Jerrell & Jerrell, 1985); hence they may also be related to hospitalization performance. Future social indicator research should control for these factors.

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