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Regional supply of outreach service and length of stay in psychiatric hospital among patients with schizophrenia: National case mix data analysis in Japan

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ABSTRACT

Several clinical trials have demonstrated that linkage to an outreach service can prevent prolonged length of stay of patients at psychiatric hospitals. However, there has been no investigation of the association between length of stay in psychiatric hospital and regional supply of outreach services using national case mix data. The aim of this study was to clarify the relationship between length of stay in psychiatric hospital and regional supply of outreach services. We used data from the National Patient Survey in Japan, a nationally representative cross-sectional survey of inpatient care conducted every three years from 1996 to 2014. Data from 42,268 patients with schizophrenia who had been admitted to psychiatric hospitals were analyzed. After controlling for patient and regional characteristics, patients in regions with fewer number of visits for psychiatric nursing care at home had significantly longer length of stay in psychiatric hospitals. This finding implies that enhancement of the regional supply of outreach services would prevent prolonged length of stay in psychiatric hospitals.

1. Introduction

"To provide comprehensive, integrated and responsive mental health and social care services in community-based settings" is one of the objectives of the Mental Health Action Plan 2013–2020 (World Health Organization, 2013). To achieve this philosophy, there has been a move in many western countries towards community based mental health services as opposed to hospital based care (Alwan et al., 2008; Kroneman and Siegers, 2004; Ravelli, 2006). However, even in some developed countries, the mental health service conversion has not progressed well (Appleby et al., 1993; Chung, 2010). For example, in Japan, several patients have remained in psychiatric hospitals due to the lack of community-based services: there were 71.6 thousand patients as of October 1999, and 53.2 thousand patients as of October 2014 (Ministry of Health, Labour and Welfare, 2014, Summary of patient survey).

Prolonged length of stay (hereafter referred to as LOS) in psychiatric hospitals has led to serious clinical repercussions for patients and made it difficult for them to return to the community (Babalola et al., 2014; Johnstone and Zolese, 1999; Oshima et al., 2003; Shumway et al., 2012). Psychiatric admission also causes serious stigma for the patient (Tulloch et al., 2011). In addition, pressure due to costs associated with psychiatric treatment in hospitals has resulted in a socio-economic burden (Chung, 2010; Sado et al., 2013). Therefore, it is important to clarify how to prevent prolonged hospitalization and to prepare appropriate services in the community (Badriah et al., 2013; Oshima et al., 2007; Ravelli, 2006; Thornicroft and Tansella, 2013).

A review of clinical trials has shown that linkage to outreach services can prevent prolonged LOS of psychiatric inpatients (Burns et al., 2007; Dieterich et al., 2010; Tulloch et al., 2015; Wheeler et al., 2015). However, there has been no examination of the association between LOS in psychiatric hospitals and the regional supply of outreach services (Pauselli et al., 2017; Tulloch et al., 2011; Wheeler et al., 2015). In Japan, since 2004, mental health policy has shifted from hospital to community based services by enhancing outreach services, primarily through the establishment of nursing care at homes in community settings. These trends were caused by the social and structural background, wherein much of the psychiatric care after patient discharge was offered to outpatients, and facilities providing medical services and welfare services were not integrated. Psychiatric nursing care at home plays an important role as a medical service supporting patients' community living (Kayama et al., 2014; Tachimori et al., 2015).

To examine the direction of these policies, it is necessary to investigate the allocation of resources from a regional perspective. Therefore, the aim of this study was to clarify the relationship between LOS in psychiatric hospitals and regional supply of outreach services, using national case mix data.

We hypothesized that a shorter LOS in psychiatric hospitals would

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be associated with increased regional supply of psychiatric nursing care at home.

2. Methods

2.1. Design

The present study used data from the National Patient Survey, which is a nationally representative cross-sectional survey of hospital services under the public healthcare insurance program. A detailed description of the National Patient Survey has been reported elsewhere (Ministry of Health, Labour and Welfare, 2014).

2.2. Setting

The National Patient Survey is conducted by the Ministry of Health, Labour and Welfare every three years and comprises surveys of inpatients, outpatients, and discharged patients. For the current study, we used discharge information from the databases of patients with schizophrenia who had been admitted to psychiatric hospitals between 1996 and 2014, because this period covered the introduction of a new national mental health vision involving a conversion from psychiatric hospitals to community treatment (Tachimori et al., 2015). Permission was obtained from the Ministry of Health, Labour and Welfare to access the National Patient Survey data during the study period.

The National Patient Survey used a two-stage stratified random sampling procedure; first, 76% of all hospitals were selected; second, a sample of discharged patients was selected from the chosen hospitals. The managing director of each hospital was asked to rate the patients discharged on one designated date set for the hospital, which was one of three days from October 21–23. The discharged patients were then surveyed for a month from September 1–30.

2.3. Participants

In this study, we targeted schizophrenia, which was defined as disorders coded as F20-29 in the International Classification of Diseases and Related Health Problems, 10th Revision (ICD-10), because patients with this disorder comprise a large portion of hospitalized patients and have a strong influence on the average length of hospital stay (Thompson et al., 2004).

A total of 43,329 questionnaires were collected from patients of 641 psychiatric hospitals during the study period. Before the analysis was conducted, 1061 cases were eliminated. First, because the questionnaire as designed could not be completed by those aged over 99 years, we excluded 111 such patients. Next, 950 cases with missing values were excluded. Ultimately, 42,268 patients with complete information from 640 psychiatric hospitals were included in the analysis.

2.4. Measurements

The National Patient Survey consists of questions about patient characteristics. We collected data on the following: primary disease, age, sex, LOS, previous place of care, and whether the patient was receiving public assistance. The Japanese public assistance program provides social benefits to persons who suffer from destitute, in accordance with their needs in daily life. Therefore, coverage by public assistance was used as a measure of financial burden.

Primary disease was classified based on the ICD-10 codes. Discharge destination was divided into four categories: home, facility, hospital, and death. The facility category included permanent nursing homes, geriatric intermediate care facilities, group homes, and other care settings.

In order to understand the regional environment of the patients' residence, we collected data about the following regional variables. Regional characteristics of patient residence were derived from national statistics on health and social care services from (available at the Portal Site of Official Statistics of Japan, e-Stat: http://www.e-stat.go.jp/SG1/estat/eStatTopPortalE.do) the Survey of Medical Institutions.

Regional data were obtained by summing municipal data for each of the following variables: number of visits for psychiatric nursing care at home, available psychiatric hospital beds per 1000 individuals in a region as of October 1 (derived from the Survey of Medical Institutions). The total population as of March 31 of each year was derived from the Basic Resident Register and Population (Ministry of Internal Affairs and Communications). The allocation of healthcare resources is planned on the basis of health regions (called “the secondary tier of medical care”) by the prefectural government, which usually includes multiple municipalities. During the study period, the number of municipalities decreased from 3252 to 1741 because of a municipal merger. Boundaries of health regions were revised according to the municipal merger. Therefore, each variable was calculated based on the boundary of municipalities and health regions as of October 1 in the corresponding year.

2.5. Ethical considerations

Returning the completed survey implied consent; therefore, hospitals were not required to obtain signed consent forms. To preserve respondent anonymity, identification numbers were assigned to hospitals and patients. The study was approved by the Ethics Review Board of the Tokyo Metropolitan Institute of Medical Science (15-4).

2.6. Data analysis

We used the LOS as a dependent variable. The average LOS of the patients was 637.6 (range 1–20775) days. The median LOS (79/80 days) was used as a cut off point for control and prolonged LOS.

Discharge year was divided into two groups: those discharged prior to 2004 (discharge years 1996, 1999, 2002) and those discharged after 2004 (discharge years 2005, 2008, 2011, 2014). Regional characteristics, such as number of visits for psychiatric nursing care at home and number of available psychiatric hospital beds by region, were divided into 3 categories using the 25th and 75th percentiles.

Logistic regression analysis was performed using LOS in the psychiatric hospital as the dependent variable and number of visits for psychiatric nursing care at home as the independent variable. Patient gender, age, discharge destination, discharge year, and number of psychiatric hospital beds were also included as independent variables. Baseline variables with $p < 0.05$ in univariate analysis were included in the multivariable models.

Statistical analyses were conducted using SPSS version 21 for windows. Statistical significance was defined as p-values less than 0.05.

3. Results

Of the 42,268 patients, 21,167 patients had a prolonged LOS ($\geqq$ 80 days). The prolonged LOS patients were more likely to be male ($\chi^2 = 93.0$, $df = 1$, $p < 0.001$), older ($p < 0.001$), be discharged to other hospitals ($\chi^2 = 2371.2$, $df = 3$, $p < 0.001$), and be discharged before 2004 ($\chi^2 = 49.5$, $df = 1$, $p < 0.001$), compared to the control patients. Table 1)

In logistic regression analysis, patients living in regions with fewer providers of psychiatric nursing care at home had a significantly longer LOS in psychiatric hospitals (*OR*, 1.12, 95% *CI*, 1.03–1.20, $p = 0.004$), even after controlling for gender, age, discharge destination, regional number of psychiatric hospital beds per population, and year of discharge (Table 2).

4. Discussion

This study showed that patients who resided in regions with fewer