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*Regular Article*

# Open wards versus locked wards of general hospitals in the treatment of psychiatric patients with medical comorbidities: A cross-sectional study in Tokyo

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*Aim:* Treatment of medical comorbidities among psychiatric patients is an expected role of general hospital psychiatric wards. The purpose of this study was to clarify whether locked wards of general hospitals are necessary in the treatment of psychiatric patients with severe medical comorbidities.

*Methods:* A cross-sectional study concerning patients who required admission due to both somatic and psychiatric diseases was performed all over Tokyo during a 2-month period. Demographic and clinical characteristics of patients who were admitted to locked wards of general hospitals were compared with those of patients admitted to open wards of general hospitals.

*Results:* In locked wards, the rate of organic mental disorders, median Lack of Judgment and Insight from the Positive and Negative Syndrome Scale, and rate of diseases requiring surgery were significantly higher than those in open wards. The rate of patients with medical comorbidities who could not be admitted was significantly higher for open wards than for locked wards. Furthermore, the rate of patients with both medical comorbidities and attempted suicide who could not be admitted was significantly higher for open wards than for locked wards.

*Conclusion:* Locked wards may be necessary to treat severe psychiatric patients with severe medical comorbidities.

**Key words:** liaison, organic, somatic, suicide, surgical.

TREATMENT OF MEDICAL comorbidities in psychiatric patients is an expected role of general hospital psychiatric units. However, such care is not sufficiently provided. The function of psychiatric wards in general hospitals thus needs to be explored. In clinical practice, locked wards in general hospitals appear to offer the maximum flexibility in dealing with both medical and psychiatric diseases that affect the judgment and impulsivity of the individual to varying degrees. So far, advantages and disadvantages of open wards and locked wards have been discussed in an empirical manner.[1–3] Although some evidence has been put forward that open wards offer advantages over locked wards in terms of patient satisfaction[4] and perception,[5] and effects of rehabilitation,[6,7] few studies have focused on medical care to save the lives of psychiatric patients. Furthermore, the results of previous studies have not used population based designs, but instead have only taken a hospital-based perspective. Few epidemiological studies have thus been performed in which the severities of both somatic and psychiatric diseases have been

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equivalent to the level of admission required. The purpose of this cross-sectional study in Tokyo was to clarify whether locked wards of general hospitals are necessary in the treatment of severe psychiatric patients with severe medical comorbidities. Such epidemiological data in Tokyo, which contains approximately 12 million inhabitants, might contribute to public policy not only in Japan, but also in other countries.

## METHODS

### Design

This cross-sectional study was performed all over Tokyo during the 2-month period from 1 April to 31 May 2007. In Tokyo, patients requiring admission due to both somatic and psychiatric diseases are ordinarily admitted to one of 28 general hospital psychiatric wards. Twenty-one of the 28 general hospital psychiatric wards (75.0%), corresponding to 75.2% of psychiatric beds among all 28 general hospital psychiatric wards (1135 beds), participated in the study. Twelve general hospitals had an open ward (total, 446 psychiatric beds), and nine general hospitals had a locked ward (total, 408 psychiatric beds).

The study protocol was approved by institutional review board of Juntendo University School of Medicine. The approved protocol did not require informed consent from patients, as data in this observational study remained anonymous and were analyzed on aggregate.

### Subjects

Subjects in this study were patients who required admission due to both somatic and psychiatric diseases. Psychiatric patients with comorbidities of somatic diseases, patients with somatic diseases who had newly contracted psychiatric diseases, and patients in whom acute psychiatric symptoms were caused by somatic diseases were all included, however patients who did not require admission were not included. Study subjects included cases transferred from other wards in the hospital. Data collection was performed consecutively.

The information collected included: (i) demographic characteristics such as age and gender; (ii) medical and surgical diagnoses; (iii) psychiatric discharge diagnoses according to the ICD-10; (iv) level of emergency, e.g. need for admission on the day of request, within 2 days, within 1 week, or no need for haste; (v) duration of waiting for admission; (vi) kinds of facilities to which patients were introduced; (vii) suicidal behavior; (viii) restraint or seclusion; (ix) the Excited Component for the Positive and Negative Syndrome Scale (PANSS-EC: Excitement, Hostility, Tension, Uncooperativeness, Poor impulse control) and Lack of Judgment and Insight;[8,9] and (x) duration of hospitalization for somatic diseases.

At the same time, we surveyed cases that could not be admitted to psychiatric beds in general hospitals despite the existence of somatic diseases requiring admission. The information collected included the following: (i) demographic characteristics such as age and gender; (ii) suspected medical or surgical diagnoses; (iii) suspected psychiatric diagnoses according to the ICD-10; (iv) suicidal behavior; and (v) the reason that the patient could not be admitted.

### Statistical analysis

Differences between categorical variables were calculated using Fisher's exact test. Differences between sequential variables were calculated using the Student's *t*-test. If data were not sampled from Gaussian distributions, a non-parametric test (the Mann–Whitney test) was used. Statistical testing was two-tailed. Values of $P < 0.05$ were regarded as statistically significant.

## RESULTS

The number of patients who were newly admitted to open wards in general hospitals during the study period was 520 (Table 1). Of these 520 patients, 77 cases (15%) were due to both somatic and psychiatric diseases (open-ward group). The number of patients who were newly admitted to locked wards in general hospitals during the study period was 477, including 97 patients (20%) admitted due to both somatic and psychiatric diseases (locked-ward group).

Between groups, no significant differences in mean age, gender, rate of emergency admissions, or rate of attempted suicide were found. Among patients with attempted suicide, overdose of psychotropic agents was seen in four patients (5%) in the open-ward group and one patient (1%) in the locked-ward group, representing no significant difference ($P = 0.17$). However, patients with psychiatric diag-

**Table 1.** Characteristics and outcomes of open wards and locked wards in general hospitals in Tokyo during the study period

| Characteristics | Open wards | Locked wards | *P* |
|---|---|---|---|
| Number of general hospitals | 12 | 9 | |
| Number of psychiatric beds | 446 | 408 | |
| Number of newly admitted patients | 520 | 477 | |
| With medical comorbidities, *n* (%)† | 77 (15) | 97 (20) | 0.24 |
| Mean age, years (SD) | 56.8 (17.7) | 62.3 (18.1) | 0.067 |
| Sex, male, *n* (%) | 29 (38) | 41 (42) | 0.64 |
| Emergency admission, *n* (%) | 18 (23) | 33 (34) | 0.14 |
| With suicidal attempt, *n* (%) | 17 (22) | 11 (11) | 0.064 |
| Diagnoses (ICD-10) | | | |
| F00–F04, *n* (%)**‡ | 9 (12) | 30 (31) | 0.0031 |
| F05–F07, *n* (%)***‡ | 1 (1) | 17 (18) | 0.0003 |
| F2, *n* (%)‡ | 23 (30) | 23 (24) | 0.39 |
| F3, *n* (%)***‡ | 31 (40) | 14 (14) | 0.0002 |
| Others, *n* (%) | 13 (17) | 13 (16) | |
| PANSS-EC, mean score (SD) | 13.6 (5.8) | 15.2 (6.4) | 0.11 |
| Lack of judgment and insight of PANSS median score** | 3 | 4 | 0.0030 |
| Diseases requiring surgery, *n* (%)* | 27 (35) | 50 (52) | 0.033 |
| Physical restraint, *n* (%) | 23 (30) | 22 (23) | 0.30 |
| Length of hospital-stay, median days | 19.0 | 30.0 | 0.18 |
| Patients with medical comorbidities who could not be admitted, *n* (%)**§ | 56 (42) | 32 (25) | 0.0039 |
| With attempted suicide, *n* (%)* | 26 (46) | 7 (22) | 0.024 |

*$P < 0.05$; **$P < 0.01$; ***$P < 0.001$.

†The rate of 'With medical comorbidities': the rate of patients with medical comorbidities among newly admitted patients. Diagnoses were made according to the ICD-10 at discharge.

‡F00–F04, dementia and organic amnesic syndrome; F05–F07, delirium and other disorders; F2, schizophrenia, schizotypal and delusional disorders; F3, mood disorders.

§The rate of 'Patients with medical comorbidities who could not be admitted': the rate of patients with medical comorbidities who could not be admitted among patients with medical comorbidities who could and could not be admitted.

PANSS-EC, Excited Component for the Positive and Negative Syndrome Scale.

nosis of organic mental disorders (ICD-10: F0) were significantly more frequent in the locked-ward group than in the open-ward group, and the rate of mood disorders (ICD-10: F3) showed the opposite tendency. Among 10 patients with F0 diagnoses in the open-ward group, nine patients showed dementia and organic amnesic syndrome (F00–F04), and one patient showed delirium and other disorders (F05–F07). Among 47 patients with F0 diagnoses in the locked-ward group, 30 patients were classified into F00–F04, and 17 patients showed F05–F07. The rate of delirium (F05–F07) was higher in the locked-ward group than in the open-ward group (18% vs 1%, $P = 0.0003$). The rate of dementia (F00–F04) was also significantly higher in the locked-ward group than in the open-ward group (31% vs 12%, $P = 0.0031$). Although no significant difference in mean PANSS-EC was seen, median score for Lack of Judgment and Insight of the PANSS was significantly higher in the locked-ward group than in the open-ward group. Furthermore, the rate of diseases requiring surgery was significantly higher in the locked-ward group than in the open-ward group. Two patients died of medical comorbidities, both from the locked-ward group. Significant differences in rate of physical restraint and median duration of hospitalization were not found between groups.

The rate of patients with medical comorbidities who could not be admitted was significantly higher for open wards than for locked wards (Table 1). Furthermore, the rate of patients with both medical comorbidities and attempted suicide who could not be admitted was significantly higher for open wards than for locked wards.

## DISCUSSION

The present result that rates of patients with delirium and with dementia were higher in the locked-ward group than in the open-ward group suggests a limitation for admission of patients with delirium or dementia to open wards. In inverse relation to this, the rate of mood disorders was higher in the open-ward group than in the locked-ward group. Unfortunately, no similar reports using population-based designs have been reported, so comparison of this result with previous findings is impossible. In clinical practice, locked wards may be needed to treat severe somatic diseases of many cases with delirium or dementia.

The result that the median score for Lack of Judgment and Insight of PANSS was significantly higher in the locked-ward group than in the open-ward group is also new. Unexpectedly, no significant difference in mean PANSS-EC was seen between groups, although locked wards deal with a wide range of disturbed behavior.[10] Thus, lack of judgment and insight might be a priority matter in such medical comorbidity practice. The fact that more dementia patients were admitted to locked wards may have caused the discrepancy between scores for PANSS-EC and Lack of Judgment and Insight of PANSS. Locked wards in general hospitals may thus be needed for patients with medical comorbidities showing marked lack of judgment and insight.

The finding that the rate of diseases requiring surgery was significantly higher in the locked-ward group than in the open-ward group was also noteworthy. This suggests that locked wards play a more important role in medically severe cases than open wards. The fact that both patients who died of medical comorbidities were included in the locked-ward group may support this.

In addition to such quality issues, the finding that the rate of patients with medical comorbidities who could not be admitted was significantly higher for open wards than for locked wards, suggests, in quantitative terms, a greater contribution of locked wards to medical comorbidities in psychiatric patients as compared to open wards. Furthermore, the finding that the rate of patients with both medical comorbidities and attempted suicide who could not be admitted was significantly higher for open wards than for locked wards suggests a limitation for admission to open wards because of fears about such patients committing suicide during admission.[11]

The present findings that locked wards dealt with cases showing greater levels of both mental and physical severity than open wards suggests the necessity of locked wards for treating severe psychiatric patients with severe medical comorbidities. The present findings also suggest that locked wards are more useful than open wards for the care of medical comorbidities in severe psychiatric patients. With respect to ward structure, open wards are no different from non-psychiatric wards. Private rooms and a specialized zone with several beds for medical comorbidities in open wards can contribute to the care of medical comorbidities in psychiatric patients to some extent. However, locked wards with many private rooms may offer a greater contribution.

Similar epidemiological studies are needed on a more regular basis to improve the treatment of somatic diseases in psychiatric patients and to clarify the function of general hospital psychiatric wards. The strengths and weaknesses of this study bear discussion. One strength of the study was that all psychiatric patients who lived in a defined area during the study period were included. Although the number of patients involuntarily admitted to open wards is intriguing, such information was not included in this study. The number of private rooms such as isolation rooms, particularly in open wards, is also of interest. Such information should be included in future studies. One limitation was that our findings may only be representative of the mental health system in Japan. However, such findings may be useful for comparing differences in mental health systems in terms of medical comorbidities and ward structure among countries. Unfortunately, previous studies about medical comorbidities have not used population-based designs, but have been from a hospital-based perspective only. This epidemiological study thus represents the first-step for comparing mental health systems in terms of medical comorbidities and ward structure with those of other countries.

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## REFERENCES

1 Kim K, Eaton MT Jr. Experiences in the conversion of a closed to an open psychiatric ward in a general hospital. *Am. J. Psychiatry* 1959; **116**: 74–76.
2 Marcus M. The therapeutic potential of a locked ward. *Hosp. Community Psychiatry* 1967; **18**: 219.
3 Rachlin S. On the need for a closed ward in an open hospital: The psychiatric intensive-care unit. *Hosp. Community Psychiatry* 1973; **24**: 829–833.
4 Müller MJ, Schlösser R, Kapp-Steen G, Schanz B, Benkert O. Patients' satisfaction with psychiatric treatment: Comparison between an open and a closed ward. *Psychiatr. Q.* 2002; **73**: 93–107.
5 Haglund K, von Essen L. Locked entrance doors at psychiatric wards – Advantages and disadvantages according to voluntarily admitted patients. *Nord. J. Psychiatry* 2005; **59**: 511–515.
6 Fan Z, Huang J, Wu Q, Jiang S. Comparison of standard locked-ward treatment versus open-ward rehabilitation treatment for chronic schizophrenic patients. A one-year controlled trial in Canton. *Br. J. Psychiatry* 1994; **24** (Suppl.): 45–51.
7 Jin Z. Effect of an open-door policy combined with a structured activity programme on the residual symptoms of schizophrenic in-patients. A six-month randomised controlled trial in Yanbian, Jilin. *Br. J. Psychiatry* 1994; **24** (Suppl.): 52–57.
8 Key SR, Opler LA, Fiszbein A. *Positive and Negative Syndrome Scale (PANSS) Rating Manual*, Japanese edition (translated by Yamada H, Masui K, Kikumoto K). Seiwa Shoten, Tokyo, 1991.
9 Breier A, Meehan K, Birkett M *et al.* A double-blind, placebo-controlled dose–response comparison of intramuscular olanzapine and haloperidol in the treatment of acute agitation in schizophrenia. *Arch. Gen. Psychiatry* 2002; **59**: 441–448.
10 Smith AD, Humphreys M. Characteristics of in-patients transferred to a locked ward in a Scottish psychiatric hospital. *Health Bull. (Edinb)* 1997; **55**: 77–82.
11 Deisenhammer EA, DeCol C, Honeder M, Hinterhuber H, Fleischhacker WW. In-patient suicide in psychiatric hospitals. *Acta Psychiatr. Scand.* 2000; **102**: 290–294.