Refinement of DPC classification of psychiatric disorders

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Abstract

In order to extend the applied field of casemix based evaluation system to psychiatric care, the authors have analyzed the resource consumption of patients of whom main diagnosis was psychiatric disorders.

The DPC data (April 1, 2011 to March 31, 2012) of 37,598 cases from 900 hospitals was used for the analysis. In order to focus on the acute cases, the analyzed cases were limited to those with 90 length of stay (LOS) and less. The differences in LOS were compared according to the ADL level at admission, GAF score at admission, sex, age category (15 years old and less, between 16 and 64, 65 years old and more) and experience of isolated hospitalization.

The results have clarified that GAF score at admission, experiences of isolated hospitalization, 65 years old and more and specific care by psychiatrist.

The above mentioned factors are not used for classification logic of the current DPC system. In order to expand the application area of DPC based patient grouping, it is recommended to elaborate the grouping logic according to the results of this study.

Key words: DPC, Psychiatric care, GAF score, ADL, PCS

❖Introduction

In 2003 the Japanese government has introduced the Japanese original patient classification system (PCS) so called DPC (Diagnosis Procedure Combination) as financing tool for the acute in-patient care[1]. At first this system was introduced into the university hospitals and national center (in total, 82 facilities), then the number of applied hospital has been expanded gradually. In 2012, 1750 acute care hospitals participate to the scheme. As explained in our previous literatures, DPC system gathers a very detailed data with which one can analyze the treatment process in detail and apply it for regional health planning[1]. Considering this characteristics, we are asked the possibility to expand the DPC system for other type of care, such as rehabilitation, long term care and psychiatric care. Especially the needs for development of the psychiatric DPC are increasing because of the increase of acute phase patients with some psychiatric problems, such as dementia and depression.

In this paper, we explain the results of refinement project of DPC classification for psychiatric care.

❖Material and Methods

Data for this study were extracted from the Japanese inpatient administrative claims database, the DPC database[1]. The database was originally instituted as part of a national project to develop a Japanese casemix classification system, which has been ongoing since 2002. The annual number of cases in the database is approximately nine million in 2012. The database contains: i) main diagnoses, pre-existing comorbidities at admission and complications after admission which

are coded with ICD-10 codes; ii) surgical procedures coded with Japanese original codes (K-codes), operation time and the performed date; iii) discharge status (dead or alive); and iv) a list of drugs and blood products used and the dates of use. Study approval was obtained from the Institutional Review Boards and the Ethics Committee of The Tokyo Medical and Dental University. Given the anonymous nature of the data collection process, informed consent was not required.

The DPC data (April 1, 2011 to March 31, 2012) of 37,598 cases from 900 hospitals was used for the analysis. In the current DPC classification system, there are 5 groups for psychiatric MDC; 170020 (Mental and behavioral disorders due to psychoactive substance use), 170030 (Schizophrenia, schizotypal and delusional disorders), 170040 (Mood disorders), 170050(Neurotic, stress-related and somatoform disorders), 170060 (Other mental disorders). In order to focus on the acute cases, the analyzed cases were limited to those with 90 length of stay (LOS) and less. The differences in LOS were compared according to the ADL level at admission (Barthel index: 10> vs 10 and more), GAF score at admission (30> vs 30 and more), sex, age category (15 years old and less, between 16 and 64, 65 years old and more) and experience of isolated hospitalization.

Statistical analyses were conducted using IBM SPSS version 19.0 (IBM SPSS, Armonk, NY, USA)

❖ Results

Among them 170040 was the most frequent (32.2%) followed by 170030 (22.5%), 170050 (18.7%), 170020 (15.2%) and 170060 (11.4%).

Table 1 showed the difference in LOS stratified by DPC and existence of specific care by psychiatrist. Among the 37,598 cases, 23,210 (61.7%) received the specific care. The specific care received group showed a statistically significant longer LOS in total (34.0 days vs 7.6 days; p<0.01) and in individual DPC (p<0.01 for all DPC).

Table 2 showed the difference in LOS stratified by DPC and GAF score. Among the cases with GAF score (32,771), the number of cases with GAF score of less than 30 was 12,980 (39.6%). Especially DPC170030 and 170040 showed higher percentage of low GAF score (59.7% and 42.8%, respectively). The lower GAF score group a statistically significant longer LOS in total (33.3 days vs 21.9 days; p<0.01) and in individual DPC (p<0.01 for all DPC).

Table 3 showed the difference in LOS stratified by DPC and the experience of isolated hospitalization. Among the total cases (37,599), the number of cases with isolation was 3,338 (8.9%).The group with isolation showed a statistically significant longer LOS in total (35.6 days vs 22.8 days; p<0.01) and in individual DPC (p<0.01 for all DPC).

Table 1　Difference in LOS stratified by DPC and existence of specific care by psychiatrist

DPC	Specific care by psychiatrist	N		Mean	Median	Standard deviation	Min	Max
170020	Yes	504	8.1%	21.3	13.0	22.2	1	90
	No	5,737	91.9%	2.0	1.6	3.2	1	72
	Total	6,241		3.5	1.7	8.7	1	90
170030	Yes	7,254	88.8%	36.1	32.1	24.8	1	90
	No	912	11.2%	14.0	5.3	18.0	1	89
	Total	8,166		33.6	29.5	25.1	1	90
170040	Yes	9,678	85.0%	36.2	31.9	23.6	1	90
	No	1,706	15.0%	18.5	12.0	18.8	1	90
	Total	11,384		33.6	29.3	23.8	1	90
170050	Yes	3,356	46.4%	27.9	22.2	22.0	1	90
	No	3,882	53.6%	7.6	3.2	11.2	1	89
	Total	7,238		17.0	8.2	19.9	1	90
170060	Yes	2,418	52.9%	30.2	25.0	23.1	1	90
	No	2,151	47.1%	11.3	4.5	15.6	1	90
	Total	4,569		21.3	13.0	22.1	1	90
Total	Yes	23,210	61.7%	34.0	29.6	24.0	1	90
	No	14,388	38.3%	7.6	2.5	12.9	1	90
	Total	37,598		23.9	15.6	24.2	1	90

Table 2   difference in LOS stratified by DPC and GAF score

DPC	GAF score	N		Mean	Median	Standard deviation	Min	Max
170020	30 ≦	3,198	83.9%	2.9	2.0	7.1	1	90
	30 >	612	16.1%	13.3	3.0	18.9	1	90
	Total	3,810		4.6	2.0	10.7	1	90
170030	30 ≦	3,197	40.3%	31.2	26.0	24.1	1	90
	30 >	4,732	59.7%	35.8	32.0	25.6	1	90
	Total	7,929		33.9	30.0	25.1	1	90
170040	30 ≦	6,309	57.2%	31.7	27.0	23.5	1	90
	30 >	4,712	42.8%	37.0	34.0	23.7	1	90
	Total	11,021		34.0	30.0	23.7	1	90
170050	30 ≦	4,765	77.4%	16.7	8.0	19.3	1	90
	30 >	1,388	22.6%	25.7	19.0	23.0	1	90
	Total	6,153		18.7	10.0	20.6	1	90
170060	30 ≦	2,322	60.2%	19.2	11.0	20.9	1	90
	30 >	1,536	39.8%	28.7	23.0	23.5	1	90
	Total	3,858		23.0	15.0	22.4	1	90
Total	30 ≦	19,791	60.4%	21.9	13.0	23.0	1	90
	30 >	12,980	39.6%	33.3	29.0	24.8	1	90
	Total	32,771		26.4	20.0	24.4	1	90

Table 3   ifference in LOS stratified by DPC and the experience of isolated hospitalization

DPC	Experience of isolated hospi- talization	N		Mean	Median	Standard deviation	Min	Max
170020	No	5,983	96.0%	3.02	2.00	7.360	1	90
	Yes	248	4.0%	16.23	5.00	21.256	1	90
	Total	6,231		3.54	2.00	8.752	1	90
170030	No	6,468	79.2%	32.28	28.00	24.309	1	90
	Yes	1,694	20.8%	38.62	37.00	27.434	1	90
	Total	8,162		33.59	29.00	25.120	1	90
170040	No	10,685	93.9%	32.98	29.00	23.547	1	90
	Yes	693	6.1%	42.97	44.00	24.973	1	90
	Total	11,378		33.58	29.00	23.756	1	90
170050	No	6,957	96.2%	16.77	8.00	19.661	1	90
	Yes	274	3.8%	22.91	13.50	24.363	1	90
	Total	7,231		17.00	8.00	19.892	1	90
170060	No	4,128	90.6%	20.37	12.00	21.529	1	90
	Yes	429	9.4%	30.79	25.00	24.780	1	90
	Total	4,557		21.35	13.00	22.064	1	90
Total	No	34,221	91.1%	22.79	15.00	23.549	1	90
	Yes	3,338	8.9%	35.56	33.00	27.053	1	90
	Total	37,559		23.93	16.00	24.156	1	90

Table 4 showed the difference in LOS stratified by DPC and ADL score. Among the cases with ADL score (33,048), the number of cases with ADL score of less than 10 was 6,751 (20.4%). Especially DPC170020 showed higher percentage of low ADL score (63.2%). The lower ADL score group showed a statistically significant shorter LOS in total (14.2 days vs 27.5 days; p<0.01), in DPC 170020 (2.6 days vs 5.2 days, p<0.01) and . in DPC 170050 (10.3 days vs 19.0 days, p<0.01). For other DPCs, there were no statistical differences between the two groups.

Table 5 showed the results of multiple regression analysis about factors associated with LOS for DPC170030. The patient with isolation, lower GAF

Table 4   Difference in LOS stratified by DPC and ADL score at admission

DPC	ADL score	N		Mean	Median	Standard deviation	Min	Max
170020	10 ≦	1,849	58.2%	5.16	2.00	11.813	1	90
	10 >	3,176	63.2%	2.62	2.00	6.129	1	90
	Total	5,025		3.55	2.00	8.751	1	90
170030	10 ≦	6,457	86.6%	34.04	30.00	24.931	1	90
	10 >	995	13.4%	31.02	27.00	26.026	1	90
	Total	7,452		33.64	29.00	25.099	1	90
170040	10 ≦	9,800	92.2%	33.35	29.00	23.382	1	90
	10 >	831	7.8%	34.48	28.00	26.699	1	90
	Total	10,631		33.44	29.00	23.659	1	90
170050	10 ≦	5,263	85.0%	18.97	11.00	20.400	1	90
	10 >	926	15.0%	10.31	3.00	16.050	1	90
	Total	6,189		17.68	9.00	20.048	1	90
170060	10 ≦	2,928	78.1%	22.47	15.00	22.038	1	90
	10 >	823	21.9%	22.70	14.00	22.472	1	90
	Total	3,751		22.52	15.00	22.131	1	90
Total	10 ≦	26,297	79.6%	27.45	22.00	24.067	1	90
	10 >	6,751	20.4%	14.23	2.00	21.638	1	90
	Total	33,048		24.75	17.00	24.186	1	90

Table 5   Results of multiple regression analysis on factors associated with LOS of DPC 170030 (Schizophrenia, schizotypal and delusional disorders) (R^2=0.075)

	Unstandardized		Standardized coefficient	t value	P value
	Coefficient	SE			
Constant	10.813	1.366		7.917	0.000
sex	0.829	0.590	0.02	1.406	0.160
Isolation	4.572	0.734	0.07	6.232	0.000
GAF_level	3.185	0.598	0.06	5.329	0.000
Dummy for child	1.425	3.503	0.00	0.407	0.684
Dummy for aged	3.551	0.845	0.05	4.201	0.000
ADLscore	− 0.885	0.874	− 0.01	− 1.012	0.312
Specific psychiatric care	20.605	0.971	0.24	21.220	0.000

Sex: 0=Male, 1=Female; Isolation: 0=No, 1=Yes,
Gaf_level: 0=30and more, 1=less than 30;
Dummy for child: 0=15 years and more,1=less than 15 years old
Dummy for aged: 0=less than 65 years old, 1=65 years and more;
(Reference for age dummy is case of aged between 15 and 65)
ADL score: 0=10 and more, 1=less than 10;
Specific psychiatric care:0=No, 1=Yes

Table 6   Results of multiple regression analysis on factors associated with LOS of DPC 170040 (Mood disorders) (R^2=0.084)

	Unstandardized		Standardized coefficient	t value	P value
	Coefficient	SE			
Constant	16.916	1.024		16.517	0.000
sex	− 0.513	0.477	− 0.01	− 1.076	0.282
Isolation	7.653	0.953	0.08	8.027	0.000
GAF_level	3.366	0.465	0.07	7.245	0.000
Dummy for child	− 7.411	4.362	− 0.02	− 1.699	0.089
Dummy for aged	4.533	0.486	0.09	9.332	0.000
ADLscore	1.238	0.865	0.01	1.431	0.152
Specific psychiatric care	16.620	0.656	0.24	25.353	0.000

Independent variables are same as for 170030

score, specific psychiatric care and aged with 65 and more were detected as significant factors of longer LOS.

Table 6 showed the results of multiple regression analysis about factors associated with LOS for DPC170040. The patient with isolation, lower GAF score, specific psychiatric care and aged with 65 and more were detected as significant factors of longer LOS.

LOS.

❖Discussion

The current results have clarified that experience of isolated hospitalization, lower GAF score, existence of specific psychiatric care and age are related to the resource consumption, although these factors are not con-
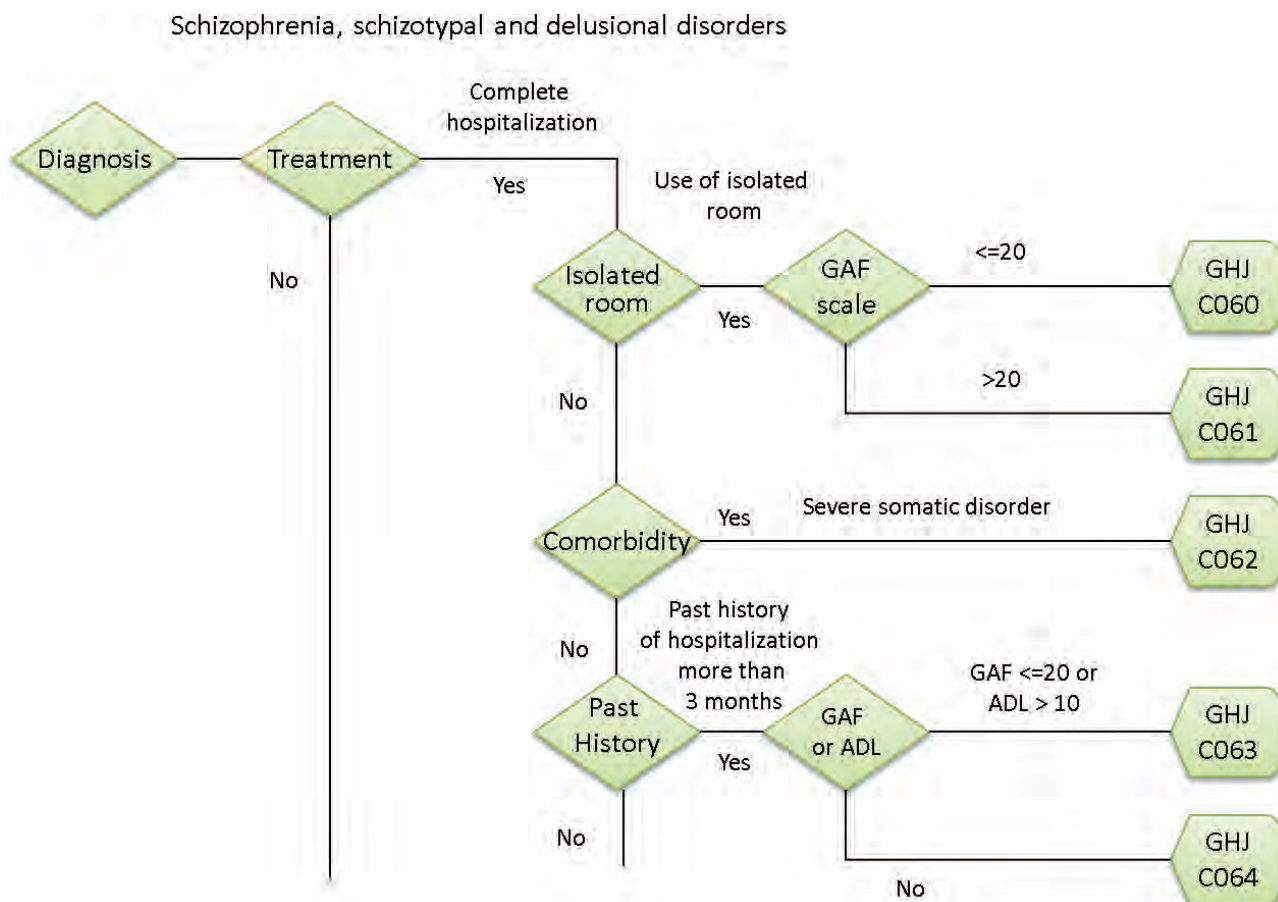

Figure 1   An example of French PCS for psychiatric case

sidered in the current DPC logic. Considering the characteristics of psychiatric disorders, it is quite natural to evaluate the influence of these factors for LOS. As shown in Figure 1, the French casemix system for psychiatric care uses factors such as isolation, GAF score and ADL score[2].

As a research team in charge of continuous modification of DPC system, we have noticed this necessity. This is why the Form 1 (the Japanese Minimum Data Set as a standardized discharged summary) gathers the information such as GAF score, ADL score and experience of isolated hospitalization. Furthermore, even though the DPC based payment system is bundled, specialist cares such as surgical operation and specific care by psychiatrist are paid by Fee-For-Service payment. So we have information in order to ameliorate the classification of psychiatric DPC. However, we lack the detailed information of treatment in the psychiatric wards up to now. In order to create a harmonized classification, we have to gather the detailed information of patients hospitalized in psychiatric wards. Now we are discussing for the detail of minimum data set for this purpose referring to the similar PCS of other countries.

Several limitations must be considered when interpreting our results. First, as DPC has been developed mainly targeting for acute somatic diseases, it might be possible to underestimate the prevalence of psychiatric disorders. In this analysis, we focused to the psychiatric disorders as principal diagnosis not patients who have psychiatric disorders as comorbidity and complication. Second, as the DPC database covers only in-patients of general beds not those of psychiatric beds, we do not cover total cases of acute psychiatric care. This might cause a bias, because the patients in general beds tend to be lighter than patients in psychiatric beds for mental condition.

Despite the above mentioned limitations, our current results strongly suggest the necessity of modification of psychiatric DPC and its possibility.

❖Literatures

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