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Predictors of Cost of Managing Cardiology Cases in a Teaching Hospital in Malaysia

Syed Aljunid, MD, MPH, PhD
Professor of Health Economics, Faculty of Medicine,
University Kebangsaan, Malaysia

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Abstract Hospital UKM is the first hospital to implement case-mix system in Malaysia. The objective of the programme is to utilise case-mix system as a tool in improving efficiency and quality of care. International Refined DRG are selected to enable that process. Step down costing was carried out to determine predictors of cost on 3,622 cases of cardiology grouped under MDC 05 of IRDRG. LOS, case type, discharged outcome, severity level and age of the patients are the main predictors of cost for cardiology cases.

Introduction

Hospital UKM is the first hospital to implement case-mix system in Malaysia. The objective of the programme is to utilise case-mix system as a tool in improving efficiency and quality of care.

From July 2002 to June 2004, a total of 35,568 cases were grouped using IRDRG-Version 1.1 case-mix grouper. Top five MDCs are MDC 14 (Pregnancy, Child Birth and Peurperim) (28.5%), MDC 05 (Diseases and Disorders of the Circulatory System) (10.2%), MDC 08 (Disease and Disorders of Musculoskeletal System and Connective Tissue) (8.3%), MDC 18 (Infectious and Parasitic Diseases) (8.2%) and MDC02 (Diseases and Disorders of the eye)(6.4%).

Cardiovascular diseases are the major cause of deaths in Malaysia. About 20 to 25% of all hospital mortality were due to cardiovascular diseases since 1997. Hence, cardio-vascular diseases posed a major economic burden to the health care system in Malaysia.

The objectives of the study are to determine the distributions of the cardiology cases admitted in HUKM by severity level, to impute average cost per DRG and to determine predictors of cost in managing the cardiology cases.

Methods & Materials

All cases in MDC05 (Diseases and Disorders of the Circulatory System). were selected out for this study. Pediatric cases, patients who did not compete the whole spectrum of care due to deaths or discharged at their own risks were excluded form the study.

Step down costing was carried out to determine the cost per DRG. Three level of cost-centres were used in the study: daily cost-centres, intermediate cost centres and final cost-centres.

A total of 3,622 cases were included in the study. Medical Cardiology cases consist of 86.5% of the cases and the remaining 13.5% are Surgical Cardiology.

Most of the cases are in severity level one (42.8%), 28.6 % in severity level two and 25.1% in severity level three. A total of 127 cases (3.5%) are outliers. The mortality rates for severity level one, two and three are 1.0%, 2.6% and 11.5% respectively. Top three cardiology cases are Acute Myocardial Infarction Without Comorbidity and Complication (IRDRG 05331) (8.4%), Cardiac Catheterization for Ischeamic Heart Disease Without Comorbidity and Complication (IRDRG 05311) (7.6%) and Acute Myocardial Infarction With Major Comorbidity and Complication (IRDRG 05333) (7.4%).

Results

The mean cost per episode of care for Medical Cardiology cases was RM 3,562 (SD = RM 2,119) with average LOS of 6.4 days (SD = 3.8days) . For the Surgical Cardiology cases, the mean cost per episode of care was RM 6,526 (SD = RM 4,585) and average LOS of 5.8 days (SD = 4.1 days). The main components of cost for Medical Cardiology cases are ICU cost (28.8%), pharmacy (17.3%) and Ward Services (15.3%). In Surgical Cardiology, the biggest component of cost is for Operation Theatre (27.9%), followed by Ward Services (25.4%) and pharmacy (8.5%). Multivariate analysis using multiple linear regression found that significant factors influencing cost of cardiology cases are length of stay, age of the patient, discharged outcome, case type and severity level.

Conclusions

ICU, Operation Theatres, Ward Services and Pharmacy are the main components of cost of cardiology cases.

Predictors of cost of cardiology cases in HUKM are length of stay, age of the patient, discharged outcome, case type and severity level.

Table 1. Ten most frequent DRGs in Major Diagnostic Category 05 - HUKM. 2002-2004

No.	*IRDRG*	Description	*No. Cases*	*%*
1	05331	Acute Myocardial Infarction W/O CC	304	8.4
2	05311	Cardiac Catheterization for Ischemic Heart Disease W/O CC	275	7.6
3	05333	Acute Myocardial Infarction W MCC	268	7.4
4	05431	Angina Pectoris & Chest Pain W/O CC	246	6.8
5	05332	Acute Myocardial Infarction W CC	235	6.5
6	05131	Percutaneous Cardiovascular Procedure W/O AMI W/O CC	184	5.1
7	05393	Atherosclerosis W MCC	167	4.6
8	05392	Atherosclerosis W CC	159	4.4
9	05391	Atherosclerosis W/O CC	152	4.2
10	05432	Angina Pectoris & Chest Pain W CC	148	4.1

Table 2. Predictors of Treatment Cost for Cardiology Cases in HUKM

Factors (Predictors)	Beta	S.E *(Beta)	P- value	'Partial correlations coefficients'
LOS	0.048	0.001	<0.001	0.817
Age	0.001	<0.001	<0.001	0.065
Medical Partition	-0.280	0.008	<0.001	-0.498
Discharge died	-0.124	0.014	<0.001	-0.146
Severity level -2	0.069	0.007	<0.001	0.157
Severity level -3	0.057	0.008	<0.001	0.112

Constant = 3.236 and 'Adjusted' R^2 = 0.778