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Kertas Asli/*Original Article*s

The Impact of Casemix Reimbursement on Hospital Revenue in Indonesia

(Kesan Pembayaran Casemix pada Pendapatan Hospital di Indonesia)

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ABSTRACT

The objective of this study is to examine the impact of the casemix reimbursement on the hospital revenue at three selected hospitals (Type B, C and D) reimbursed using 602 groups from 14,749 cases. The results of the study showed that the hospitals received 32.4% higher income when reimbursed with Indonesia Case Bases Groups (INA-CBG) as compared to fee-for-service. Type D hospitals is the biggest gainer with 81.0% increased in income followed by Type B hospital that obtained 34.7% higher revenue. In conclusion, the use of INA-CBG as a prospective payment method has benefitted the hospitals by the increase in the revenues. It is hope that additional resources gained in this programme will allow the hospitals to provide optimum care to the population. It is recommended that the JKA management will use the INA-CBG casemix data to monitor the performance of the hospitals to ensure that quality and efficiency of the services provided to the population is continuously maintained.

Keywords: Hospital revenue; sosial health insurance; casemix system; fee for service

ABSTRAK

Kajian ini bertujuan untuk menilai pendapatan hospital yang menggunakan sistem casemix dengan menganalisis sebanyak 602 kumpulan CBGs daripada 14,749 kes dari tiga jenis hospital awam di Aceh (Jenis B, C dan D). Kajian mendapati bahawa hospital mendapat 32.4% pendapatan yang lebih tinggi dibawah tarif INA-CBG berbanding dengan yuran untuk perkhidmatan. Hospital jenis D adalah yang paling beruntung dengan kenaikan pendapatan sehingga 81.0% diikuti oleh Hospital jenis B yang mendapat 32.4% kenaikan pendapatan. Kesimpulannya, INA-CBG sebagai kaedah pembayaran prospektif memberikan manfaat kepada hospital dengan meningkatkan pendapatan. Adalah diharapkan pendapatan yang bertambah ini akan membolehkan hospital memberikan rawatan yang optimum kepada penduduk. Adalah dicadangkan agar pihak pengurusan JKA dapat menggunakan data casemix INA-CBG untuk memantau performans hospital untuk memastikan pemberian perkhidmatan yang berkualiti dan efisien dilakukan secara berterusan.

Kata kunci: Pendapatan hospital; insurans kesihatan sosial; casemix sistem; pembayaran mengikut yuran

INTRODUCTION

The implementation of social health insurance programme in Aceh Province is a mechanism to achieve universal health care coverage, equitable access and good quality in health care services. It requires a sustainable financial resource for a long-term period.

The Government of Aceh Province has established Social Health Insurance (SHI) programme to cover the whole population of Aceh (4.6 Million) since 1st June 2006. The SHI programme is called *"Jaminan Kesehatan Aceh or Acheh Health Insurance (AHI)"*. Fee-for-service was used as the provider payment method of this programme from 2006-2013. Based on the official reports from Aceh Ggovernment and other sources, the health care expenditure increased every year even though the provisions of health care services were still not optimum. Many countries faced similar problems with regard to the use of fee-for-service. Hence, to ensure the sustainability of AHI, Reforming the health financing system needs to be carried out by introducing a more efficient provider payment method. One approach that has been implemented in more than 44 developed and developing countries is financing health services by applying casemix system as the provider payment method (WHO 2005). Casemix system refered to patient classification scheme which was originally developed as a means of relating the type of patients a hospital treats. This system encourages hospitals to standardize the treatment process using clinical guideline and critical pathways in accordance with the best practice

to ensure that patients receive the best and most effective treatments (Aljunid et al. 2014). Based on the advantages, the Government of Aceh decided to integrate the AHI programme into the National Health Insurance (NHI) based on casemix system. This transformation has sparked a debate and caused fear of health providers that their revenue will decrease due to the casemix implementation. This apprehension was based on the rejection of Indonesian medical association toward premium rate set by the government that was considered irrational and could potentially degrade the quality of health care services (Jamsos Indonesia 2012). Thus, studies on the impact of the implementation of the casemix system on hospital revenue are extremely imporant. The purpose of this study is to determine the different rates of hospital revenue between AHI tariff based on fee for service (FFS) and INA-CBGs tariff as the new provider payment method.

METHODS

Three public hospitals involved in this study were referral hospitals which have the highest number of admission in each region: (Cut Meutia Public Hospital) CMPH, (Type B) in Lhokseumawe, (Teuku Chiek di Tiro Public Hospital) TCPH (Type C) in Pidie, and SPH (Type D) in Sabang Island (The basic information of the hospitals can be seen in the Table 1). In-patients cases from the three hospitals were collected and cleaned. The trimming process was conducted to remove the outliers. In this process, the tariff with more than 90% and less than 10 percent of the mean tariff was excluded in each hospital data set. Cases labelled as outliers were excluded from subsequent analysis. Finally, 14,749 cases from all hospital types were included in the study i.e. (CMPH: 4,321 cases, TCPH: 8,686 and SPH: 1,742). The trimming result can be seen in the Table 2.

The final analysis of this research was done by comparing the mean tariff of AHI and INA CBGs statistically. For this purpose, the average rate of AHI for each hospital type by CBGs was compared to INA-CBGs rates using Mann Whitney test. The study design is presented in Figure 1.

DATA COLLECTION

Data for this research were collected from three hospitals (Type B, C and D) from January 2012 to August 2013. The data were compiled by the officer of *PT. ASKES* in each public hospital for verification purposes. The data were also maintained by a medical record officer in each hospital which has 14 variebles included the patiens characteristics, type of diagnosis, status discharge, and the tariff as the

TABEL 1. Basic Information on Three General Hospitals in Aceh (B, C and D)

	CMPH	TCPH	SPH
Hospital Type	B	C	D
No, of licensed beds	226	177	70
Total no, of staff	777	525	250
Doctors	64	47	20
Nurses	399	269	62
Other Support Staff	314	209	168
No, of annual inpatient admissions	16,848	17,858	3,178
No, of annual outpatients visits	150,624	118,810	14,731
Average Length of Stay (days)	4.00	4.05	2.69
Bed occupancy rate (%)	80.0	96.9	46.6

TABLE 2. Distribution of Data Inlier and Outlier in Three Hospital

Hospital Type	Data Trimming				Total		P Value
	Inlier		Outlier				
	n	%	n	%	N	%	
Type B (CMPH)	4,321	84.3	805	15.7	5,126	100	0.66
Type C (TCPH)	8,686	84.1	1647	15.9	10,333	100	
Type D (SPH)	1,742	83.4	346	16.6	2,088	100	
Total	14,749	84.1	2798	15.9	17,547	100	

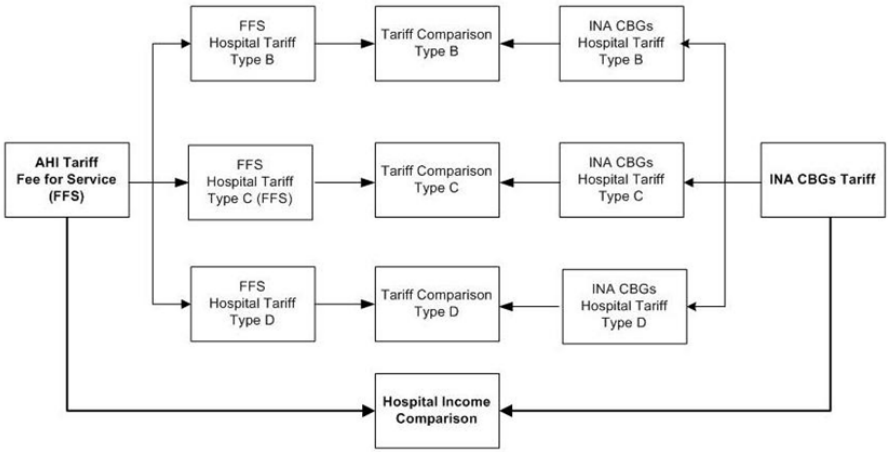

FIGURE 1. Study Design

focus of this. A total of 14,749 inpatients data were obtained and included in the data analysis (Table 3).

LENGTH OF STAY

The average length of stay (LOS) in the dataset was 4.79 days with a median of 4.00 days and mode of 3.00 days. TCPH has the longest LOS of 5.24 days and SPH has the lowest LOS. Table 2 shows the descriptive statistics of the length of stay in the three hospitals. Across the three hospitals, most of the patients stayed between 3-4 days and as high as one-fifth of the patients stay only between 1-2 days which might reflect unnecessary admissions. The results of the ANOVA Test indicated that there was a significant difference of average length of stay of patients in the three hospitals (Table 4).

SEVERITY LEVEL

Most of patients in the dataset were in Severity of Illness Level I as 13,191 patients (75.20 %), while the number of 3,522 patients (20.10 %) was in Severity of Illness Level 2 and 834 patients (4.80%) was in Severity of Illness Level 3. The results of the Chi-Square Test indicated that the p-value (0.001) was lower than the 0.005 alpha levels; there was a significant difference of severity level of illness in three hospitals (Table 5).

DISCHARGE STATUS

In the data collected, out of the five discharge states, only four were utilized. The majority of patients (N=15,747; 89.7%) were discharged back home. Only 360 patients (2.1%) were transferred to another facility and 899 patients (5.1%) were left against medical advice, whereas 541 patients (3.1%) were expired or dead (Table 6).

DIFFERENCE OF HOSPITAL REVENUE

The revenue of the hospitals increased 36.7% when these hospitals were reimbursed using INA-CBGs. The biggest difference was the revenue of type D that reached 81.0%, followed by type B tariff by a margin of 34.7%. Meanwhile, the difference of the tariff in type C was 32.4% which is the lowest compared to the other two hospitals (Table 7).

DISCUSSION

The Health Insurance programme protects people becoming poor due to healthcare cost problems. In this program, the role of hospitals and other healthcare facilities are very important. They must provide good quality health-care services so that the objective of this program can be reached efficiently and effectively. In order to be able to give good quality services, hospitals need to be financially healthy. Financing capability represent a vital element of competitive advantage (Curtis et al. 2009)

In the NHI era, the health insurance claim becomes a major revenue for public hospitals in Indonesia. Most of hospitals' revenues come from the insurance claim of health-care service. In the old national health insurance system, *the fee for service* claim payment was used for the *AHI* Programme. In the *NHI* system, there is only one claim payment method. It is a package system and based on the INA-CBG's rate. The system change influences the hospitals' financial performance, since the hospitals' revenue from the *NHI* was significant. As is the case in this study. By comparing the tariff, we found that, the use of INA-CBG as a prospective payment method has benefitted the hospitals by the increase in the income. This result was supported by *BPJS* (2014). In this research, they found that the hospital revenue increased 55.34% by using INA CBGs payment system compared to the fee for service system.

TABLE 3. Total Number of Inpatients Cases Collected by Three Hospitals

Hospital Name	Hospital Type	No. of Cases	Percent
CMPH	B	4,321	29.2
TCPH	C	8,686	58.9
SPH	D	1,742	11.9
Total		14,749	100.0

TABLE 4. Length of Stay of Patients in Three Hospitals

Hospital	Mean	Std. Deviation	95% Confidence Interval for Mean		P Value
			Lower Bound	Upper Bound	
CMPH	4.54	2.88	4.46	4.62	
TCPH	5.24	3.56	5.17	5.31	0.001
SPH	3.15	2.04	3.07	3.24	
Total	4.79	3.29	4.74	4.84	

TABLE 5. Severity of Illness of Patients in Three Hospitals

Hospital	Severity Level			Total	P Value
	I	II	III		
CMPH	3.440	730	151	4.321	0.001
	79,6%	16,89%	3,49%	100,00%	
TCPH	6.349	1842	495	8.686	
	73,09%	21,21%	5,70%	100.00%	
SPH	1.278	397	67	1.742	
	73,36%	22,79%	3,85%	100.00%	
Total	11.067	2.969	713	14.749	
	75,04%	20,13%	4,83%	100.00%	

TABLE 6. Discharge Status of Patients in Three Hospital

Hospital	DISCHARGE STATUS					P value
	Home and Self Care	Transferred Acute Care Facility	Life Again Medical Advice	Expired / Death	Total	
CMPH	3.936	72	215	98	4.321	0,001
	91,1%	1,7%	5,0%	2,3%	29,30%	
TCPH	7.812	170	364	340	8.686	
	89,94%	1,96%	4,19%	3,91%	58,89%	
SPH	1.489	60	176	17	1.742	
	85,48%	3,44%	10,10%	0,98%	11,81%	
Total	13.237	302	755	455	14.749	
	89,75%	2,05%	5,12%	3,08%	100,00%	

TABLE 7. Different in Overall Hospital RevenueComparing Tariff between INA CBGs and AHI each type of Hospitals

Hospital Type	N	Tariff (Rp)		Rate Different	
	Cases	AHI	INA CBGs	Rupiah	Percent
B (CMPH)	4,321	11,934,928,141	16,073,594,837	4,138,666,696	34.68
C (TCPH)	8,686	21,084,237,966	27,925,397,633	6,841,159,667	32.45
D (SPH)	1,742	2,584,221,979	4,676,310,671	2,092,088,692	80.96
Total	14,749	35,603,388,086	48,675,303,141	13,071,915,055	36.72

In addition, Ambriani (2014), observed two public hospitals in Central Java (Type B and C). By comparing the average claim in hospitals under hospital rate and INA CBG's rate for period of January – April 2014, the study found that the claim under INA-CBG was higher than the claim under hospital rate, in both outpatient cases and inpatient cases as the claims under the JKN are higher than under the hospitals' rate.

Some facts above indicate that the transformation of health services (from fee for service to casemix system) has given financial advantages to the hospitals by increasing the main revenue from INA-CBGs claims. This evidence has encountered some issues dealing with hospital rejections and concerns about the implementation of hospital tariff based on casemix system (INA-CBGs). The condition becomes more complicated when there was also a concern from clinicians regarding the decrease of the number of doctors and hospital revenue (Merdeka 2014; Kompas 2012). In fact, since the implementation of National Health Insurance (NHI) based on casemix system (INA-CBGs) in 2014, it was found that there were reports on the significant increase of hospital income, mainly hospitals equipped with adequate resources to implement the casemix system properly (Liputan 6, 2014).

The increase of hospital revenue by implementing the casemix system clearly indicates that the tariff INA-CBGs is higher than the fee for service. The following factors are the possible reasons:

1. INA-CBGs tariff based on proper costing method.

   INA-CBGs tariff is a package of tariff, which has covered all of the spending on the hospital based on the standardized cost of hospital operational. Besides, the tariff INA CBGs is ddetermined by the data coding and costing on each hospital, so the tariff that is relevant to the conditions each hospital. In addition to this, the government has encouraged each public hospital becoming independent in running their services, which is known as Board of Public Services *(BLU)*, a breakthrough programme aiming to develop hospital capacity mainly in cost management. The implementation of INA CBGs tariff is also a system used to measure the hospital performances related to cost and services.

2. INA-CBG tariff is more updated than fee for service tariff.

   INA CBGs tariff is based on the real cost of some selected hospitals classified by each region in Indonesian provinces. The tariff was revised continually and adjusted to the current situation of the hospital. In contrast, the fee for service tariff of the *AHI* programme adopted the Ministry of Health Regulation Number 518/*Menkes*/Per/VI/2008. Considering the period of the regulation, which was more than 5 years, surely this tariff guideline was not relevant to the current development of the hospital. It also considers the information obtained from the management of hospitals who complain about the low rate of *AHI* services which made them face difficulties in covering the hospital operational cost. This condition also leads the private hospitals not to participate in the *AHI* programme. The contrasting service occurred in INA-CBGs gives more pressure to the equality of patients – Insurance Agency – Hospital.

3. *PT. Askes* used very strict criteria to reject many claims under F-F-S

   PT. Askes as a health insurance agency was given an authority by the government to manage the financial programme. In reimbursing claims proposed by hospitals, *PT Askes* verified the claims strictly. Incomplete claims or treatments which were considered irrelevant to patients' needs would be unpaid. This condition has resulted in conflicts between two parties (*PT. Askes* and Hospitals). INA CBGs system is a prospective payment method ensuring that the hospitals are paid proportionally depending on claims proposed so that the chaos described as the impact of fee for service can be avoided.

The increase of hospital revenue by using casemix system also took place in Mongolia, one of countries that already implemented a pilot project of the casemix system. The project that was carried out over a fifteen-month period from September 2007 to December 2008 by a consultant from United Nation University-International Institute for Global Health (UNU-IIGH 2010) also conducted a simulation to compare the new tariff based on casemix system with the existing tariff. The simulation used all 39,074 cases from two general tertiary hospitals and three specialist hospitals. The results of this simulation indicated that the new tariff might increase the hospital revenue by 168.9% for outpatients. However, the hospital revenue for inpatients will increase 36.8%. Hence, the overall impact of the whole hospital revenue for both inpatients and outpatients cases increase 37.1%.

In others countries that already implemented the casemix system in their hospitals, for instance the UKM Hospital in Malaysia, the casemix system is able to mobilize the resources in the hospital to improve efficiency (Moshiri et al. 2010). Additionally, the casemix system can promote the quality of service by providing information that can be accessed by patients before receiving treatments. Information about health care is not only a reference for the public to choose the hospital in order to obtain services related to their condition, such information can also be utilized by other medical personnels for information exchange. After the first-year implementation of the casemix policy in Hong Kong, clinicians did not perceive any negative impact on patient service. They agreed that there was an improvement in clinical documentation. The perceived lack of both knowledge and access to knowledge among the junior clinicians needs to be addressed. Lastly, a post-implementation survey was found to be useful in providing evidence to facilitate the formulation of communication strategies in the implementation of a corporate casemix system (Lee et al. 2005).

One of the most important missions of casemix implementation in hospitals is to ameliorate the transparency of hospital activities in order to make hospital services measurable and then to prepare a common basis for discussions about health reforms. “It is not possible to ameliorate quality and efficiency of services that are not measurable” With the data of casemix implementation, we can objectively analyze the performance of hospital services, standardization, transparency and accountability. Finally, we strongly hope that in the near future data related to health services can be accessed easily by public to make decisions in seeking health services. This figure can be found in Japan after casemix implementation where the public can assess health services information based on outcome data on the website of the Ministry of Health, where the number of discharge cases is opened for each DPC by 360 hospitals. For example, a patient with multiple sclerosis can know which hospitals treat this disease most frequently in Japan. Other opened data are ALOS for each DPC, re admission rate with the reason and complexity index (Matsuda 2010).

Based on experiences in many high-income countries, casemix system was usually introduced in the countries to increase efficiency in inpatient care or to improve transparency in hospital activities. From these, increasing efficiency is the reason most closely linked to casemix system. The former Yugoslav Republic of Macedonia (Lazarevik 2011). Romania (Vladescu et al. 2008) and Serbia (Djukić 2013) also expect casemix systems to increase efficiency. Making hospital activities more transparent for purchasers and providers was an explicit objective in Poland (Czach et al. 2011). In China (Yip WC et al. 2010) and the former Yugoslav Republic of Macedonia (DRG Work Group Macedonia 2010), the introduction of DRG-based payment systems is also expected to improve service quality. In Croatia, DRG-based payment is used to increase the number of cases and reduce waiting lists (Vončina et al. 2010)

Currently in Indonesia, especially in Aceh, the public hospitals can be managed as the hospital autonomy, known as *Badan Layanan Umum (BLU)* in which there is flexibility for managers to manage the hospitals’ finance. Instead of the old public hospital management regulation, the new one gives some freedom for public hospitals’ manager to prepare their own budget, to make their own decision, to make their own development and to invest. The new regulation states that public hospitals can be managed in corporate ways with the principle of productivity, efficiency and effectiveness (MOH 2010).

For the hospitals, to serve their patients, they are spending money for materials, human resources and equipments. In order to be able to survive and make some development, hospitals need to cover all costs they spend. Some surplus is also expected to improve the services, as surplus is one way to figure out a hospital financial performance. In other words, provider payment system should allow the providers to achieve the reasonable revenue, in order to motivate them to produce good quality services and to dissuade them from moving better-paid jobs abroad (Norman & Weber 1994). In addition, Kaufman and Felix (2009) added that the improvement of hospital performance can be achieved by using casemix system as the provider payment method. This system allows hospital managers to determine more accurately the type of resources to treat a particular group and to predict the cost of the treatment [24]. Besides, the hospital is able to design the adequate planning by using casemix data. Therefore, it is urgent for hospitals to be reimbursed by using the

prospective payment method or casemix system, which is known as INA CBGs in Indonesia.

CONCLUSION

The implementation of casemix system (INA-CBGs) as a prospective payment method has benefitted hospitals by increasing their revenue. It is recommended that the *AHI* management uses the INA-CBG casemix data to monitor the performance of the hospitals in order to ensure that the quality and efficiency of services provided to the population are continuously maintained.

COMPETING INTERESTS

The authors declare that they have no competing interests.

AUTHORS' CONTRIBUTIONS

SI, SA and AMN were involved in the conceptualization of the study, study design, data analysis, and editing of the final draft for publication. SI was also involved in data collection. All authors read and approved the final manuscript.

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