ACTIVITY BASED COSTING METHOD IN DETERMINING UNIT COST OF LITHOTRIPSY FOR TREATMENT OF URINARY BLADDER CALCULUS AT VITA INSANI HOSPITAL PEMATANGSIANTAR

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ABSTRACT

Objective: *To determine the unit cost of lithotripsy for treatment of urinary bladder calculus at Vita Insani Hospital Pematangsiantar.* ***Material & Methods:*** *This study is a descriptive quantitative study, in which the data was obtained from the finance division of Vita Insani Hospital. The research object is the unit cost of accommodation that occurs in patients with urinary bladder calculus with lithotripsy cases from January 2020 to December 2020.* ***Results:*** *The unit cost of lithotripsy for urinary bladder calculus services at Vita Insani Hospital Pematangsiantar which is calculated using the activity-based costing (ABC) method is Rp 4.167.009. There is a difference in cost among the ABC method, hospital calculations, and INA CBG's rates with the following details: the amount calculated for the hospital is Rp 4.996.718, while the calculation using ABC method is Rp 4.167.009; the difference in costs is Rp 829.709. INA CBG's rates Rp 6.137.500, and compared to calculation of hospital, the difference cost is Rp 1.140.782. Compared to the INA CBG's rates, to the unit cost of the ABC method, there is a difference, amounting Rp 1.970.491.* ***Conclusion:*** *The results of unit cost lithotripsy for treatment of urinary bladder calculus through the ABC method are lower compared to hospital calculation and INA CBG's rates.*

Keywords: *ABC method, urinary bladder calculus, lithotripsy, unit cost.*

ABSTRAK

Tujuan: *Mengetahui unit cost kasus batu buli-buli dengan lithotripsi di Rumah Sakit Vita Insani (RSVI) Pematangsiantar.* ***Bahan & Cara:*** *Penelitian ini merupakan penelitian kuantitatif deskriptif dimana data yang diperoleh dari bagian keuangan RSVI. Objek penelitian yaitu unit cost kasus batu buli-buli dengan lithotripsi dari bulan Januari 2020 sampai Desember 2020.* ***Hasil:*** *Unit cost kasus batu buli-buli dengan litotripsi di RSVI Pematangsiantar dengan metode ABC sebesar Rp 4.167.009. Ada perbedaan biaya antara metode ABC, perhitungan rumah sakit dan tarif INA CBGs dengan rincian sebagai berikut: Perhitungan biaya di rumah sakit diperoleh sebesar Rp 4.997.7188, sementara perhitungan dengan metode ABC sebesar Rp 4.167.009, didapatkan perbedaan biaya sebesar Rp 829.709. Diperoleh biaya Tarif INA CBGs sebesar Rp 6.137.500, dan bila dibandingkan dengan perhitungan rumah sakit, didapatkan perbedaan sebesar Rp 1.140.782. Dan jika dibandingkan tarif INA CBGs dengan metode ABC, didapatkan perbedaan sebesar Rp 1.970.491.* ***Simpulan:*** *Hasil perhitungan unit cost dengan menggunakan metode ABC lebih rendah dibandingkan dengan perhitungan rumah sakit dan tarif INA CBGs.*

Kata kunci: *Metode ABC, batu buli-buli, lithotripsi, unit cost.*

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INTRODUCTION

The Indonesian government through the ministry of health in early 2014, began operating the National Health Insurance (JKN) program.[1] The JKN program is organized by the Social Security Administering Body (BPJS) in accordance with Law No. 24 of 2011 on BPJS. The JKN is one of the government's efforts to improve health services for all Indonesian citizens.[2]

The most important part of implementing JKN is health financing. Health financing aims to encourage quality improvement, patient-oriented services, efficiency, and the formation of team services.[3] As the goal is expected to be achieved with

proper financing, the implementation of the National Health Insurance (JKN), the pattern of payments to advanced health facilities has been regulated based on INA-CBG's which is a payment pattern. This INA-CBG's is prospectively based on the casemix system approach is a disease grouping system by combining the cost of treatment with the type of disease in the hospital.[4]

One of the diseases that require precise costing is calculus in bladder with lithotripsy.[5] Lithotripsy is an endourological procedure to treat bladder stones less than 1 cm in size without any incisions.[6-7] The frequency cases in bladder stones increase by the age of 50 years and over.[8] As the hospitals with advanced health facilities for treating bladder stones are required to implement efficiency, the calculation of costs is very important. Vita Insani Hospital as one of the type B hospital in Pematangsiantar, North Sumatera needs to do the right cost calculation.[9] This is because the number of patients at the hospital has increased every year.

In order to calculate the unit cost of hospital services, there is an activity-based determination method designed to overcome distortions in traditional cost accounting called the ABC (Activity Based Costing) method.[10-11] The ABC method carefully measures the costs of each activity according to the cost driver that causes these costs to occur[12-13], so it is more accurate in charging more costs.[14] An accurate calculation of the cost of calculus in bladder with lithotripsy can be used as a basis for using this action as a source of income Vita Insani Hospital considering the increase of prevalence.

Based on the description above, the ABC method is proposed in this present work to determine the unit cost of lithotripsy for treatment of urinary bladder calculus, and to investigate the difference between the hospital calculations and ABC methods in Vita Insani Hospital.

OBJECTIVE

The purpose of this study was to determine the unit cost of lithotripsy for treatment of urinary bladder calculus at Vita Insani Hospital Pematangsiantar.

MATERIAL & METHODS

This research is a descriptive quantitative study, in which the data obtained from the finance division of Vita Insani Hospital is analyzed using interpretation quantitative approach. This study has been approved by the ethical committee of Universitas Prima Indonesia with number 024/KEPK/UNPRI/X/2021. The research subjects were the Head of Finance, Urologist, Head of the Central Surgical Installation Room, Head of Ward, and administrative officers. The research object is the activities carried out within medical services of urinary bladder calculus with lithotripsy at Vita Insani Hospital. The research variable is the unit cost of accommodation that occurs in patients with urinary bladder calculus with lithotripsy cases from January 2020 to December 2020. The research instruments in this study are consisted of: Documentation guidelines are the lithotripsy for treatment of urinary bladder calculus carried out at Vita Insani Hospital, The respondents who were interviewed consisted of the urologist, the head of the finance department, the head nurse of the central operating room, the central ward nurse and the administrative staff of Vita Insani Hospital Pematangsiantar. The data obtained are in the form of an overview about medical services, financial management, and cost calculation within the lithotripsy. Direct observations were made on the object of research, namely activities carried out during the lithotripsy. This research employed primary data and secondary data by following a method from a previous study.[15] The steps are to identify and define a list of activities and activity drivers. Then, classification of activities as primary activities and secondary activities to describe the tasks were employed.[16]

RESULTS

The activity-based costing (ABC) method is used to determine the unit cost calculations for the lithotripsy for treatment of urinary bladder calculus as follows:

1. Determining the cost of direct resource overhead in urologic outpatient, operating room, and Anggrek ward. The results of the calculation of the cost of each related unit can be seen in table 2.
2. Determining the indirect resource overhead costs for each activity based on time and activity center in the related unit.
3. Summing up all direct and overhead costs for calculus in bladder with lithotripsy in accordance with the clinical pathway.

Table 1. Direct Cost of Lithotripsy Treatment for Urinary Calculus Bladder at Vita Insani Hospital Pematangsiantar 2020.

Cost Category	Unit	Number of Units	Unit Cost	Total
Outpatient service				
Registration	Activity	1	25.000	25.000
Urology consultation	Activity	1	75.000	75.000
Central Surgical Installation				
Endoscopic Surgery	Activity	1	691.720	691.720
Anesthesia	Activity	1	138.344	138.344
Tool sterilization	Equipment	1	20.000	20.000
Laundry	Kg	3	20.000	60.000
Medicines and Consumables				
Terumo syringe 3 cc	Pcs	1	3.560	3.560
Terumo syringe 5 cc	Pcs	1	4.790	4.790
Terumo syringe 10 cc	Pcs	1	6.085	6.085
Ringer Lactat 500 ml	Flb	7	14.929	104.503
Spinocan 27	Pcs	1	66.823	66.823
Bunascan spinal 0.5 %Heavy 4 ml	Amp	1	85.305	85.305
Folding gauze 5 cm x 13 cm 12 ply	Pcs	5	1.013	5.605
Handscoen St 7.5 Gamex	Pcs	2	37.110	74.220
Handscoen St 7 Maxter	Pcs	1	7.920	7.920
Mask O_2	Pcs	1	25.850	25.850
O_2	Cc	200	14.6	2.920
Ceftriaxone 1 gr Inj	Amp	3	48.730	146.190
Ketorolac 30 mg Inj	Vial	2	62.045	124.090
Cefixime 100 mg	Tab	10	1.681	16.810
Natrium Diclofenac 50 mg	Tab	10	230	2.300
Pronalges supp	Supp	1	18.095	18.095
Polybag cath No. 16	Pcs	1	24.558	24.558
Urine bag	Pcs	1	5.642	5.642
Pot 100 ml	Pcs	1	1.939	1.939
Aquadest 25 cc	Flb	3	3.850	11.550
Natrium Diclofenac 50 mg	Tab	10	230	2.300
Pronalges supp	Supp	1	18.095	18.095
Polybag cath No. 16	Pcs	1	24.558	24.558
Urine bag	Pcs	1	5.642	5.642
Pot 100 ml	Pcs	1	1.939	1.939
Aquadest 25 cc	Flb	3	3.850	11.550
Aquadest 1000 cc	Flb	10	37.565	375.650
KY Jelly 80 gr	Tube	1	41.360	41.360
Abbocath No. 18	Pcs	1	32.054	32.054
Set Infus Terumo	Pcs	1	19.129	19.129
Patient tag bracelet	Pcs	1	6.078	6.078
Stardine	Cc	100	194	19.400
Medical mask	Pcs	5	4.136	20.680
Surgery hat	Pcs	5	517	2.585
Anggrek Ward				
Visite Urologist	Activity	2	87.000	174.000
Infusion installation	Activity	1	17.400	17.400
Laboratory and Radiologic Examination				
Blood test	Activity	1	102.000	102.000
Urine test	Activity	1	62.900	62.900
Kidney function test	Activity	1	124.950	124.950
Chest X Ray	Activity	1	157.500	157.500
BNO	Activity	1	227.850	227.850
USG Urology	Activity	1	279.300	279.300
EKG	Activity	1	130.200	130.200
Total				**3.605.939**

Source from Vita Insani Hospital Pematangsiantar 2020.

Table 2. Total Overhead Cost at Vita Insani Hospital Pematangsiantar 2020.

Hospital Unit	Overhead Cost		Total Overhead Cost[(c)] (Rp)
	Indirect Resource[(a)] (Rp)	Direct Resource[(b)] (Rp)	
Urologic Outpatient	25.765	8.452	34.217
Operating Room	243.383	121.975	365.358
Anggrek Ward	53 671	107 824	161 495

Description : c = a + b. a = indirect resource. b = direct resource. c = total overhead cost
Source from Vita Insani Hospital Pematangsiantar 2020.

Table 3. Unit Cost of Lithotripsy Treatment for Urinary Calculus Bladder at Vita Insani Hospital Pematangsiantar 2020 With ABC Method.

Fee Structure	Cost (Rp.)		Total Cost (Rp)
Direct Cost Calculus in Bladder with Lithotripsy	3.605. 939		3.605. 939
Overhead Cost	Indirect Resource Overhead	Direct Resource Overhead	
Urologic Outpatient	25.765	8.452	34.217
Operating Room	243.383	121.975	365.358
Anggrek Ward	53.671	107.824	161.495
Total			**4.167.009**

DISCUSSION

Based on the calculations using the ABC method (Table 3). the unit cost for calculus in bladder with lithotripsy services was Rp 4.167.009. and this cost consisted of:

1. Direct Costs

The direct cost services were Rp 3.605.939 or 85 % of the total unit cost during the procedure. The high burden of this direct cost is due to the large number of urologist and anesthetist fee. consumables and laboratory examination fee that must be carried out by patients before performing surgery. The medical services charged include consultation fees at the urology outpatient. preoperative visits. postoperative visits. lithotripsy services and anesthesia in the operating room. The hospital provides doctor services class III actions of 20 % from INA-CBG's rates. so in this case it is difficult to do cost efficiency.

Based on a report from the finance department of Vita Insani Hospital Pematangsiantar. the direct cost of patients with urinary bladder calculus varies. in which it difference lies in the cost of anesthetic drugs and consumable medical materials. Doctor's compliance with clinical pathways and the use of drugs according to the formulary in performing the lithotripsy services in BPJS class III patients greatly affects the quality of action and cost efficiency in hospital.

2. Expense Overhead Costs in Unit Cost Calculation

The overhead cost was Rp 561.070 or 13.5 % of the total cost. These overhead costs are divided into urologic outpatient. ward. and operating room.

which are Rp 34.217 (0.8 %). Rp 161.495 (3.9 %). and Rp 365.358 (8.8 %) respectively.

Based on the calculations (Table 3). the indirect resource overhead costs at urologic outpatient were Rp 25.765. while the direct resource overhead costs were Rp 8.452. The fee charged to the urologic outpatient is only 0.8 % of the total cost of lithotripsy.

The imposition of overhead costs in the ward was 3.9 % from the total cost of the lithotripsy. with details of indirect resource overhead costs of Rp 53.671 and direct resource overhead costs of Rp 107.824. In this ward unit. many facilities are involved in lithotripsy treatment. including patient preparation before lithotripsy and the care needed after lithotripsy. so that compared to other units. the overhead costs in this unit are higher than in outpatient's unit and operating room.

Operating room unit overhead costs were charged at 8.8 % from total cost of the lithotripsy. The overhead costs of this unit costed for Rp 243.383 and the direct costs was Rp 121.975. In this unit. the endourologic procedure is performed on the patient so that the total indirect resource overhead cost is the largest compared to the other units. Its calculation was based on the percentage of operating room unit income. the number and type of operations performed. Lithotripsy is included especially in surgery and this unit is the second unit that contributes a percentage of the highest income. Thus. based on the calculation of the burden carried out by Vita Insani Hospital. the costs charged to patient are considered to be quite high.

The cost of indirect resources overhead reflects to the cost of non-functional units. These units in Vita Insani Hospital Pematangsiantar include the directors. training. procurement. security. vehicles. etc. The number of workers in these units is 192 employees or 32 % from the total employees at Vita Insani Hospital Pematangsiantar for 588 employees.

Based on the activity cost method. the outpatient unit and the operating room showed that the indirect cost was greater. This indicates the amount of costs incurred by the non-functional unit. The cost that spends a large amount of money on this non-functional unit lies in the cost of employee salaries. the use of procurement goods and office and subscription costs. The high costs of non-functional units indicate that there are inefficient costs for these units.

Meanwhile. the direct resource overhead mostly reflects the costs of employees who participate directly in the patient care process and service-related costs. Based on the data obtained. the number of nurses is 279 with 282 beds due to government regulation. namely the ratio of nurses and bed 1: 1. Costs related to service are quite large compared to consumables.

The unit cost of the calculus in bladder with lithotripsy was Rp 4.167.009. while the hospital calculation for this service was Rp 4.996.718. The unit cost with this different calculation method is still lower than the BPJS Claim. which is Rp 6.137.500. Based on the calculation. the difference between the unit cost of the hospital and the unit cost of ABC is Rp 829.709. This cost difference lies in the type of anesthetic drug and the classification of surgery written by the urologist. In the clinical pathway. of lithotripsy urinary bladder calculus. the procedure includes surgery, but in some data lithotripsy is written as major surgical operation. In addition. the calculation using activity-based costing is charged with building depreciation. while in the traditional calculation. depreciation costs are not charged.

In comparison. the cost of the lithotripsy for urinary bladder calculus with the ABC method is still lower than the rate set by the government for this procedure. which is Rp 6.137.500. The profit obtained by the hospital as a service provider is Rp 1.140.782 when compared to the hospital's calculation. Whilst. when compared to the recalculation with the ABC methods. it is Rp 1.970.491. The determination of costing methods in hospitals differs in other business organization sectors. Hospital economies are very often based on public funding and the main goal is far more to provide health care at a set rate than to make a profit.[17-18] This is the reason why the determination of an appropriate unit cost becomes the primary object for managers in hospitals.[19] Based on the Indonesian Ministry of Health Regulation No. 59 of 2014 the tariff for health services in hospitals is determined based on an agreement between BPJS Health and the Association of Health Facilities by referring to the standard INA-CBG's.[20]

Based on some research. several developing countries with medium economic conditions do not yet have a reference unit cost and determination system to determine the cost of standard medical services. so that each hospital has a different way of determining the unit cost which will produce

Table 4. Difference Between ABC Method. Hospital Calculations and INA CBG's Rates Urinary Calculus Bladder at Vita Insani Hospital Pematangsiantar 2020 With ABC Method.

Comparison Between Unit Cost ABC and Hospital		
Unit Cost ABC (Rp) 4.167.009	Unit Cost Hospital (Rp) 4 996 718	Difference (Rp) 829.709
Comparison Between Unit Cost ABC and INA-CBG's Rates		
Unit Cost ABC (Rp) 4.167.009	INA-CBG's Rates (Rp) 6 137 500	Difference (Rp) 1.970.491
Comparison Between Unit Cost Hospital and INA-CBG's Rates		
Unit Cost Hospital (Rp) 4.996.718	INA-CBG's Rates (Rp) 6.137.500	Difference (Rp) 1.140.782

different outcomes. Problems will arise by comparing the efficiency of each method. especially in the implications for the health policy. The method of determining the standard unit cost required for the implementation and planning of national health insurance can affect the budget estimate. An appropriate budget will affect the hospital's financial management as well as the sustainability of the national insurance program.[21]

CONCLUSION

The results of unit cost lithotripsy for treatment of urinary bladder calculus through the ABC method are lower compared to hospital calculation and INA CBG's rates.

REFERENCES

1. T. Damayanti. Analisis Unit Cost Sectio Caesaria dengan Metode Activity Based Costing di Rumah Sakit Bhayangkara Yogyakarta. J. Medicoeticolegal dan Manaj. 2017; 6(1): 16-23.
2. S. Kurniawan and F. Pribadi. Analysis Unit Cost In Mild Head Injury Patient With Activity Based Costing Method At The Hopital In Yogyakarta. Arch. Bus. Res. 2018; 6(1): 105-116.
3. I. G. Nandra and H. Wiguna. Activity Based Costing System Sebagai Alternatif Penetapan Tarif Jasa Rawat. 2017; 2(2): 148-172.
4. N. Bayu Aji. Cost Analysis with Activity Based Costing Method on Coronary Heart Catheterization at Dr. Sardjito Hospital Yogyakarta. J. Medicoeticolegal dan Manaj. Rumah Sakit. 2018; 7(3): 228-237.
5. A. Maulana. P. I. Nandana. and N. L. Salatiah. Tindakan Litotripsi Transuretra Pada Batu Kandung Kemih Ukuran Besar Di RS Harapan Keluarga Mataram. 2018; 7(4): 23-26.
6. J. F. Donaldson et al. Treatment of Bladder Stones in Adults and Children: A Systematic Review and Meta-analysis on Behalf of the European Association of Urology Urolithiasis Guideline Panel. 2019; 76.
7. A. Cicione et al. Bladder stone management: An update. Minerva Urol. e Nefrol. 2018; 70(1): 53-65.
8. Türk et al. Bladder Stones EAU Guidelines. Eur. Assoc. Urol. 2019.
9. S. Sunervia. Y. Damanik. R. Winanjaya. S. T. Bangsa. and S. Utara. Sistem Pendukung Keputusan Pemilihan Rumah Sakit Terbaik Di Kota Pematangsiantar Dengan Menggunakan Metode TOPSIS. 2021; 2(2): 84-90.
10. A. Paula et al. An 8 step framework for implementing time driven activity based costing in healthcare studies. 2019.
11. H. Özyap. Comparison of cost determination of both resource consumption accounting and time-driven activity-based costing systems in a healthcare setting. 2017. p. 201-206.
12. L. Piersiala. Cost Accounting for Management of Health Services in a Hospital. Acta Univ. Lodz. Folia Oeconomica. 2017; 3(329): 213-225.
13. J. A. Martin. C. R. Mayhew. A. J. Morris. A. M. Bader. M. H. Tsai. and R. D. Urman. Using Time-Driven Activity-Based Costing as a Key Component of the Value Platform: A Pilot Analysis of Colonoscopy. Aortic Valve Replacement and Carpal Tunnel Release Procedures. 2018; 10(4): 314-320.
14. A. Urolithiasis et al. Determining Variable Costs in

the Acute Urolithiasis Cycle of Care Through Time-Driven Activity-Based Costing. Urology. 2021.
15. J. Basto. R. Chahal. and B. Riedel. Healthcare Time-driven activity-based costing to model the utility of parallel induction redesign in high-turnover operating lists. 2019; 7: 1-5.
16. O. N.- Only. Using Time-Driven Activity-Based Costing to Model the Costs of Various Process-Improvement Strategies in Acute Pain Management. 2018; 63(4): 76-85.
17. M. E. Pollard. A. A. Laviana. A. L. Kaplan. C. Pagan. and C. S. Saigal. Time-Driven Activity-Based Costing Analysis of Urological Stone Disease. 2018; 5: 327-333.
18. A. A. Laviana. H. Tan. J. C. Hu. A. Z. Weizer. S. S. Chang. and D. A. Barocas. Retroperitoneal versus transperitoneal robotic-assisted laparoscopic partial nephrectomy: a matched-pair . bicenter analysis with cost comparison using time-driven activity-based costing. 2017.
19. J. C. Simmonds. R. J. Hollis. R. K. Tamberino. B. S. Mba. M. A. Vecchiotti. and A. R. Scott. Comparing the Real and Perceived Cost of Adenotonsillectomy Using Time-Driven Activity-Based Costing. 2019. p. 1347-1357.
20. A. S. Shah. Endoscopic Versus Open Carpal Tunnel Release: A Detailed Analysis Using Time-Driven Activity-Based Costing at an Academic Medical Center. 2018. p. 1-9.
21. A. A. Helzainka. Challenges in the Implementation of Clinical Pathway in Indonesia: A Systematic Review. 2021; 48(1438): 430-434.