

Cost of Delivery at Siriraj Hospital under Universal Health Coverage

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Abstract

Healthcare is one of human basic needs and an integral part of social wellbeing. Healthcare visits incur direct and indirect costs. This study aimed to analyze costs of spontaneous vertex delivery and delivery by elective caesarean section at Siriraj Hospital under the Universal Health Coverage scheme for the fiscal year 2016. This cross-sectional descriptive study was conducted from October 2015 to September 2016. The cost data from 98 normal deliveries and 8 caesarean sections were analyzed under provider and patient perspectives, using Thai baht currency. It was found that the total cost of providing delivery at Siriraj Hospital was baht THB 2,238,971.37. The highest cost was the direct cost which accounted for THB 1,837,926.65 or 82.1%; and the indirect cost was THB 401,044.72 or 17.9%. The highest direct cost was the nonmedical service charge of THB 1,677,110.92, followed by the cost of drugs, medical supplies and the equipment with depreciation cost of THB 139,239.50 and THB 21,576.2, respectively. The indirect costs were further divided into cost of technical staff of THB 290,412.41 and cost of supportive staff of THB 110,632.31. The cost per admission for normal delivery was THB 17,685.61 (cost per day was THB 5,171.23), and the cost per admission for caesarean section was THB 63,222.64 (cost per day was THB 12,644.53). The cost of delivery service in patient perspective was THB 1,217.71 which included nonmedical cost of THB 203.33 and opportunity cost of receiving services of THB 1,014.38.

Keywords: delivery; cost; expense; value

Introduction

Healthcare is one of human basic needs and an integral part of social wellbeing. Healthcare visits incur direct and indirect costs. In 2012, the United Nations proclaimed 12 December as International Universal Health Coverage Day. These global efforts scale up universal health coverage for all.⁽¹⁾ Costs and cost composition are crucial to policy makers and providers to build an efficient and resilient health system to meet public demands.

Siriraj Hospital serves as a super tertiary health facility providing healthcare services for patients and a training academy for doctors, nurses and clinical practitioners. Widely known for quality obstetric services, Siriraj Hospital provides extensive number of childbirth deliveries yearly.⁽²⁾ This research aimed to determine the costs associated with delivery and incurred by caretakers or relatives in supporting mother deliveries. Therefore, the selection of followers to provide appropriate information, author excluded pregnant women with congenital disease, medical complications, single and rest for more than 6 days in spontaneous delivery and more than 7 days after caesarean section delivery.

Materials and Methods

This study was approved by the Human Research Ethics Committee of Siriraj Hospital on 19 January 19, 2018 to January 18, 2019 (COA no. Si 036/2018). The first renewal date with the same COA no. was approved on Jan 19, 2019 to Jan 18, 2020. This research comprised an estimate economic cost from both provider and patient perspectives. The provider perspective costing research constituted a cross-sectional retrospective study whereas the patient

perspective costing research comprised a prospective study.

Economic cost from provider perspective

The two study population under provider perspective included (1) service recipients and (2) service providers. The eligible service recipients were female patients who had spontaneous deliveries (ICD-10 code O80) or Caesarean section deliveries without complications (ICD-10 code O82, ICD-9-CM 74)^(5,6) at Siriraj Hospital from October 2015 to September 2016 under the Universal Health Coverage scheme. The eligible recipients were registered during the study period as newly enrolled and were not transferred to other units or hospitals. Service providers included doctors, nurses, practical nurses or clinical staff involved in eligible service recipients' deliveries and postnatal care during the same period.

From 1 October 2015 to 30 September 2016 (fiscal year 2016) 7,988 women gave birth at Siriraj Hospital while 106 eligible service recipients (98 spontaneous vertex deliveries and 8 caesarean section deliveries) were under the Universal Health Coverage scheme. From 21 February 2018 to 31 October 2018, internal cost data of these service recipients were retrospectively collected from the database of the cost assessment unit of Siriraj Hospital including 8 wards (2 delivery rooms, 1 caesarean section operating room and 5 post-delivery inpatient wards) and 11 cost groups (service labor, support labor, medical material, consumable, operation, equipment depreciation, allocated labor from nursing department, allocated expenses from nursing department, allocated depreciation from the nursing department, administrative units of the faculty expenses and support departments of the faculty expenses) using a data extraction form. The

internal and external cost data were analyzed.⁽³⁻⁷⁾

Economic cost from patient perspective

From 23 February 2018 to 21 October 2018, the patient perspective study was conducted among 107 women giving birth under the Universal Health Coverage scheme as well as their relatives or caregivers who came to visit and support the clients during admission. The external cost data were collected by interviewing using a questionnaire obtained with permission from the studies of Kongsin S, et al.⁽⁸⁾ The external cost data comprised personal information of the women giving birth at the hospital and of their relatives or caregivers during labor and hospital stay, use of the services and opportunity loss of women giving birth at the hospital and caregivers during labor and hospital stay and expenses incurred from patient care and loss of employment opportunities (of household members or caregivers). The internal and external cost data were analyzed.⁽³⁻⁷⁾

Results

Type of delivery

Of all deliveries included in the study, 98 deliveries were spontaneous (92.5%) and 8 deliveries were caesarean section (7.5%), with an average length of stay of 3.5 days.

The length of stay proportions of women giving birth were: 3 days (N=45, 42.5%), 4 days (N=26, 24.5%), 2 days (N=19, 17.9%), 5 days (N=8, 7.6%) and over 5 days (N=8, 7.6%), with an average length of stay of 3.45 days.

Regarding the length of stay proportions of 98 women giving birth by spontaneous delivery, 45 had 3 days (45.9%), 22 had 4 days (22.5%), 19 had 2 days (19.4%), 6 had 5 days (6.1%) and 6 had

over 5 days (6.1%). The average length of stay of women giving birth by spontaneous delivery was 3.4 days.

Concerning the length of stay proportions of 8 women giving birth by caesarean section delivery, 4 had 4 days (50.0%), 2 had 5 days (25.0%) and 2 had over 5 days (25.0%). The average length of stay of women giving birth by caesarean section delivery was 5 days as shown in Table 1.

Economic cost from provider perspective

The cost for provider perspective (internal cost) consisted of the items listed below.

1. Direct cost: the cost for providing service to patients, consisting of routine service cost (RSC), material cost (MC) and capital cost (CC), (accounting for 82.1% of the total cost)

- RSC was derived from the sum of labor and operating costs; hence, the total RSC of hospital care for women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 was THB 1,677,110.92, consisting of labor cost (THB 1,664,235.84) and operating cost (THB 12,875.08).

- The MC of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 medicines and medical supplies which equals to THB 139,239.50.

- The CC hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 was derived from the summation of CC of 8 wards, equal to the amount of THB 21,576.23.

2. Indirect cost: was derived from the summation of service line indirect cost (THB 290,412.41) and support line indirect cost (THB 110,632.31), equal

Table1 Method of delivery and length of stay of women giving birth

| Data | Delivery | |
|--|----------|---------|
| | Number | Percent |
| Method of delivery | | |
| Spontaneous | 98 | 92.5 |
| Caesarean | 8 | 7.5 |
| Length of stay spontaneous and caesarean section delivery) | | |
| 2 days | 19 | 17.9 |
| 3 days | 45 | 42.5 |
| 4 days | 26 | 24.5 |
| 5 days | 8 | 7.6 |
| Over 5 days | 8 | 7.6 |
| Average length of stay 3.5 days | | |
| Max=10.00 Min=2.00 | | |
| Length of stay (spontaneous delivery) | | |
| 2 days | 19 | 19.4 |
| 3 days | 45 | 45.9 |
| 4 days | 22 | 22.5 |
| 5 days | 6 | 6.1 |
| Over 5 days | 6 | 6.1 |
| Average length of stay 3.4 days | | |
| max=10.00 min=2.00 | | |
| Length of stay (caesarean section delivery) | | |
| 4 days | 4 | 50.0 |
| 5 days | 2 | 25.0 |
| Over 5 days | 2 | 25.0 |
| Average length of stay 5 days | | |
| max=8.00 min=4.00 | | |

to THB 401,044.72 (accounted for 17.9% of the total cost).

Economic cost from patient perspective

The cost for patient perspective (external cost) consisted of the items listed below. External costs were incurred by service recipients, i.e., women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 and their caregivers.

1. Direct medical cost

Direct medical cost referred to actual expenses incurred by women giving birth at the hospital for laboratory diagnostics, medication, special examinations and other related expenses.

2. Nonmedical cost

Nonmedical cost consisted of travel expenses, meals and other expenses incurred by women giving

birth and/or their caregivers. Nonmedical Cost was THB 203.33 (16.7%) as shown in Table 2.

3. Opportunity cost

Opportunity cost referred to the loss of income of women giving birth as a direct result of receiving hospital services, including prenatal care or delivery and/or loss of income of the caregivers of women

giving birth receiving those services. Opportunity cost was the largest in value (THB 1,014.38, 83.3%) as shown in Table 2.

The internal and external cost composition of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 are shown in Table 3.

Table 2 External cost composition of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016

| Cost composition | Cost per unit (THB/visit) | Percentage |
|---|---------------------------|------------|
| A. Non-medical cost | | |
| Travel expenses | 118.53 | |
| Meals | 84.80 | |
| Total | 203.33 | 16.7 |
| B. Opportunity cost | | |
| Amount of lost income of service recipients | 542.38 | |
| Amount of lost income of caregivers | 472.00 | |
| Total | 1,014.38 | 83.3 |
| C. Total external cost | | |
| | 1,217.71 | 100.0 |

Table 3 Total cost of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016

| Type of cost | Amount (THB) | Percentage |
|----------------------------|--------------|------------|
| Provider cost (N=106) | | |
| Internal cost | 2,238,971.37 | 100.0 |
| Direct cost | 1,837,926.65 | 82.1 |
| Routine Service Cost | 1,677,110.92 | 74.9 |
| Material Cost | 139,239.50 | 6.2 |
| Capital Cost | 21,576.23 | 1.0 |
| Indirect cost | 401,044.72 | 17.9 |
| Service line indirect cost | 290,412.41 | 13.0 |
| Support line indirect cost | 110,632.31 | 4.9 |
| Patient cost (N=107) | | |
| External cost | 1217.71 | 100.0 |
| Nonmedical cost | 203.33 | 16.7 |
| Opportunity cost | 1014.38 | 83.3 |

Unit cost and full cost of women giving birth 63,222.64 THB. The unit cost per day of spontaneous Internal cost was the summation of direct costs, delivery (average LOS=3.42 days) was THB 5,171.23 namely, RSC, MC, CC and indirect cost. In this study, whereas the unit cost per day of caesarean section the unit cost per admission of spontaneous delivery delivery (average LOS=5 days) was THB 12,644.53, was THB 17,685.61 whereas the unit cost per ad- as shown in Tables 4 and 5. mission of caesarean section delivery was THB

Table 4 Unit cost and full cost of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 (spontaneous delivery)

| Type of cost | Cost value (THB) |
|---|------------------|
| Direct cost of spontaneous delivery [RSC=(LC+OC)) + (MC+CC)] | 1,407,209.67 |
| Indirect cost of spontaneous delivery (IDC: Service Line + IDC: Support Line) | 325,980.55 |
| Full cost of spontaneous delivery (Direct cost + Indirect cost) | 1,733,190.22 |
| Unit cost per client of spontaneous delivery (Full cost)/98 | 17,685.61 |
| Unit cost per day [Unit cost per admission/(AVG LOS=3.42)] | 5,171.23 |

Table 5 Unit cost and full cost of hospital care of women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016 (caesarean section delivery)

| Type of cost | Cost value (THB) |
|---|------------------|
| Direct cost of caesarean section delivery [RSC=(LC+OC)) + MC+CC] | 430,716.98 |
| Indirect cost of caesarean section delivery (IDC: Service Line + IDC: Support Line) | 75,064.16 |
| Full cost of caesarean section delivery (Direct cost + Indirect cost) | 505,781.14 |
| Unit cost per client of caesarean section delivery (Full cost)/8 | 63,222.64 |
| Unit cost per day [Unit cost per admission/(AVG LOS=5)] | 12,644.53 |

Discussion

Total internal costs of woman delivering at Siriraj Hospital

Internal costs of woman delivering at Siriraj Hospital were THB 2,238,971.37 consisting of direct costs THB 1,837,926.65 or 82.1% and indirect costs percent 401,044.72 or 17.9%.

Internal costs of woman delivering at Siriraj Hospital characterized by cost component

The direct costs of woman delivering at Siriraj

Hospital consisted by of Labor Cost, MC and CC.

Labor cost was the component with the highest value of 1,664,235.84 THB consisting of service line labor cost THB 1,510,968.11 and support line labor cost of THB 153,267.73, similar to the research findings of Chownna S⁽⁹⁾ stating that labor costs formed the highest proportion. This was attributable to delivery services at Siriraj Hospital requiring highly experienced medical personnel, thus higher compensation, i.e., of salary, position allowance and specialist com-

pensation.

External costs of woman delivering at Siriraj Hospital

The external cost examination revealed that the costs incurred for each delivery were travel expenses and meals of women giving birth and their caregivers. Namely travel expenses of women giving birth (29.4%) and travel expense of caregivers/relatives (28.9%) while the meal expenses of women giving birth and their caregivers/relatives were 22.3% and 19.4%, respectively. The total external cost of woman delivering at Siriraj Hospital under the Universal Health Coverage, fiscal year 2016 was equal to THB 1,217.71, consisting of opportunity cost THB 1,014.38 or 83.3% and nonmedical costs THB 203.33 or 16.7%.

Weakness of this study

This study considered only women giving birth at Siriraj Hospital under the Universal Health Coverage scheme, fiscal year 2016, without medical complications and did not consider the financial status of women giving birth. In reality, external costs may vary according to the status of the women giving birth. For example, if a sample is in good financial standing, accommodation or food costs may be more expensive than a less wealthy sample. As a result, averages may not be able to indicate the actual expenditure between women giving birth in general and samples.

The author hopes that administrators and policy managers will use this study as a guideline for policy allocation and budget assessment for childbirth for the upcoming year effectively and meet the standards of effective childbirth sufficiently.

Comparison to other studies

There is a comparison to hospital care cost analysis of mother deliveries at health service facilities under the universal health coverage: fiscal year 2016, which studies “unit cost per admission and unit cost per day” at Koh Chang Hospital⁽⁹⁾ which is a primary hospital. It is found that unit cost per admission and unit cost per day of a normal labor at Koh Chang Hospital are THB 9,288.50 and THB 3,377.60 respectively which are lower than those at Siriraj Hospital. However, there is no cesarean section at Koh Chang Hospital. Another example is from Inburi Hospital, which is a secondary hospital. It is found that Unit Cost per admission and Unit Cost per day of a normal labor at Inburi Hospital are THB 89,860.90 and THB 37,656.00. For a cesarean section, it is found that Unit Cost per admission and Unit Cost per day are THB 99,765.50 and THB 25,745.00, which are higher than those at Siriraj Hospital which is a tertiary hospital. The researcher found that in a tertiary hospital, the number of labor cost is higher than the number of women who actually give birth at the hospital. Therefore, the cost of labor delivery is higher. With regards to a primary hospital, the number of labor cost is low but the number of women who give birth is high; therefore, the cost of labor is lower.

Therefore, the cost of labor depends on the number of service providers and the number of women who give birth at a hospital.

Conclusion

Costs and cost composition is crucial to policy makers and providers to build an efficient and resilient health system in Thailand to meet public demands.

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References

1. Techakehakij W, Singweratham N, Wongphan T. Unit costs and budget impact of public compulsory programs for health promotion and disease prevention in Thailand. Bangkok: Aksorn Graphic and Design Publishing Limited Partnership; 2016.
2. Anekpornwattana S, Yangnoi J, Jareemit N, Borriboonhiransan D. Cesarean Section Rate in Siriraj Hospital 15 According to the Robson Classification. Thai Journal of Obstetrics and Gynaecology 2020;28(1):6-15.
3. Carrin G, Evlo K. A methodology for the calculation of health care costs and their recovery. Geneva: World Health Organization; 1995.
4. Creese A, Parker D. Cost analysis in primary health care: A training manual for program manager. Geneva:World Health Organization; 2000.
5. Cunningham FG, MacDonald PC, Gant NF, Lenovo KJ, Gilstrap III LC, Hankins GDV, et al, editors. Williams Obstetrics. 21st ed. Stamford: Appleton & Lange; 2001.
6. Cunningham FG, MacDonald PC, Gant NF, Lenovo KJ, Gilstrap III LC, Hankins GDV, et al, editors. Williams obstetrics. 21st ed. Stamford: Appleton & Lange; 2001.
7. Michael F. Drummond, Bernie O'Brien, Greg L. Stoddart, George W. Torrance. Method for the economic evaluation of health care programmes. 2nd ed. Oxford: Medical Publication; 1997.
8. Thapkhoksong T, Kongsin S, Jiamton S, Prasithsirikul S. Activity based costing analysis on general anesthetic service of anesthesiology department in Bamrasnaradura Infectious Diseases Institute Nonthaburi. Journal of Health Science 2017;26(5):937-46. (In Thai)
9. Saowapa C, Kongsin, S, Jiamton S, Yosapon L. Hospital care cost analysis of normal delivery of migrant workers, fiscal year 2015: a case study of Ko Chang Hospital, Trat Province. Journal of Health Science 2018;27(5):927-35. (In Thai)

บทคัดย่อ: ต้นทุนการคลอดบุตร ณ โรงพยาบาลศิริราชภายใต้ระบบหลักประกันสุขภาพถ้วนหน้า

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ระบบประกันสุขภาพถ้วนหน้าเป็นความต้องการพื้นฐานของมนุษย์ และเป็นส่วนสำคัญของสวัสดิการสังคม ระบบประกันสุขภาพมีค่าใช้จ่าย ทั้งค่าใช้จ่ายทางตรง และค่าใช้จ่ายทางอ้อม การศึกษาครั้งนี้ได้ทำการศึกษาด้านทุน การคลอดบุตรด้วยวิธีการคลอดปกติทางช่องคลอด(ไม่รวมการคลอดด้วยคีม เครื่องดูดทางช่องคลอด และการ ผ่าตัดคลอดทางหน้าท้อง ที่โรงพยาบาลศิริราชภายใต้ระบบประกันสุขภาพถ้วนหน้าปีงบประมาณ 2559 วิธีการ ศึกษาใช้การศึกษาเชิงพรรณนาแบบภาคตัดขวางเริ่มดำเนินการตั้งแต่ 1 ตุลาคม 2558 ถึง 30 กันยายน 2559 โดย ศึกษาจากข้อมูลหญิงที่มาคลอดบุตรที่โรงพยาบาลศิริราชจำนวน 7,988 รายและคัดเลือกกลุ่มตัวอย่างที่เข้าเงื่อนไข แบ่งเป็น คลอดปกติทางช่องคลอดจำนวน 98 ราย และการผ่าตัดคลอดทางหน้าท้องจำนวน 8 ราย โดยคิดต้นทุน การคลอดบุตรในมุมมองของผู้ให้บริการ และผู้รับบริการ ต้นทุนรวมในการให้บริการหญิงที่มาคลอดบุตรในโรง- พยาบาลศิริราช เท่ากับ 2,238,971.37 บาท สูงสุดเป็นต้นทุนทางตรง เท่ากับ 1,837,926.65 บาท คิดเป็นร้อยละ 82.1 และต้นทุนทางอ้อม เท่ากับ 401,044.72 บาท คิดเป็นร้อยละ 17.9 โดยต้นทุนทางตรงสูงสุดคือต้นทุนที่ไม่ ได้เก็บค่าบริการทางการแพทย์ เท่ากับ 1,677,110.92 บาท รองลงมาเป็นต้นทุนค่ายาเวชภัณฑ์การแพทย์และ ต้นทุนค่าเสื่อมราคาครุภัณฑ์ เท่ากับ 139,239.50 บาท และ 21,576.23 บาท ส่วนต้นทุนทางอ้อม เท่ากับ 401,044.72 บาท โดยแบ่งเป็นต้นทุนทางอ้อมของสายบริการ เท่ากับ 290,412.41 บาทและต้นทุนทางอ้อมสาย สนับสนุน เท่ากับ 110,632.31 บาท สรุปได้ว่าต้นทุนต่อการคลอดปกติ เท่ากับ 17,685.61 บาท และ ต้นทุนต่อการคลอดผ่าตัดคลอด เท่ากับ 63,222.64 บาท ส่วนต้นทุนต่อวันนอนในโรงพยาบาลของการคลอด ปกติ 5,171.23 บาท และต้นทุนต่อวันนอนในโรงพยาบาลของการผ่าตัดคลอด เท่ากับ 12,644.53 บาทส่วนต้นทุน การให้บริการหญิงที่มาคลอดบุตรในโรงพยาบาลศิริราชในมุมมองของผู้รับบริการ เท่ากับ 1,217.71 บาท เป็นต้น ทุนที่ไม่ใช่ด้านการแพทย์ เท่ากับ 203.33 บาท และต้นทุนค่าเสียโอกาสจากการมารับบริการ เท่ากับ 1,014.38 บาท

คำสำคัญ: คลอดบุตร; ต้นทุน; ค่าใช้จ่าย; มูลค่า