

# Trend in Mode of Delivery in Rajavithi Hospital: A Ten-Year Analysis (2002-2011)

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**Objective:** To create trends in mode of delivery both public and private service at Rajavithi Hospital

**Material and Method:** The medical records of singleton pregnant women delivered between January 1, 2002 and December 31, 2011 were retrospectively analyzed for mode of delivery, indication of operative obstetrics, and modality of services (public and private service).

**Results:** During the study period, total singleton deliveries gradually decreased from 9,418 to 6,023 while the spontaneous vaginal delivery rate fluctuated, and the cesarean delivery rate increased from 25.48% to 34.70%. Vaginal operative deliveries steadily declined such as, forceps extraction 3.83% to 0.95%, vacuum extraction, 1.72% to 0.85%, and vaginal breech delivery 0.92 to 0.28%.

**Conclusion:** The cesarean delivery rate increased in contrast with the decline of the vaginal operative delivery rate.

**Keywords:** Cesarean delivery, Forceps delivery, Vacuum delivery, Breech vaginal delivery

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Modes of delivery have changed in a few decades in many countries such as the cesarean delivery (CD) rate increased by 53% from 21% in 1996 to 32% in 2007<sup>(1)</sup>. Those in Thailand were similarly increased from 15.2% in 1990<sup>(2)</sup> to 34.1% in 2007 and 2008<sup>(3)</sup>. The present study hospital, Rajavithi Hospital, among the biggest specialist training hospitals of the Ministry of Public Health, carries out about 6,000 deliveries annually, and the cesarean delivery rate has also been increasing since 1988 while the total delivery rate was decreasing<sup>(4,5)</sup>.

The vaginal operative delivery such as forceps extraction (FE), vacuum extraction (VE), and vaginal breech delivery (VBD) were decreasing worldwide as well as the study hospital in the last two decades<sup>(5-7)</sup>. The objective of the present study was to create trends in mode of delivery among singleton pregnant women, both public and private service.

## Material and Method

The medical records of singleton pregnant women who delivered between January 1, 2002 and

December 31, 2011 were retrospectively analyzed in mode of delivery, indication of operative obstetrics, and modality of services. Public service is conducted by non-particular care providers: the doctors in obstetric training, obstetric nurses, and so on under supervision, while the private service is performed by particular obstetric specialist in all care modalities. The results were reported as number and percentage during the year 2002 to 2011 by mode of delivery and by public and private service. Linear regression and coefficient of determination ( $R^2$ ) were applied to summarize the trend of mode of delivery between 2002 and 2011. All analysis was performed using Excel version 2007. The hospital's ethics committee approved the present study.

## Results

During the study period, total singleton deliveries was gradually decreased from the peak of 9,418 in 2002 to the nadir of 4,386 in 2006, and ascended to 6,023 in 2011. Table 1 and Fig. 1 demonstrate the spontaneous vaginal delivery (SVD) rate fluctuated between 59.49% and 67.59%, while CD rate had an increasing trend from 25.48% in 2002 to 34.70% in 2011; the peak/nadir of public service were 27.35%/17.98%, and private service of 81.92%/66.99%. Operative vaginal deliveries declined in all modalities such as forceps extraction 3.83% to 0.95%, vacuum

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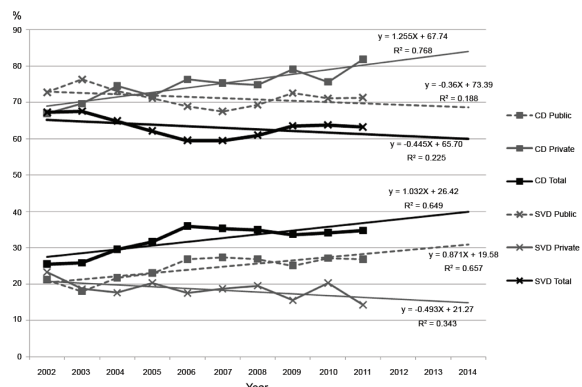
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**Table 1.** Mode of singleton delivery during 2002-2011 by public and private service

Year	Operative delivery				Spontaneous vaginal delivery, No. (%)				Total delivery, No. (%)			
	Cesarean delivery, No. (%)		Forceps extraction, No. (%)		Vacuum extraction, No. (%)		Vaginal breech delivery, No. (%)		Public	Private		
	Public	Private	Public	Private	Public	Private	Public	Private				
2002	1,770 (21.14)	700 (66.99)	319 (3.81)	42 (4.02)	106 (1.27)	56 (5.36)	83 (0.99)	4 (0.38)	6,094 (72.78)	243 (23.25)	8,373 (88.90)	1,045 (11.10)
2003	1,406 (17.98)	976 (69.71)	282 (3.61)	71 (5.07)	99 (1.27)	90 (6.43)	60 (0.77)	2 (0.14)	5,969 (76.35)	261 (18.64)	7,818 (84.81)	1,400 (15.19)
2004	1,643 (21.71)	979 (74.62)	279 (3.69)	42 (3.20)	79 (1.04)	59 (4.50)	34 (0.45)	1 (0.08)	5,532 (73.11)	231 (17.61)	7,567 (85.22)	1,312 (14.78)
2005	1,394 (22.97)	936 (71.78)	249 (4.10)	40 (3.07)	84 (1.38)	58 (4.45)	2 (0.40)	2 (0.15)	4,317 (71.14)	265 (20.32)	6,068 (82.31)	1,304 (17.69)
2006	962 (26.83)	614 (76.37)	91 (2.54)	9 (1.12)	45 (1.26)	35 (4.35)	15 (0.42)	3 (0.37)	2,471 (68.93)	141 (17.54)	3,585 (81.68)	804 (18.32)
2007	1,255 (27.35)	680 (75.39)	165 (3.60)	14 (1.55)	50 (1.09)	38 (4.21)	19 (0.41)	1 (0.11)	3,097 (67.50)	169 (18.74)	4,588 (83.57)	902 (16.43)
2008	1,221 (26.85)	683 (74.89)	113 (2.49)	14 (1.54)	37 (0.81)	36 (3.95)	26 (0.57)	1 (0.11)	3,150 (69.28)	178 (19.52)	4,547 (83.29)	912 (16.71)
2009	1,174 (25.06)	699 (79.16)	64 (1.37)	24 (2.72)	27 (0.58)	22 (2.49)	18 (0.38)	1 (0.11)	3,401 (72.61)	137 (15.52)	4,684 (84.14)	883 (15.86)
2010	1,265 (27.12)	591 (75.67)	33 (0.71)	8 (1.02)	25 (0.54)	24 (3.07)	25 (0.54)	0	3,317 (71.10)	158 (20.23)	4,665 (85.66)	781 (14.34)
2011	1,383 (26.8)	707 (81.92)	47 (0.91)	10 (1.16)	32 (0.62)	19 (2.20)	17 (0.33)	0	3,681 (71.32)	127 (14.27)	5,161 (85.67)	863 (14.33)



**Fig. 1** Trend of spontaneous vaginal delivery and cesarean delivery by public and private service.

extraction 1.72% to 0.85%, and vaginal breech delivery 0.92 to 0.28%.

The peak/nadir of FE of public service was 4.10%/0.71%, and private service of 5.07%/1.02%. The VE of public service was 1.38%/0.54%, and private service of 6.43%/2.20%. The peak/nadir of VBD of public service was 0.99%/0.33%, and private service of 0.38%/0%, as shown in Table 1.

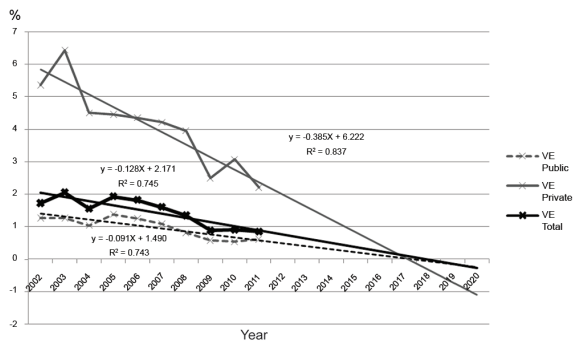
Fig. 2, 3, and 4 demonstrated the trends of VE, FE, and VBD.

The most common indication of CD was cephalopelvic disproportion (CPD). The peak/nadir of CPD of public service was 34.3%/26.8%, and private service of 42.5%/37.2%, and those remaining were previous cesarean, breech presentation, and others.

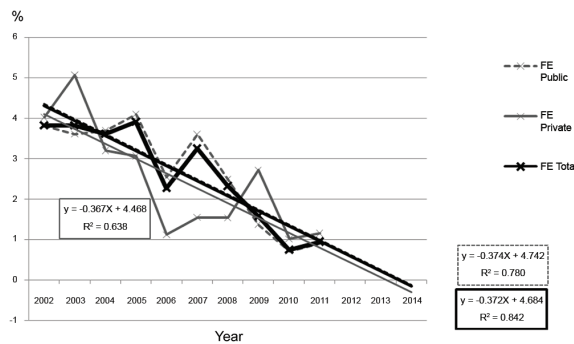
Maternal exhaustion was the same, most common indication of FE, and VE. The peak/nadir of maternal exhaustion for FE of public service was 34.2%/8.8%, and private service of 80.0%/7.5%, and those remaining were prophylactic, prolonged second stage of labor, maternal disease, and others respectively. Whereas, the peak/nadir of maternal exhaustion for VE of public service was 49.1%/8.1%, and private service of 79.2%/31.4%, and those remaining were prolonged second stage labor, prophylactic, maternal disease, and others, respectively.

## Discussion

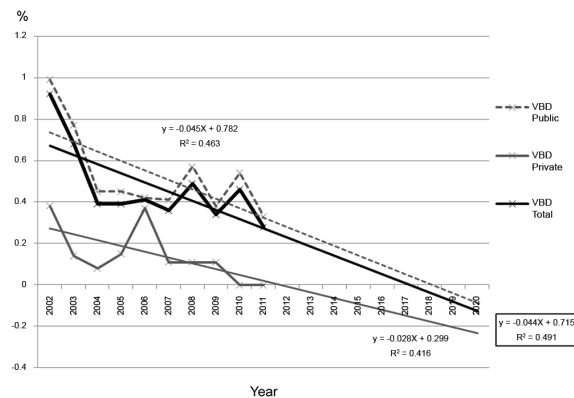
The total number of delivery from the present study hospital including the multifetal pregnancy decreased from 16,331 in 1998 to 10,772 in 2002<sup>(5)</sup>. The trends in total singleton delivery in the same period were quite similar between two big hospitals, the Rajavithi Hospital and Siriraj Hospital<sup>(8)</sup>, as well saw as increased CD rates<sup>(5,8)</sup>.



**Fig. 2** Trend of vacuum extraction by public and private service.



**Fig. 3** Trend of forceps extraction by public and private service.



**Fig. 4** Trend of vaginal breech delivery by public and private service.

The trend of SVD/CD rate of public service was higher/lower proportion in comparison to private service. However, the average CD rate of public service was 24.38% with the difference of 9.37%, and private service of 74.65% with the difference of 14.3%. The increased percentage was not quite distinct, but the baseline proportion was hugely dissimilar, not only

with unnecessary and non-medical indications among private service<sup>(9)</sup>, but also an unclear definition of indications and set criteria of failure to progress. Nevertheless, the most common indication for CD among both public and private service was CPD.

Kovavisarach et al<sup>(10)</sup> reported that correlation rate of clinical criteria and Royal Thai College of Obstetricians and Gynaecologists (RTCOG) for diagnosis of CPD or failure to progress of labor in study hospital was significantly lower in private service than those in public service of 53.2% versus 85.5% with  $p < 0.01$ , even though the correlation of the total deliveries included private and public cases was quite high of 82.0%. It means that CPD or failure to progress of labor might be early and overly diagnosed for rapid termination of pregnancy by mean of CD.

In Queensland, Australia, CD rate was higher in private service at 48.0%, compared with those in public service of 26.9%, and was rising from 1997 to 2006. The previous cesarean delivery was the most common indication for CD rates in both groups<sup>(11)</sup>. A public hospital in northern Thailand reported the likeness of CD rate in the range of 11.3% to 23.6% with  $p < 0.001$ <sup>(12)</sup>.

The trend of CD has been increasing worldwide for example USA<sup>(13,14)</sup>, Australia<sup>(11,15)</sup>, Singapore<sup>(16)</sup>, Saudi Arabia<sup>(17)</sup>, China<sup>(18)</sup> and Nigeria<sup>(19)</sup>. However, the World Health Organization recommended the appropriate rate should not be over 15%<sup>(20)</sup>. However, a review of CD suggested that CD rates of more than 15% have not been associated with the reduction of maternal and neonatal mortality and morbidity<sup>(21)</sup>. Therefore, the rapid rising CD rate over 15% in both private and public cases in the study informed that the unnecessary risk over benefit toward CD rate was still increasing. It has been suggested that private service is one of the well-established factors for increasing CD rates<sup>(12)</sup>. Markedly different CD rates in private service, compared with those in public service, had similar results in the present study. The increasing CD rate should be monitored by the hospital administrator especially in the private cases as soon as possible. All operative vaginal deliveries were decreasing in both private and public cases.

In conclusion, the cesarean delivery rate was increased in contrast with declination of vaginal operative delivery rates.

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#### Potential conflicts of interest

None.

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แนวโน้มในรูปแบบการคลอดในโรงพยาบาลราชวิถี: การวิเคราะห์ข้อมูล 10 ปี (พ.ศ. 2545 ถึง พ.ศ. 2554)

นาฏนภา วชิรธรรมาภรณ์, เอกชัย ไคววิสารัช

วัตถุประสงค์: เพื่อหาแนวโน้มในรูปแบบการคลอดทั้งการบริการสาธารณะและส่วนตัวในโรงพยาบาลราชวิถี

วัสดุและวิธีการ: วิเคราะห์ย้อนหลังจากเวชระเบียนของผู้หญิงตั้งครรภ์เดี่ยวซึ่งคลอดระหว่างวันที่ 1 มกราคม พ.ศ. 2545 ถึง 31 ธันวาคม พ.ศ. 2554 เกี่ยวกับวิธีการคลอด ข้อบ่งชี้การทำหัตถการทางสูติศาสตร์และแบบการบริการ (การบริการสาธารณะและส่วนตัว)

ผลการศึกษา: ระหว่างช่วงการศึกษาการคลอดครรภ์เดี่ยวลดลงทีละน้อยจาก 9,418 ราย เป็น 6,023 ราย ขณะที่การคลอดทางช่องคลอดตามธรรมชาติขึ้นๆ ลงๆ และอัตราการผ่าตัดคลอดเพิ่มจากร้อยละ 25.48 เป็น 34.07 การคลอดด้วยหัตถการทางช่องคลอดลดลงอย่างสม่ำเสมอ การดึงด้วยคีมลดลงจากร้อยละ 3.83 เป็น 0.95 การดึงด้วยเครื่องดูดสุญญากาศลดลงจากร้อยละ 1.72 เป็น 0.85 และการคลอดทำกันทางช่องคลอดลดลงจากร้อยละ 0.92 เป็น 0.28

สรุป: อัตราผ่าตัดคลอดเพิ่มขึ้นเมื่อเปรียบเทียบกับการลดถอยลงของอัตราการคลอดหัตถการทางช่องคลอด

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