

Who gives birth in private facilities in Asia? A look at six countries

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Over the past two decades, multilateral organizations have encouraged increased engagement with private healthcare providers in developing countries. As these efforts progress, there are concerns regarding how private delivery care may effect maternal health outcomes. Currently available data do not allow for an in-depth study of the direct effect of increasing private sector use on maternal health across countries. As a first step, however, we use demographic and health surveys (DHS) data to (1) examine trends in growth of delivery care provided by private facilities and (2) describe who is using the private sector within the healthcare system. As Asia has shown strong increases in institutional coverage of delivery care in the last decade, we will examine trends in six Asian countries. We hypothesize that if the private sector competes for clients based on perceived quality, their clientele will be wealthier, more educated and live in an area where there are enough health facilities to allow for competition. We test this hypothesis by examining factors of socio-demographic, economic and physical access and actual/perceived need related to a mother's choice to deliver in a health facility and then, among women delivering in a facility, their use of a private provider. Results show a significant trend towards greater use of private sector delivery care over the last decade. Wealth and education are related to private sector delivery care in about half of our countries, but are not as universally related to use as we would expect. A previous private facility birth predicted repeat private facility use across nearly all countries. In two countries (Cambodia and India), primiparity also predicted private facility use. More in-depth work is needed to truly understand the behaviour of the private sector in these countries; these results warn against making generalizations about private sector delivery care.

Keywords Maternal health, private sector, Asia, delivery care

KEY MESSAGES

- In the six Asian countries studied, there has been a significant trend upward in facility delivery, and specifically private sector delivery, over the last decade.
- In Bangladesh, Indonesia, India and the Philippines, the increase in facility births seems to come primarily from the growth in private sector delivery care.
- Wealth and education are related to private sector delivery care in about half of our countries, but are not as universally related to use as one would expect. The significance of other results are mixed.
- More in-depth work is needed to understand private sector delivery care across contexts; these results warn against making generalizations about private sector delivery care.

Introduction

Over the past two decades, multilateral organizations have encouraged increased engagement with private healthcare providers in low- and middle-income countries in an effort to increase and improve reproductive health services (Ferrinho *et al.* 2001; Zwi *et al.* 2001). As these efforts progress, there are concerns that there may be aspects to private delivery care that may have adverse effects on maternal health. The most vocal critics have stated that private providers do not have the same incentive to provide services with public health benefits and may be more likely to provide low-quality treatment while overprescribing diagnostics, procedures and pharmaceuticals (Hanson *et al.* 2008; Marriott 2009). It is not clear, however, that the private sector functions the same way in every health system (Hanson and Berman 1998; Brugha and Pritze-Aliassime 2003; Parkhurst *et al.* 2005; Shaikh and Hatcher 2005). In some cases, the private sector may cater to subgroups of patients insufficiently served by the public sector, acting as a complement (Brugha and Pritze-Aliassime 2003).

In other countries, public and private health facilities may act as substitutes for each other, and patients can choose between them for care based on quality and cost (Hanson and Berman 1998). In the case where it complements public services, the private sector can contribute to greater coverage of maternal care. In the case where it acts as a substitute, the direction of the effect on care is less clear.

Currently available data do not allow for an in-depth study of the direct effect of increasing private sector use on maternal health across countries. As a first step, however, we use demographic and health surveys (DHS) data to (1) examine trends in growth of delivery care provided by private facilities and (2) describe who is using private sector within the healthcare system. In health systems where the public sector functions at all socio-economic levels, if the private sector competes for clients based on perceived quality, then we expect their clientele will be wealthier, more educated and likely live in an area where there are enough health facilities to allow for competition. In health systems where the public sector fails to provide for all subgroups of the population, the private sector may substitute for the public sector, and therefore their clientele may come from a more diverse set of socio-economic groups.

As Asian countries have shown some of the strongest increases in institutional coverage of delivery care in the last decade (Limwattananon *et al.* 2011; Wang *et al.* 2011), we will test this hypothesis in six Asian countries with two points of data in the last decade. We do this by modelling two related care-seeking decision points: whether to deliver in a health facility or at home, and then among women delivering in a facility, whether to deliver in a private or public facility.

Background

Use of facility births

A vast body of literature has examined facility use for childbirth in low- and middle-income countries. As a follow-up to a review by Thaddeus and Maine (1994), a comprehensive literature review by Gabrysch and Campbell (2009) noted that

across studies, socio-demographic factors such as higher maternal age (Bell *et al.* 2003; Magadi *et al.* 2007) and education of the mother and her husband (Elo 1992; Thaddeus and Maine 1994; Raghupathy 1996) increase use of birth facilities among women.

Perceived benefit of/need for facility delivery care, as indicated by facility use for the previous delivery and antenatal care (ANC) use for the index pregnancy, are also significantly related to delivery in a facility (Mishra and Retherford 2006; Stephenson *et al.* 2006; Jayaraman *et al.* 2008; Montagu *et al.* 2011). However, these indicators may be picking up unmeasured factors such as availability and ready access of services and familiarity/comfort of mother with health services (Bell *et al.* 2003; Stephenson *et al.* 2006). Facility use is also higher among first and low-order births (Bell *et al.* 2003; Stephenson *et al.* 2006). Self-reported obstetric complications are also relevant although data availability limits their inclusion (Hotchkiss *et al.* 2003; Anwar *et al.* 2008). Perceived quality of care is judged to be essential in influencing facility use in qualitative studies, but it is not easily measured in household surveys and hence lacking for most countries (Amooti-Kaguna and Nuwaha 2000; Hodnett 2000).

Economic and physical accessibility are key factors that contribute to choice of facility. Households with a greater ability to pay are more likely to access delivery services outside the home (Thaddeus and Maine 1994; Say and Raine 2007; Mayhew *et al.* 2008). Physical access is often difficult to determine. Where data are available, greater distance to health facilities does decrease facility use (Yanagisawa *et al.* 2006; Chowdhury *et al.* 2007; Gage 2007; Rahman *et al.* 2007). Where data are not available, proxies such as lack of transport and/or poor roads in conjunction with distance can be used (Gage and Calixte 2006). Rural residence also captures some of aspects of physical accessibility and is often negatively related to facility use, though this measure also picks up other unobservable household characteristics (Bell *et al.* 2003; Mekonnen and Mekonnen 2003; Say and Raine 2007).

Privatization of birth facilities

In some cases, mothers who go to a facility for delivery care may be able to choose the type of facility to attend. In other cases that choice is made for them by a family member, by a referring provider or by lack of options in accessible facilities. In many countries, public facilities are the most common option, but for various reasons a woman may seek or be sent to a private facility. Literature on facility choice has found a wide range of determinants, and across countries the same determinants have been found to have opposing effects, hindering consensus on what influences mothers to seek private care.

Focusing on evidence primarily from Asia, no consensus has emerged on what socio-demographic groups most often use private facility care. Higher education is often significant in facility choice, though whether it predicts public or private facility use varies by setting (Thind *et al.* 2008; Berman and Rose 1996 found a positive effect, whereas Do 2009 concluded there was a negative effect). Other relevant factors are ethnicity and caste/tribe status, both of which are negatively associated with use of private facilities in India (Thind *et al.* 2008).

A woman’s real or perceived need for care is also influential. Women who attend more ANC visits were more likely to use a private facility for delivery in India (Thind *et al.* 2008). More than half (54.3%) of those who went to a private hospital had received five or more ANC visits compared with 28.8% in a public hospital in Jordan (Obermeyer and Potter 1991). Perceived obstetric complications can act as a catalyst for private facility use due to the general perception that they provide better quality of care (Hodnett 2000; Ferrinho *et al.* 2001; World Bank 2005). However, research on this issue is contradictory. For instance, having perceived suffering with an obstetric complication actually encouraged use of public facilities instead of private facilities in one instance (Bazant *et al.* 2009). Regarding economic and physical accessibility indicators, a higher standard of living is associated with use of private facilities, as is urban residence (Obermeyer and Potter 1991; Berman and Rose 1996; Thind *et al.* 2008).

Theoretical framework and research questions

Figure 1 depicts from the woman’s perspective, two key sets of factors that influence where she gives birth:

- Her individual determinants, such as socio-demographic characteristics, economic, social and physical access based on factors such as household wealth, familial and community mores, and proximity to birth facilities, and actual/perceived need for health care based on risks associated with childbirth, previous birth experiences and the use of ANC and other healthcare services.
- The structure of the health system in her country, including availability of public and private providers, referral systems for delivery care, financing mechanisms for the demand and

supply side, the supply and location of the health workforce as well as their decisions on care provision, health information available to the public, and government policies influencing private/public sector behaviour as well as patient choice.

The final decision on where to deliver may happen well before the birth, with a mother and/or her family using information on risks, quality, experience and provider preferences to decide on a location. It may happen once labour has already started, and a facility birth could be chosen due to complications during labour or referral by the home provider. There many factors at play in any context, but with this theoretical framework we hope to capture some of the known forces determining place of delivery.

Ideally, one would explore how both the supply and demand side determinants noted in the figure interact in influencing place of delivery. Unfortunately, data on system-level determinants at the individual or even community level over time are not now available. Thus, our analysis is drawn from the DHS, which provide nationally representative individual-level survey data on the individual determinants of choice of facility for birth. With this in mind, we address the following questions:

- Has private sector delivery care increased over the last decade in Asia?
- If private sector delivery care has increased, has it added to growth of facility delivery care overall or does it replace other forms of facility delivery?
- Who is using private sector delivery care in this region?

Data and methods

To answer these questions, we utilize data available from the DHS from six Asian countries with more than one round of

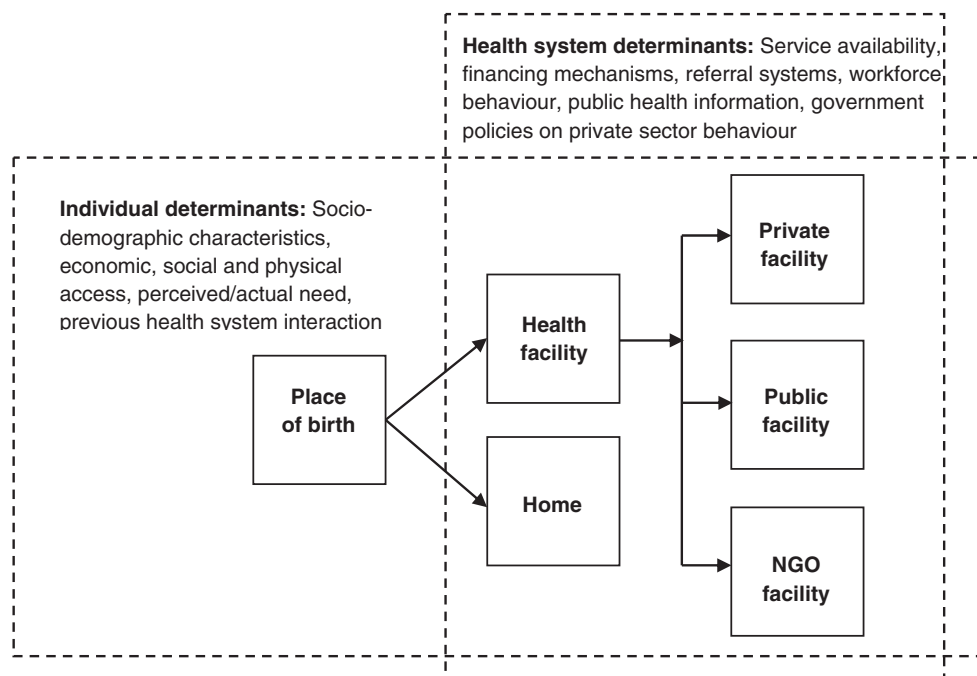


Figure 1 Factors affecting a woman’s choice of birth facility.

Table 1 Details of DHS

Country	Year	N (Women)	N (Children)
Bangladesh	1999	10 544	6832
Bangladesh	2007	10 996	6150
Cambodia	2000	15 351	8834
Cambodia	2005	16 823	8290
India ^a	1998	89 199	33 026
India ^a	2005	124 385	51 555
Indonesia	2002	29 483	16 206
Indonesia	2007	32 895	18 645
Nepal	2001	8726	6931
Nepal	2006	10 793	5783
Philippines	2003	13 633	7145
Philippines	2008	13 594	6572

^aData are for births in the 5 years prior to the survey, with the exception of India, where it is for births in the 3 years prior to survey.

data collection. The DHS provides a comparable source of data across countries and over time, collecting data for a wide range of information on women of reproductive age, their children and their household. To standardize the time period, we chose to use data from two specific time points. The year for the first time point came from the fourth round of DHS survey collection (1997–2003), whereas the second time point came from the fifth phase (2003–08). There was between 5 and 7 years separating these two surveys. The details of the surveys chosen are listed in Table 1.

These countries were analysed in depth on the factors related to facility usage, in particular private facility usage. For each country, both years of data were pooled to increase statistical power and to allow for a limited examination of trend over time. In the pooled analysis, we estimate two related probit equations with a Heckman selection model (Heckman 1979; Dubin and Rivers 1989) to determine (1) who is more likely to deliver in a facility than at home and (2) conditional on choosing a facility, who is more likely to use a private facility than a public facility. This model is meant to correct for the fact that we can only observe whether a woman goes to a public or private facility if she (or her family or provider) first decides to go to a facility for birth. This self-selection means that if the equations are estimated separately, the results for drivers of the decision between public and private facilities may be biased (for a more in-depth discussion of the Heckman selection model, see Heckman 1979 and Dubin and Rivers 1989). All regressions included the built-in 'svy' survey data corrections available in Stata 12 (Stata Corp., College Station, TX, USA, 2009). Strata and primary sampling unit identifiers were adjusted to accommodate the pooling of 2 years of data. All tabulations used the analytical weights provided by DHS.

Our outcome variables are constructed from the DHS question 'Where did you give birth to (child)?' Respondents' answers are broken down by various facility and home options, which are then grouped by DHS. These data are collected for births in the last 5 years, with the exception of India, where they are for the last 3 years. This process produces two outcome variables, one that identifies home births vs facility births, and another that

identifies public or private facility births among those who go to a facility. Facilities of non-governmental organizations (NGOs) are excluded in this analysis, due to the very small number of births recorded in this sector in our countries and time periods. In fact, in Cambodia, Indonesia and the Philippines, no births were recorded in NGO facilities.

Our key variables of interest were chosen from the categories of socio-demographics (mother's age, education of mother and father, household size), perceived/actual need (birth order, previous child death, mean ANC visits for mother, where previous birth occurred) and economic, social and physical access (perceived distance to health facility, residence, wealth index, who has final say on mother's health care) as those that had the strongest theoretical relationships with choice of facility. The DHS normally collects ANC visits only for the last pregnancy, so to be able to use our full sample of deliveries we created a 'mean' number of ANC visits for the mother for all births based on last pregnancy.

Because data were pooled over two separate years, we include a dummy variable indicating whether the observation was recorded in the first or second time point of data collection. With this we can observe if a woman is more likely to deliver in a private facility in the second time point vs the first time point, controlling for other factors.

Results

Figure 2 shows trends in health facility births for each country over two time points. The full height of the bar represents the total share of births that took place in a health facility in each country. In each bar, each facility type (private, public or NGO), is displayed as a per cent of all births in the country. The figure shows the share of facility births handled by private facilities increased in every country over the two time points.

In every country, use of a health facility for birth also increased between the first and last time points. In the latest year of data, overall facility delivery care topped 40% in India, Indonesia and the Philippines, but variation exists within the region. Fewer than 10% of births in Bangladesh and Nepal were delivered in facilities in the early year of data, and despite large increases these estimates remained below 20% in the latest year of data.

In Bangladesh, Indonesia, India and the Philippines, the increase in facility births seems to come primarily from the growth in private sector care, a potentially positive contribution to increasing overall maternal care. As seen in Figure 2, the private sector delivered more than 10% of all births in the Philippines, India and Indonesia, while in Bangladesh it delivered ~7% of all births in 2007. From this initial picture, it is apparent that private sector delivery care has grown over the last decade across the region, and appears to be helping to expand overall capacity for facility delivery care, rather than just replacing public sector services.

Tables 2 and 3 contain the results of the in-depth analysis. Table 2 shows the results of the selection model by country, modelling the determinants of giving birth in a facility rather than at home. Table 3 displays the results for the outcome model of the determinants of going to a private facility over a public facility, which was jointly estimated with the selection model in each country.

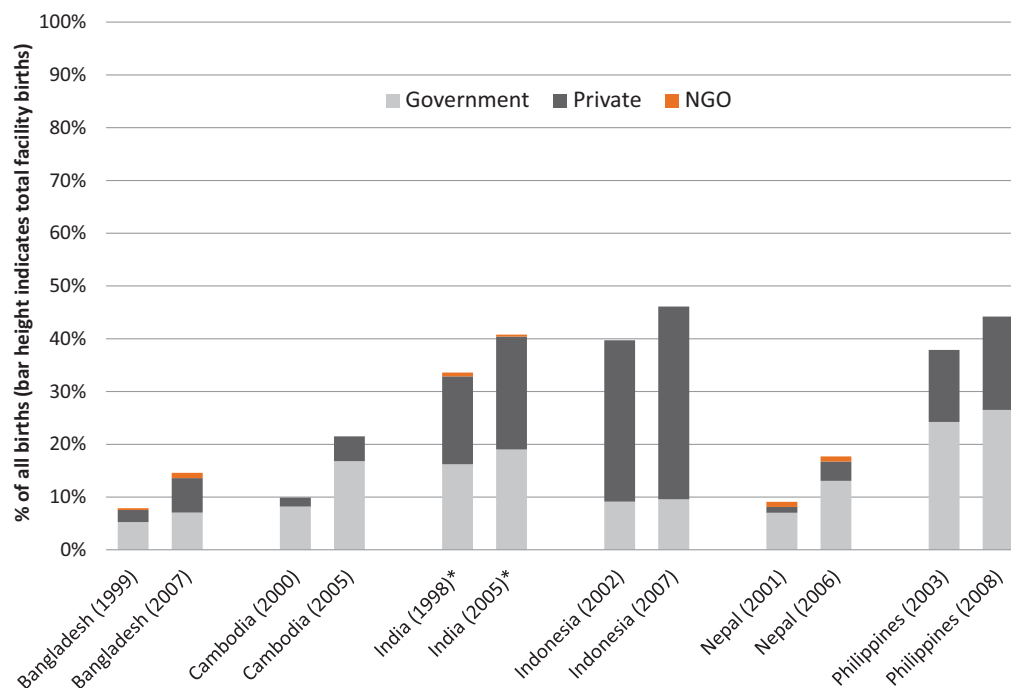


Figure 2 Facility Births by Facility Type. *Data are for births in the 5 years prior to the survey, with the exception of India, where it is for births in the 3 years prior to survey.

In Table 2, we find generally homogenous determinants of facility usage across countries. Facility use trends upward over time even after inclusion of controls. Across every country or nearly every country, women are more likely to choose to deliver at a facility instead of home if they are having a first birth; live in urban areas, have greater wealth, and higher education; their husband has higher education; and are older than 20 years old. A woman is also more likely to deliver at a facility if they have had one or more ANC visits, and the effect increases with number of visits. This may capture the direct effect of health counselling during the ANC visit, or it may be that this result reflects other indirect factors such as greater health concerns or greater comfort with the health delivery system and/or health provider.

Having had a previous death of a child is also positively related to facility use in Bangladesh and India. In all countries except Bangladesh, women who reported distance to a health facility as a barrier to health care were significantly less likely to deliver in a facility. In about half of countries, if the woman was from a larger household she is also less likely to go to a facility for birth.

In the outcome model determining private facility use (Table 3), the increases in private sector use seen in Figure 2 were found to be significant over time in every country except Bangladesh. Place of delivery for the previous child was also significant across all countries except Bangladesh, with mothers very likely to go back to a private facility if they previously delivered in one, and significantly less likely if they previously delivered in a government facility. This could be due to many factors such as location of their preferred doctor, what facility type is closest, payment preferences or a preference for private care for other reasons. While no other results are universally significant for private delivery care, some trends appear.

Wealth has the strongest association with the use of a private facility for delivery care, with greater wealth predicting greater use in Cambodia, India, Indonesia and the Philippines. The effect is stronger as wealth increases, and the total effect was largest in Cambodia. This result fits with our hypothesis that if the private sector is competing for clients based on perceived quality, then wealthier women will be more likely to use them. In Cambodia, Indonesia and Nepal, we see a significant, direct association between greater private sector use and having secondary education. In addition, those with tertiary education in India and Indonesia have a similar relationship with private sector use. Husband's education had a direct association with use, but only in Cambodia and India. We found significant associations between urban residence and private sector use for Bangladesh and the Philippines, but the effects appear to go in opposite directions.

Beyond the socio-economic groups that we hypothesized would use private delivery care, a handful of perceived/actual need variables were also found to be associated with use of a private facility for birth. Primiparity increases the likelihood of using a private facility in Cambodia and India. We would expect that mothers with a previous child death would want to go to a private facility due to perceived risk. This was the case only in India and Indonesia, and again the results suggest opposite effects. ANC visits, mother's say in healthcare decision making, and age of the mother were not significant factors in any country.

Discussion

This analysis provides further evidence of a trend towards the use of private facilities for delivery care. It also sheds some light

Table 2 Selection model—probit results of the choice to go to a delivery facility vs home delivery, births in the last 5 years^a

Characteristic	Categories	Bangladesh	Cambodia	India	Indonesia	Nepal	Philippines
Time effect (year)	Year 1 = 0, year 2 = 1	0.19*	0.44**	0.39**	0.18**	0.20**	0.16**
Perceived/actual need							
Multiparity	First child = 0, 2 or higher = 1	-0.46**	-0.52**	-0.45**	-0.25**	-0.60**	-0.43**
Previous child to mother died	No = 0, yes = 1	0.28**	-0.03	0.18**	0.16	0.15	0.12
Mother mean ANC visits: 1–3 visits	No visits = 0	0.55**	0.29**	0.45**	0.12	0.43**	-0.05
Mother mean ANC visits: 4 or more visits		1.19**	0.70**	1.22**	0.64**	0.94**	0.39**
Economic, social and physical access							
Does woman have final say on own health care	Has no say at all = 0	-0.04	NA	-0.04	0.02	0	-0.03
Distance to health facility a barrier to seeking care	Not a barrier to care = 0	0.04	-1.12**	-0.15**	-0.22**	-0.14*	-0.21**
Wealth status: middle 3 wealth quintiles	Bottom wealth quintile = 0	0.06	0.42**	0.32**	0.49**	0.31**	0.50**
Wealth status: top wealth quintile		0.57**	1.43**	0.73**	1.09**	0.84**	1.04**
Socio-demographic characteristics							
Region of residence	Rural = 0, urban = 1	0.30**	0.40**	0.40**	0.56**	0.50**	0.37**
Aged 20–34 years	<20 years = 0	0.28**	0.12	0.15**	0.20**	0.21**	0.24**
Aged 35 and over		0.35**	0.24	0.24**	0.34**	0.46**	0.44**
5–8 household members	<5 members = 0	-0.15**	-0.03	-0.08**	-0.04	-0.13*	-0.10**
More than 8 members		-0.07	0.15	-0.08**	-0.04	-0.11	-0.20**
Primary education: mother	Less than primary = 0	0.07	0.17*	0.20**	0.16	0.17*	0.1
Secondary education: mother		0.31**	0.28*	0.38**	0.49**	0.40**	0.36*
Tertiary education: mother		0.65**	0.44	0.70**	0.79**	0.72**	0.76**
Primary education: husband	Less than primary = 0	0.05	-0.05	0.09**	0.03	0.05	0.50*
Secondary education: husband		0.16*	0.14	0.16**	0.23*	0.01	0.69**
Tertiary education: husband		0.31**	0.5	0.26**	0.41**	0.30**	0.92**
Constant		-2.29**	-2.19**	-1.70**	-2.07**	-2.04**	-2.14**
Observations		12 558	6557	42 489	33 361	12 078	12 950
F		4.42	13.31	62.14	27.55	10.62	28.54

Significance denoted by asterisk: *at 95%, **at 99% confidence level.

^aFor India, data are for births in the 3 years prior to survey.

Table 3 Outcome model—probit results of the choice to go to a private vs public delivery facility, births in the last 5 years^a

Characteristic	Categories					
	Bangladesh	Cambodia	India	Indonesia	Nepal	Philippines
Time effect (year)	0.34	0.37**	0.39**	0.12*	0.29**	0.16**
Perceived/actual need						
Multiparity	0.16	-0.33**	-0.18**	0.03	-0.19	-0.11
Previous child to mother died	-0.36	0.25	0.24*	-0.30*	-0.11	-0.34
Mother mean ANC visits: 1-3 visits	0.12	-0.02	-0.07	-0.35	0.24	0.19
Mother mean ANC visits: 4 or more visits	0.02	0.26	0.22	0.04	0.34	0.23
Previous birth occurred at private facility	0.67	1.22**	1.09**	0.73**	2.24**	1.32**
Previous birth occurred at government facility	-1.07*	-0.63*	-1.06**	-1.54**	-0.27	-1.00**
Economic, social and physical access						
Does woman have final say on own health care	0	NA	-0.02	0.05	0.13	0.14
Wealth status: middle 3 wealth quintiles	-0.1	1.13**	0.31**	0.44**	0.11	0.43**
Wealth status: top wealth quintile	0.01	2.04**	0.81**	0.83**	0.15	0.97**
Socio-demographic characteristics						
Region of residence	-0.26*	0.19	0.03	0.18	-0.16	0.23**
Aged 20-34 years	-0.02	0.3	0.05	0.08	0.06	0.11
Aged 35 and over	0.13	0.24	0.03	-0.03	-0.12	0.19
Primary education: mother	0.01	0.34*	-0.08	0.24	0.19	-0.49
Secondary education: mother	0.03	0.56**	0.04	0.40*	0.40*	-0.4
Tertiary education: mother	0.01	0.52	0.38**	0.42*	0.46	-0.21
Primary education: husband	-0.06	0.38	-0.04	0.15	-0.02	0.26
Secondary education: husband	-0.16	0.35	0.19**	0.14	-0.07	0.28
Tertiary education: husband	-0.15	0.72*	0.38**	0.02	0.15	0.5
Constant	0.53	-4.37**	-1.37**	-0.85	-2.23*	-1.61
Observations ^b	1587	2147	15976	13140	1481	4857
F	4.42	13.31	62.14	27.55	10.62	28.54

Significance denoted by asterisk: *at 95%, **at 99% confidence level.

^aFor India, data are for births in the 3 years prior to survey.

^bObservations for outcome equation derived from post-estimation commands.

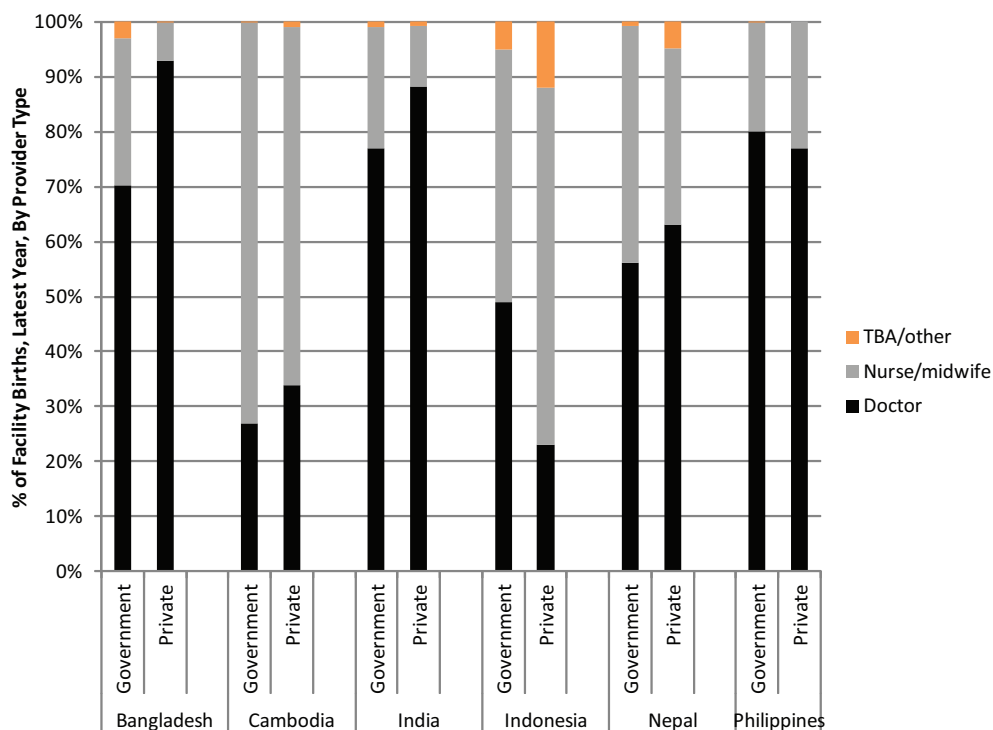


Figure 3 Type of Health Provider by Facility Type. TBA=Traditional Birth Attendant.

on what type of women give birth at private facilities over public facilities, although no universal results were found across the six countries.

One source of variation may come from the wide array of facilities that are categorized as belonging to the private sector. These facilities range from large modern hospitals to simple one-bed facilities. Because the private sector often does not face the same regulations as the public sector, private providers are also of widely varying quality (see Das and Hammer 2005 for an example of such variations among public and private providers in India). We do not have data on the exact capacity of facilities in our sample, but we can look at the level of care being provided. Figure 3 describes the type of birth assistance being given in the different types of facilities.

These data show that women who deliver at private facilities are more likely to have a doctor (rather than a nurse or midwife) in four of the six countries (Bangladesh, Cambodia, India and Nepal). While women's recall may introduce some error in these statistics, it fits with the hypothesis that at least in these four countries the private sector is providing a perceived increase in quality of care, if having a trained doctor can be considered a proxy for greater quality. Basu *et al.* (2012) also report in a review across low- and middle-income countries that private sector healthcare providers had greater reported timeliness and hospitality to patients, increasing perceived quality. In stark contrast, they also found that providers in the private sector more often violated medical standards of practice and had poorer patient outcomes. Evidence in the opposite direction is also presented in Figure 3, with more births attended by traditional birth attendants or 'other' in private facilities in three of six countries (1% in Cambodia, 12% in Indonesia and 5% in Nepal). This is concerning as one expects

giving birth in any facility should ensure a skilled birth attendant.

Nonetheless, if the private sector is perceived to provide better services, it will draw patients. A qualitative study by Ergler *et al.* (2011) shows that even the poor residents of Chennai who have physical access to public health services seek out private providers despite higher costs if they consider that care to be superior. This has implications for household health expenditures, and how public sector services are marketed or targeted to residents. This perception may also result in health staff moving from the public to the private sector. Even today, some staff employed by the public sector also work in the private sector, increasing the ambiguity of who exactly is providing delivery care (Ferrinho *et al.* 2001). In Asian countries it is often the case that such a practice is formally or informally recognized, as long as it occurs outside the main employment in the public sector (Prata *et al.* 2005).

The differences in how the private sector operates have a direct impact on how to interpret the impact of a growing private sector provision of delivery on maternal health outcomes. In theory, a more competitive market can benefit women by keeping overall prices down, and by pushing providers to see more patients. However, as has been noted widely in the literature, the market for medical care is imperfect and non-transparent, and as such the effect of this model of care on maternal health is ambiguous.

In some situations, overprovision of care and overcharging may increase in the private sector in order for them to maximize their income (Ferrinho *et al.* 2001; Brugha and Pritze-Aliassime 2003). One area that has raised the most concern has been the overprovision of caesarean section in the developing world and its link to private sector delivery care (e.g.

Murray 2000; Roberts *et al.* 2000; Potter *et al.* 2001). It is difficult to sufficiently control important outside influences such as payment systems and case mix when looking at caesarean section provision and the bulk of this research has been done in Latin American health systems, but there are some interesting results from Asia to consider.

In a multivariate analysis of over 11 000 delivery records for a hospital with both private and public services, Phadungkiatwattana and Tongsakul (2011) were able to determine that women who delivered in the private service were 9.44 times more likely to have had a caesarean than those who delivered in a public service. While babies born in the private service were less likely to end up in neonatal intensive care, the mothers were significantly more likely to have post-partum haemorrhage. In a recent study of urban poor in Dhaka City, data collectors reported finding very few women who had a vaginal delivery in the private facilities (Sarker *et al.* 2012).

Given these results, we would expect to see highly imbalanced provision of caesarean sections on our data. However, this was not always the case—only in Bangladesh was there a disparate number of total births delivered by caesarean section in the private and public sectors (71% vs 35%, respectively). In India and the Philippines, the disparities were still apparent but much less impressive (~10 percentage points higher). Following the trend seen in doctor-delivered births, Indonesia actually had fewer caesareans in the private sector (13% vs 21% in the public sector), and Cambodia and Nepal had negligible differences between sectors. These conflicting results, combined with the findings from this research paper, beg for more research into the what constitutes private sector delivery care, how it affects a women's choice of delivery location, and the relationship between that choice and birth outcomes, maternal morbidity and mortality and child survival outcomes.

Finally, some of the inter-country variation may also simply be due to differences in the power to detect, with some countries such as Bangladesh and Nepal having fewer women delivering in health facilities overall. Further analysis on larger, longitudinal datasets for these countries may provide more a comprehensive answer to what determines facility delivery. In addition, as noted in the theoretical framework, including supply side factors in the analysis will provide a more nuanced picture of what is increasing use of all facilities, and private facility care specifically.

Across all countries examined in this article, there is an increase in use of facilities for birth, and an increase in use of private facilities. Definitions of private facilities and the drivers in their use vary by country and perhaps even within countries. More in-depth work is needed to truly understand the behaviour of the private sector in these countries; these results warn against making generalizations about private sector delivery care.

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