ORIGINAL ARTICLE

Correlates of home and hospital delivery in Pakistan

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Abstract

Objective: To identify the socio-economic determinants of home-based and institutional delivery in Pakistan.

Methods: This study has used Pakistan Demographic and Health Survey (PDHS) data collected by the National Institute of Population Studies (NIPS), Islamabad, Pakistan, and Macro International Inc. (now ICF International) Calverton, Maryland, United States. It used three episodes of Pakistan Demographic and Health Survey Data from 1990-91, 2006-07 and 2012-13. Data was analysed using descriptive analysis and odds of delivering at hospital were calculated using logistic regression analysis.

Results: Home-based delivery was over 4 times higher in 1990-91 compared with institutional delivery 5,465(85.3%) vs. 852(13.3%), and around 2 times higher in 2006-07 5,900(64.7%) vs. 3,128(34.3%). However, in 2012-13, the share of women delivering at home or health facility was roughly the same, i.e. 6,180(51.6%) at home and 5,773(48.2%) at health facility.

Conclusion: There were wide gaps in the rates of institutional delivery among different subgroups, and they were accentuated by the socio-economic and financial disparities, and high illiteracy rates in the lowest wealth quintiles.

Keywords: Maternal health, Infant health, Literacy, Maternal and child health services, Institutional delivery, Home delivery. (JPMA 67: 1166; 2017)

Introduction

Maternal mortality rate (MMR) in Pakistan is 276 deaths per 100,000 live births.[1] Pakistan is the fifth-largest contributor to the maternal mortality, and six percent of the world's maternal deaths occur in Pakistan.[2] Only in 2013, around 289,000 women died due to pregnancy-related complications in Pakistan. In view of the risk factors involved in maternal mortality, international effort has focused on increasing the share of births at the proper health facilities (institutional deliveries) or the births attended by skilled birth attendants.[3] About 50 per cent of births in Pakistan take place at home, mainly with the help of untrained birth attendants.[4] The major reason for the home deliveries in Pakistan is found to be the limited role of women in decision-making at household level as well as their lower educational status and smaller control over the resources.[5] Some other determinants of the choice of place of delivery are distance to health care facility, transportation facility, cost of institutional delivery, trust in health attendants and exposure to mass media.[6-8] It is also found that women's preference for home deliveries is also shaped by their past experience of poor health system which includes poor availability of drugs, incompetent health workers, lack of privacy and rude attitudes of health attendants.[9] Furthermore, a study in Pakistan found that mother's and father's education has significant impact on the decision about place of delivery.[6]

The current study was planned to identify the determinants of institutional delivery by employing logit model and using Pakistan Demographic Health Survey (PDHS) data for the years 1990-91, 2006-07 and 2012-13. This study also analysed the data using descriptive statistic technique to determine the patterns of choice of place of delivery conditional on various socio-economic indicators over time. The data for three waves of PDHS has helped us understand the overtime changes in the choice of the place of delivery in Pakistan.

Subjects and Methods

This study has used Pakistan Demographic and Health Survey (PDHS) data collected by the National Institute of Population Studies (NIPS), Islamabad, Pakistan, and Macro International Inc. (now ICF International) Calverton, Maryland, United States.[4] Data for all the variables was taken from the three waves of PDHS corresponding to 1990-91 (December 1990 to May 1991), 2006-07 (September 2006 to February 2007) and 2012-13 (October 2012 to March 2013). PDHs are the largest household-based surveys on demographic and health issues in Pakistan, including detailed information on issues related to fertility, family planning, health-seeking behaviour, infant, child and adult mortality, maternal and child

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health and nutrition, etc.

A two-stage stratified sample design was adopted for this survey. Enumeration blocks, which were demarcated as part of the urban sampling frame in the urban domain and mouzas/dehs/ villages in the rural domain, were taken as primary sampling units (PSUs). All results are weighted with the sampling weight supplied with the data, which control the sampling design and provide design- based results.

The survey design and instruments for the three waves remained the same with the only exception that women violence module was added in the 2012-13 PDHS which was not the part of previous two PDHS surveys. As we are not using any of the violence-related issues in our study, this factor did not affect our analysis. The variables used in this study for analysis were comparable across three survey waves of PDHS. The survey is representative of entire Pakistan except Azad Jammu and Kashmir, Federally Administered Tribal Areas (FATA), and restricted military and protected areas. The population consisted of all urban and rural areas of the four provinces of Pakistan and Gilgit-Baltistan. Using Pakistan Bureau of Statistics frame for urban and rural areas, survey samples across the country were selected. There was no need for ethical clearance as the PDHS data is a publicly available dataset.[4] The variables were selected based on the literature review as well as comparability across the three waves of the survey.

We used a set of institutional, demographic, socio-economic and spatial indicators as covariates. The covariates included demographic variables (mother's age at first birth and birth order of child), socio-economic variables (mother's education level and wealth quintile), institutional variables (place of delivery, antenatal care [ANC] visits) and spatial (region and provinces) categories following literature review.[10-12] The demographic variables included mother's age at birth and the birth order of the child. The mother's age at birth was divided into three categories: less than 20, 20-34, and 35-49 years. The birth order of the child was divided into four categories: first child, second up to third child, 4 to 5, and 6 or more children born subsequently.

The socio-economic variables included the education and wealth quintile of the mother. The education of the mother was grouped into four categories: no education or illiterate mothers, primary (5years of education), secondary (10 years of education) and higher (>10 years of education, including the college, university education of professional, vocational and general category). The wealth quintile of the mother was divided into five categories: poorest, poor, middle, richer and richest. The institutional variables included the number of times the mother received antenatal care, and consisted of three categories: none, 1-3, and 4 or above. Even if the correlation between education and wealth quintile was expected to be high, we included both models simultaneously because they are theoretically important and are also analysed simultaneously in the literature.[10-12] We used two types of spatial variables in our analysis: area of residence, i.e. rural urban and provinces including Balochistan, Khyber Pakhtunkhwa (KPK), Sindh and Punjab. In our regression equation, we did not include Islamabad Capital Territory (number of observations 47) and Gilgit-Baltistan (number of observations 87) due to low number of observations. Also, the data for both these areas was only available for the PDHS 2012-13.

The dependent variable in our model was the choice of place of delivery which involved a binary choice, that is, home delivery or institutional delivery. We, therefore, chose the logit model to analyse our data. The advantage of using logit model is that its estimates lie within the probability interval [0, 1] whereas probit model estimates can give values outside [0, 1] interval which have no clear interpretation. The results were given in odd ratios (OR) with confidence interval (CI) obtained from the logit coefficient estimates which give the information about the odds that a woman in some group will deliver in health care facility relative to the odds that women will deliver at home. The three waves of PDHS data are analysed separately using logistic regression analysis and odds ratio (OR) with 95% CI and reported. Analysis of the data was conducted using Stata13 (StataCorp, College Station, Texas, United States).

Results

Of the 6,407 births in 1990-91, the number of home-based deliveries was over 4 times higher compared with that of institutional deliveries [i.e. 5,465(85.3%); 95% CI: 84.3-86.1 vs. 852(13.3%); 95% CI: 12.6-14.2)]. And of the 9,121 births in 2006-07, the number of home-based deliveries was 2 times higher than deliveries at a health care facility[i.e.(5,900(64.7%); 95% CI: 63.7-65.7 vs. 3,128(34.3%); 95% CI: 33.3-35.2). However, of the 11,977 births in 2012-13, the share of women delivering at home or health facility was roughly the same, i.e. 6,180(51.6%) (95% CI, 50.7-52.5) at home and 5,773(48.2%)(95% CI, 47.3-49.1) at health facility.

In 1990-91, nearly 8 times higher number of women aged below 20 years gave birth at home [662(89%); 95% CI, 86.0-90.6)] than at health facility [81(11%); 95% CI, 8.9-13.4)]. In 2006-07, 2 times higher number of women delivered at homes compared with delivery at health

Table-1: Descriptive statistics comparative analysis of DHS 1990-91, 2006-07 and 2012-13.

Background characteristic	2012-2013					2006-2007					1990-1991				
	Health facility (%)			% delivered at health facility	Number of births	Health facility (%)			% delivered at health facility	Number of births	Health facility (%)			% delivered at health facility	Number of births
	Public sector	Private sector	Home (%)			Public sector	Private sector	Home (%)			Public sector	Private sector	Home (%)		
Mother's age at birth															
<20	16.2	32.6	50.9	48.7	1,086	10.9	21.7	66.2	32.7	963	7.3	3.6	88.7	10.8	746
20-34	14.9	34.3	50.6	49.2	9,614	11.2	24.9	62.9	36.1	6,984	7.4	7.2	83.8	14.6	4,843
35-49	10.8	29.6	59.4	40.4	1,277	9.2	15.4	73.9	24.7	1,175	4.9	3.2	91.4	8.0	818
Birth order															
1	17.3	47.1	35.2	64.5	2,783	14.1	34.2	50.8	48.3	1,902	11.1	8.6	78.4	19.7	1,167
2-3	16.9	34.3	48.6	51.2	4,374	11.7	26.8	60.9	38.5	3,119	7.8	7.4	83.3	15.3	2,031
4-5	12.5	26.6	60.7	39.1	2,564	10.3	17.4	70.9	27.7	2,111	6.4	5.4	87.5	11.7	1,538
6+	9.2	23.6	67.1	32.7	2,256	7.3	13.9	77.4	21.1	1,989	3.9	3.9	90.6	7.8	1,671
Antenatal visit															
None	5.4	11.6	82.5	17.0	1,815	4.6	7.2	88.1	11.8	1,972	1.8	1.1	96.9	2.9	4,458
1-3	14.7	33.4	51.8	48.1	2,897	10.9	24.7	64.2	35.6	2,015	13.4	9.3	77.3	22.7	853
4+	22.5	55.8	21.6	78.3	2,723	20.6	49.5	29.8	70.1	1,611	28.3	29.5	42.0	57.8	908
Residence															
Urban	22.2	45.7	31.7	67.9	3,489	17.4	38.8	42.5	56.3	2,699	16.0	16.7	66.5	32.7	1,980
Rural	11.5	28.7	59.7	40.1	8,488	8.2	16.8	74.0	25.0	6,422	3.1	1.6	93.7	4.7	4,426
Region															
Punjab	14.6	34.0	51.3	48.5	6,859	10.0	23.4	65.5	33.4	5,125	6.0	4.5	88.1	10.5	3,933
Urban#	24.4	40.7	34.3	65.1	2,007										
Rural	10.5	31.2	58.3	41.7	4,852										
Sindh	14.0	44.6	41.4	58.6	2,740	10.5	31.2	57.3	41.7	2,284	12.71	14.87	70.62	27.6	1,364
Urban	17.6	60.0	22.4	77.6	1,070										
Rural	11.8	34.7	53.5	46.5	1,670										
Khyber															
Pakhtunkhwa	16.5	24.0	59.3	40.5	1,654	15.4	14.3	69.5	29.7	1,312	4.64	1.97	93.01	6.6	864
Urban	23.3	39.7	36.9	63.0	267										
Rural	15.2	21.0	63.6	36.2	1,388										
Baluchistan	7.7	8.1	83.1	15.8	590	10.4	7.8	81.0	18.2	400	1.6	0.8	96.1	2.4	246
Urban	14.9	15.7	68.9	30.6	107										
Rural	6.2	6.4	86.3	12.6	484										
ICT Islamabad	54.7	31.7	12.9	86.4	47										
GilgitBaltistan	23.1	19.5	57.3	42.6	87										
Mother' s education															
No education	10.4	23.6	65.9	34.0	6,852	7.8	14.3	76.8	22.1	5,986	3.9	2.8	91.7	6.7	4,983
Primary	16.8	35.2	47.9	52.0	2,039	13.7	26.8	58.2	40.5	1,354	10.4	6.9	82.2	17.2	641
Middle	22.4	43.8	33.6	66.2	905	17.0	37.4	45.0	54.5	538	24.1	25.8	49.8	49.8	304
Secondary	23.7	52.2	23.8	75.9	1,209	21.6	51.2	26.4	72.8	722	33.3	54.8	11.9	88.0	479
Higher	21.1	68.6	9.6	89.7	973	18.5	65.2	15.5	83.7	522					
Wealth quintile															
Lowest	7.7	19.4	72.8	27.1	2,864	3.8	8.6	86.5	12.4	2,153	1.02	0.37	97.48	1.4	1,188
Second	10.3	23.5	66.0	33.8	2,535	6.7	13.5	78.9	20.2	1,925	2.94	0.33	94.28	3.3	1,292
Middle	14.5	31.1	54.2	45.6	2,346	10.5	18.9	69.4	29.4	1,829	1.86	1.81	94.18	3.7	1,275
Fourth	22.0	41.4	36.3	63.4	2,349	16.5	30.5	51.6	47.0	1,651	7.58	5.74	86.06	13.3	1,428
Highest	21.8	62.2	15.6	84.0	1,883	20.5	53.3	25.6	73.8	1,563	22.24	23.55	53.55	45.8	1,225
Total	14.6	33.6	51.6	48.2	11,977	10.9	23.3	64.7	34.3	9,121	7.1	6.2	85.3	13.3	6,407

Source: Pakistan Demographic and Health Survey reports 2012-13, 2006-07 & 1990-91 (https://dhsprogram.com/).

Provincial urban and rural disaggregation was not available before 2012-2013.

ICT: Islamabad Capital Territory.

Table-2: Logistic Regression Analysis Results (Odds Ratios).

		1990-91		2006-07		2012-13	
	Groups*	**OR [CI]**	**P>|z|**	**OR [CI]**	**P>|z|**	**OR [CI]**	**P>|z|**
Region	Urban						
	Rural	0.567 [0.429-0.749]	0.000	0.756 [0.657-0.870]	0.000	1.052 [0.906-1.222]	0.504
Province	Punjab						
	Sindh	3.340 [2.680-4.163]	0.000	2.262 [1.969-2.599]	0.000	2.270 [1.969-2.616]	0.000
	KP	1.084 [0.788-1.493]	0.619	1.347 [1.147-1.583]	0.000	0.972 [0.848-1.115]	0.686
	Baluchistan	0.526 [0.304-0.911]	0.022	0.835 [0.675-1.033]	0.097	0.350 [0.291-0.422]	0.000
Mother's education	No education						
	Primary	1.378 [1.026-1.849]	0.033	1.498 [1.267-1.771]	0.000	1.328 [1.122-1.572]	0.001
	Secondary	4.206 [3.175-5.571]	0.000	2.531 [2.111-3.034]	0.000	2.131 [1.781-2.550]	0.000
	Higher	20.39 [9.217-45.11]	0.000	4.970 [3.692-6.690]	0.000	5.218 [3.814-7.138]	0.000
Wealth index	Poorest						
	Poorer	2.550 [1.169-5.562]	0.019	1.739 [1.431-2.113]	0.000	1.413 [1.181-1.690]	0.000
	Middle	2.481 [1.173-5.249]	0.017	2.674 [2.191-3.263]	0.000	2.083 [1.718-2.524]	0.000
	Richer	5.865 [2.885-11.92]	0.000	4.308 [3.492-5.313]	0.000	3.599 [2.902-4.462]	0.000
	Richest	15.15 [7.367-31.15]	0.000	8.561 [6.68-10.973]	0.000	7.077 [5.353-9.355]	0.000
Mother's age at birth	<20						
	20-34	1.689 [1.166-2.447]	0.006	1.502 [1.215-1.858]	0.000	1.173 [0.939-1.465]	0.159
	35-49	1.566 [0.936-2.620]	0.088	2.001 [1.493-2.681]	0.000	1.454 [1.083-1.952]	0.013
Birth order	1						
	2-3	0.465 [0.342-0.630]	0.000	0.540 [0.457-0.639]	0.000	0.587 [0.496-0.693]	0.000
	4-5	0.408 [0.292-0.569]	0.000	0.390 [0.322-0.472]	0.000	0.398 [0.330-0.480]	0.000
	6+	0.328 [0.231-0.466]	0.000	0.345 [0.278-0.428]	0.000	0.398 [0.321-0.494]	0.000
Pseudo R^2		0.3434		0.2150		0.1838	
Hosmer-Lemeshow χ^2 (8)		10.84	0.210	14.74	0.060	26.09	0.001

* The bold values in the Groups column indicate the reference groups.
KP: Khyber Pakhtunkhwa
OR: Odds ratio
CI: Confidence interval.

facility [637(66%); 95% CI, 63.1-69.1 vs. 318(33%); 95% CI, 29.8-35.7)] in health facility. In 2013, nearly same number of women delivered at homes and health facilities [553(51%); 95% CI, 47.9-53.9 vs. 529(49%); 95% CI, 45.7-51.7)] in health facility. However, the share of women above 34 years giving birth at home [748(91%); 95% CI, 89.1-93.0)] was 11 times higher than women in the same age group giving birth in health facility [65(8%); 95% CI, 6.4-10.2)] in 1990-91; it was 3 times higher in 2006-07 [868(74%); 95% CI, 71.4-76.4 vs. 294(25%); 95% CI, 22.3-27.2)]; and 1.5 times higher in 2012-13 [759(59%); 95% CI, 56.7-62.1 vs. 516(40%); 95% CI, 37.8-43.2)].

Regarding the association of order of child birth with the place of delivery, we found that out of all the women who gave birth to the first child, 915(78%) (95% CI, 75.8-80.6) was at home in 1990-91, 966(51%) (95% CI, 48.6-53.0) in 2006-07 and 980(35%) (95% CI, 33.6-37.2) in 2012-13. Compared with the women who gave birth to first child, a larger percentage of the women giving birth to sixth or subsequent child gave birth at home. The percentage of women giving birth to 6th or subsequent child at home was 12 times higher compared with health facility in 1990-91, 4 times higher in 2006-07 and 2 times higher in 2012-13.

Among the women who had no ANC visit, only 129(3%) (95% CI, 2.5-3.5) delivered at health facility in 1990-91, but the women who had more than 3 ANC visits, about 525(58%) (95% CI, 54.6-61.0) delivered at health facility. In 2006-07, 233(12%) (95% CI, 10.5-13.4) of the women with no ANC visit delivered at health facility but 1,129(70%) (95% CI, 67.9-723) delivered at health facility when they had more than 3 ANC visits. In 2012-13, 309(17%) (95% CI, 15.4-18.8) of the women who had no ANC visit delivered at health facility but 2,132(78.3%) (95% CI, 76.7-79.8) delivered at health facility when they had more than 3 ANC visits (Table-1).

In 1990-91, the odds that a rural woman would give birth at home were 1.76 times higher than her urban counterpart (OR 0.567; 95%; CI 0.429-0.749; p=0.000); in 2006-07, the odds of delivering at home for a rural woman were 1.32 times higher than her urban counterpart (OR

0.76; 95%; CI 0.657-0.870; p=0.000). However, in 2012-13, the odds of institutional birth for rural women were almost the same as the urban women, though the coefficient was not statistically significant (OR 1.052; 95%; CI 0.906-1.222; p=0.504).

There was wide disparity in the rates of institutional delivery in four provinces. Compared with Punjab, the odds of institutional delivery in Sindh in 1990-91 were over 3 times higher (OR 3.340; 95%; CI 2.680-4.163; p=0.000) in 1990-1991, and 2.3 times higher in 2012-13 (OR 2.27; 95%; CI 1.969-2.616; p=0.000). The probability of institutional birth in Balochistan was around one-third of Punjab in 1990-91, but in 2012-13, it was almost the same as in Punjab. In KPK, the odds of institutional delivery were almost the same as in Punjab in 1990-91 (OR 1.084; 95%; CI 0.788-1.493; p=0.619); in 2006-07, odds of institutional delivery were 1.35 times higher than institutional delivery in Punjab (OR 1.347; 95%; CI 1.147-1.583; p=0.000); but in 2012-13 the odds of institutional delivery were again almost the same as the odds of home-based delivery (OR 0.972; 95%; CI 0.848-1.115; p=0.686).

The wealth status is also a significant predictor of the choice of birth place. The odds of institutional delivery for a woman belonging to the poorer wealth quintile were 2.6 times higher than the reference group of the poorest wealth quintile in 1990-91 (OR 2.550; 95%; CI 1.169-5.562; p=0.019); in 2006-07, it was 1.7 times higher than the reference group (OR 1.739; 95%; CI 1.431-2.113; p=0.000), and in 2012-13, these odds were 1.4 times higher than institutional delivery among the poorest wealth quintile (OR 1.413; 95%; CI 1.181-1.690; p=0.000). A similar pattern was observed in higher wealth quintiles (Table-2).

Discussion

A little more than half of the births occurred institutionally in Pakistan in the year 2012-13, whereas they were only 13.3% in the year 1990-91. The descriptive analysis shows that mother's age at birth strongly predicts the odds of institutional delivery. Even if the share of the under-20 mothers delivering at home was 88.87% in 1990-91 and 50.9% in 2012-13, the situation is still not satisfactory because a range of avoidable birth-related complications can be further reduced with the institutional delivery.[3] As the mother's age increases, it is observed that they prefer to deliver at home rather than at health facility. The possible reason could be a myth that the likelihood of birth-related complications is high for the first baby which falls with the number of subsequent births. This is in line with the hypothesis that as the age of mother increases, she becomes more influential in the decision-making.[13,14]

In 1990-91, only 4.7% of the urban women delivered in the health facilities, but in 2012-13, this ratio is over 40%. Though not an ideal situation, still this is a positive development for rural areas. Multiple factors might have been responsible for this. The rising educational levels in the rural areas and relatively deeper penetration of information technology are some of the major factors behind a larger rural population opting for institutional delivery. The analysis also showed that urban mothers were more likely to go for institutional delivery. A number of previous studies also reached similar conclusions.[15,16] Significant increase in the number of basic health units (BHUs) at rural areas might also explain why larger share of rural women opts for institutional delivery over time.[17] The wide differences in the rate of delivery at health facilities along urban/rural divide are symptomatic of more general rural urban disparities. We know a priori that substantial regional disparities exist in terms of development level. Some studies have however found that the urban-rural differences are not significant in Pakistan after adjusting for the education and the wealth status of the household.[17] A combination of factors such as availability of medical services and cultural attitudes to the use of the modern facilities is considered to determine the patterns of home or institutional deliveries. Punjab has performed a little better in terms of achieving the goal of institutional deliveries than Sindh, and this is consistent with the overall pattern in which Punjab has shown better performance on other socio-economic indicators like literacy and income growth.[18]

The odds of institutional delivery are quite diverse across four provinces and the Federal Capital and Gilgit-Baltistan areas. In KPK, the odds of institutional delivery in 2012-13 were almost the same as in Punjab though they were 1.35 times higher in 2006-07. The surge of extremism in KPK in recent years with reports of Taliban discouraging women to leave their homes could be the reason behind the change in the falling probability of institutional birth. Balochistan has performed worse than the three other provinces. In 2012-13 alone, the odds of institutional delivery for a woman in Balochistan were one-third the probability in Punjab. The possible reason is rise in extremism in many parts of Balochistan which is antithetical to the freer movement of women outside their homes.

The role of wealth status is also crucial in the choice of institutional delivery. In the recent survey 2012-13, the probability that a woman in the highest wealth quintile would go for institutional delivery is three times higher

compared with probability of institutional delivery for a woman in the lowest wealth quintile. This should be a serious concern because the poorest women are more vulnerable to birth related complications. Some earlier studies also show that the mothers in the poorer wealth quintiles generally lack access to the institutional delivery,[3,7] while some studies show a positive relationship between the higher wealth status and institutional deliveries.[19] The fact that wealth status is an important predictor of the choice of institutional delivery is a sad reminder that the poor women are more vulnerable to the obstetric complications at the time of birth. The difference in the odd ratios of institutional delivery between the poorest and richest quintiles may also be symptomatic of the fact that institutional delivery is not affordable for many poor people. The odds that a woman in the richest wealth quintile will have institutional delivery are likely to be seven times higher than that of the woman in the poorest wealth quintile in 2012-13, while in 1990-91, it was likely to be 20 times. The gap points to a failure of the public policy to narrow down the disparities in the provision of essential public health services to the masses, especially in rural areas. The rich people can afford to buy services in the private sector, which are limited in the public sector and may be inaccessible to a large population in rural areas due to relatively low purchasing power. Our results corroborate a number of previous studies on the role of wealth status in the choice of place of delivery.[19,20]

Child's birth order also determines the likelihood of the institutional delivery. As the number of children increase, more mothers are likely to deliver at home. The gender of the first child could also influence the choice of place of delivery, but unfortunately no data is available to test this proposition. The large number of institutional deliveries in 2012-13 can be explained by the infrastructure development in the last two decades. The strong negative association between the order of birth and the institutional delivery may be explained by the general attitude in Pakistani society. It is generally believed that the birth of first child is more likely to be institutional because it is considered more difficult or a high social value is placed on the first pregnancy,[14] while the births of subsequent children show falling odds of institutional birth.[7]

Mothers' education is an important predictor of the decision of institutional delivery.[7] In 1990-91, a woman with higher education was 20 times more likely to deliver in the health facility compared with the women with no education, but in 2012-13, these women are only 5 times more likely to deliver in the health facility. Again, this could be attributable to the higher availability of health care facilities and change in attitudes in the less educated women thanks to the relatively more candid discussion of female health issues in the electronic and social media. This result is consistent with previous studies.[21]

A little caveat needs to be put here regarding the goodness of the fit of the models. We used Hosmer-Lemeshow test to estimate the goodness of the fit of the models. While the econometric specification for 1990-91 and 2006-07 didnot show any problem, the model for 2012-2013 indicated misspecification at the 99% confidence level. However, chose not to drop any variable because the independent variables were chosen based on the existing literature and dropping any of the variables would ignore important hypotheses about the relationship between the institutional delivery and its correlates.

Conclusion

There were wide gaps in the rates of institutional delivery among different subgroups. These gaps were accentuated by the socio-economic and financial disparities, and high illiteracy rates in the lowest wealth quintiles. The focus of public health policy needs to be on the expansion of the obstetric care with an emphasis on the underprivileged groups, especially in the rural areas.

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