

What Determine Institutional Delivery in Rural Uttar Pradesh? An Analysis of Choice of Delivery Location

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The use of health services is a complex behavioural phenomenon. It is not only related to organization of health service delivery system but also affected by availability, quality, cost, and continuity, comprehensiveness of services, social structure and health belief of the population.⁽¹⁾ Access to quality care during pregnancy and especially at delivery seem to be the crucial factor in explaining the disparity in maternal mortality and morbidity between the developing and the industrialised world. An estimated 90% of maternal deaths could be avoided, if adequate care was provided.⁽²⁾ Childbirth is a risk-producing event, and timely and adequate medical care for women who experience obstetric complications is an option for mitigating the risk. Women are encouraged to deliver their babies in health facilities as a strategy to improve maternal health outcomes. Population policy of Uttar Pradesh aimed to increase institutional deliveries from 17 percent in 1997 to 35 percent in 2006, to 45 percent in 2011 and to 55 percent in 2016, in order to reduce maternal mortality to below 250 by 2016.⁽³⁾

The choice of place of delivery has consistently been found to be associated with maternal and neonatal outcomes.^(4,5,6) Childbirth in a health institution such as a hospital attended to by trained medical staff with midwifery skills has been shown to be associated with lower rates of maternal and neonatal mortality and morbidity than home births,^(5,7) even though, our society perceives pregnancy as a condition that does not require medical attention.⁽⁸⁾ Thus, in order to promote institutional delivery various maternity benefit schemes had been launched by the government. Utilization of health services is affected by a multitude of factors including not only availability, distance, cost, and quality of services, but also by socioeconomic factors and personal health beliefs.

In an attempt to understand the factors that determine women's utilization of health services,⁽⁹⁾ posited the role of need, permission, ability, and availability. There were systematic differences in place of delivery and type of attendance at delivery by age

of the mother⁽¹⁰⁾ and order of the birth⁽¹¹⁾ and also by caste and standard of living of the woman. But socioeconomic factors, have been shown to be of greater importance in determining health service use than demographic factors and a woman's level of education has been the most consistent finding.^(7,11,12) Cost has also been shown to be a barrier to service use⁽¹³⁾ and it influences the source from which care is sought.

Differentials within institutional deliveries have also been observed. With rapid economic growth, there has been a concomitant expansion of the private sector in health care delivery in India. In Uttar Pradesh which has large regional disparities within state, choices of institution for delivery care has been influenced by region where they reside.

Thus, it is important to tease out the two types of institutions – public and private by regions of Uttar Pradesh.

With this background, objectives of the present study are- to understand the determinants of delivery location (home, public or private facility) and reasons for not utilizing existing health care facilities in rural Uttar Pradesh, a major state of India, using data from the District Level Household Data-(DLHSII).

Conceptual Model for utilization of delivery care services

Andersen's Behavioural Model of Health Services Utilization was used as the conceptual framework of the study. (1) This model classifies factors that facilitate or impede use of health service can be classified into three groups: factors that predispose affect health services utilization into three groups: predisposing, enabling and need factors.

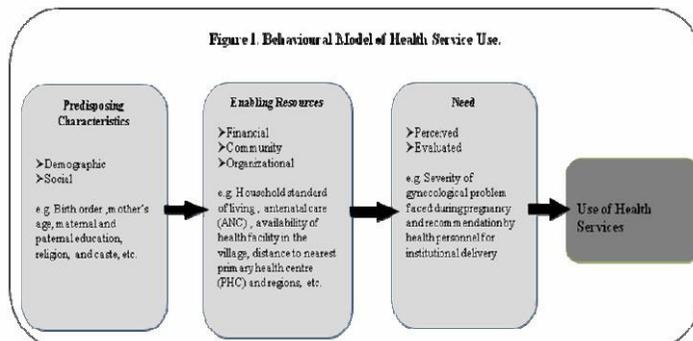


Figure.1 describes the pathways of the model. Among the *predisposing* factors, demographic characteristics (age, gender, marital status) reflect the propensity of individuals to use services. Social structure (education, occupation, race/ ethnicity) measures the ability of the individual to cope with the problem, the resources available in the community, and the state of the physical environment. *Enabling* factors, both personal and organizational, must be present for service utilization, and these represent the actual ability of the individual to obtain health services. Personal enabling factors include income, health insurance, regular source of care, and travel

and waiting times; organizational enabling factors include the availability of health care providers and their spatial distribution. The most immediate cause of health services utilization is *need*. This judgment about need can be made by the individual himself or family caregivers (perceived need), and can be estimated by a self assessment of health status, symptoms experienced during a period of time, or number of symptoms during a period of time. Need can also be defined through a professional evaluation (evaluated need); for example, physician severity ratings for an episode of illness. (1)

Data and Methods

The District Level Household Survey (2002-04) data for Uttar Pradesh have been used for the present analysis. The survey covered all the 70 districts in two phases. A systematic, multi-stage stratified sampling design was adopted. In each district, 40 primary sampling units (PSUs- Villages/Urban Frame size) were selected with probability proportional to size using 1991 census data, and female literacy was used for implicit arrangement within each strata. The distribution of the number of rural and urban PSUs was made on the basis of the percentage of urban population in the district. The target sample size was set at 1000 complete residential household. In third stage, within each PSU, 28 residential households were selected with Circular Systematic Random Sampling (CSRS) procedure in order to take care of 10 percent non-response due to various reasons. (14)

In District Level Household Survey, a comprehensive interview schedule for currently married women age 15 - 44 years has been used, which collected in-depth information on antenatal care and immunization services, institutional deliveries, contraceptive prevalence, unmet need for family planning, awareness about RTI/STI and HIV/AIDS, assessment of quality of government health facilities and client satisfaction, etc. Apart from these, a village schedule was also added in this survey for the information of availability and accessibility of various facilities in the village especially on accessibility of educational and health facilities.

The present analysis had been based on rural sample of Uttar Pradesh, in order to link the health facility availability from village schedule. The rural Uttar Pradesh had sample size of 44,725 (weighted) 45,020 (un-weighted) currently married women aged 15- 44 years. We abstracted data from the live births which took place for the last three years preceding the survey date (n=22,451). Bivariate analysis for each independent variable was performed against the dependent variable to elicit the effect of each factor on the health services utilization in the population, without adjusting for the effect of other variables. Since the dependent variable had three response categories, a multinomial logistic (MNL) regression model was used to assess the effect of each variable independently on the dependant variable while controlling for the confounders. Odds ratio from MNL regression and predicted probabilities are reported.

Variable specification

A categorical dependent variable was created based on the place of delivery of the live birth took place in last three years. It was categorized as 'home' if the mother reported that the last birth occurred at home; 'public' if it took place in a government hospital, government dispensary, community health center or primary health center, and 'private' if the birth occurred at a private hospital, private clinic, and non-governmental organizations (NGO) or trust hospital. NGO and trust hospitals were included in the private sector category and could not be classified as a separate entity due to their small numbers.

The predisposing variables included in the model were birth order of the child for which care was sought, socio-demographics of the mother and father (maternal age, maternal and paternal education, religion, and caste). Enabling factors are household standard of living (SLI), whether antenatal care (ANC) had been taken and its intensity (number of visits), availability of government health facility in the village, distance to nearest primary health centre (PHC) and regions. Other than ANC and household SLI all the factors are contextual which may impede or promote the utilization of facility. 70 districts of Uttar Pradesh have been classified into four regions using classification of National Family Health survey (see *Appendix 1*).⁽¹⁵⁾ Though the potential need for the institutional delivery is universal but the facility coverage has not matched with it, thus need has been defined on the basis of pregnancy. Non-utilization of services by regions with government facilities for delivery have been analyzed and crossclassified with above background characteristics of the respondents. Reasons were classified into three major groups (Table 1).

Table1. Reasons for not using health facilities for institutional deliveries.

Major issues	Reasons
Need	Not necessary Not
Accessibility	Too far/no transport } Poor quality/Transportation Poor quality service
Family and community acceptability	Family did not allow Better

Results

Among the 22,451 currently married women, who gave birth in last three years, the majority delivered at home i.e. 84 %, within private facility and public facility approximately 9% and 7 % respectively. Among predisposing factors higher birth order, non-Hindu religion, OBC and SC/ST status were associated with home delivery while lower birth order and increasing mother’s and father’s education were associated with institutional delivery specially with private facility. All enabling and

need variables were also significantly associated with the choice of provider (Table 2). Among contextual factors region from which women belongs has played important role in determining the place of delivery. Though the home delivery is more than 80 % in all the regions but distribution of rest of the women among public and private facilities shows that in western region, the second most common place for delivery outside their home had come out to be private facility, while in other three regions, percentage of women delivery at public and private facilities were almost equal.

Table 3 presents results of multinomial logistic regression model. Among predisposing variables, birth order is not a significant determinant of public over private sector use, but is a determinant of home delivery. Similarly, Caste of women does not impact public versus private facility for delivery care, but is determining factor for institutional delivery over home. Women with higher birth order (more than 2 children) had lower odds of delivering at public facility compared to homes (OR= 0.65, p value<0.001); while increasing maternal and paternal education were associated with greater odds of delivery in a public facility. Compared to Hindu women, non-Hindu women had lower odds (OR=0.80, p-value<0.05) of delivering at public health facilities.

Among enabling variables, household standard of living index has significant impact on choice of private facility over public. In comparison to women belonging to low SLI households, women from high SLI households have 30% lower chances of delivering at public facility over private. The effect is stronger when private facilities and home deliveries were compared. Antenatal care visits is the strongest predictor of institutional delivery. The odds for delivering at public facilities over home are four times for women who had more than three ANC as compared to those who did not go ANC care.

Table 2: Descriptive characteristics of live births according to place of delivery, Rural Uttar Pradesh, 2002-04

<i>Predisposing factors</i>		Place of Delivery		
		Public	Delivery	Home
Birth Order	2 or less	10.0	13.1	76.9
	More than 2	5.3	5.9	88.8
Mother's Age	<20 yrs	8.9	9.0	82.1
	20-29 yrs	7.6	9.7	82.7
	>30 yrs	5.4	6.1	88.5
Mother's Education	Illiterate	5.4	5.5	89.0
	<=5 years	8.4	10.5	81.0
	6 to 10 years	11.5	17.6	71.0
Husband's Education	>10 years	20.3	32.8	46.9
	Illiterate	3.8	4.0	92.2
	<=5 years	5.2	5.9	87.9
Religion	6 to 10 years	8.0	9.4	82.6
	>10 years	12.5	18.5	68.9
	Hindu	7.5	8.8	83.7
Caste	Non-Hindu	4.9	7.3	87.8
	SC/ST	5.6	5.1	89.3
	OBC	6.8	8.5	84.7

	Others	10.0	14.1	75.9
Enabling Factors				
Standard of Living Index	Low	5.6	5.5	88.9
	Medium	9.9	12.2	78.0
	High	13.4	29.6	57.0
Antenatal care visits	No ANC	3.8	4.4	91.8
	3 or less	10.4	11.3	78.3
	More than 3	15.2	21.9	62.9
Distance from Nearest Primary health centre	<=5 km	7.7	9.1	83.1
	6-10 km	6.8	8.2	85.0
	10-20 km	5.1	7.3	87.7
	>20 km	6.1	6.6	87.3
Presence of Government health facility	No	6.8	8.4	84.8
	Yes	8.2	9.6	82.1
Regions	Western	5.1	10.3	84.5
	Central	6.3	5.5	88.2
	Eastern	8.6	8.8	82.6
	Bundelkhand	8.0	6.0	86.1
Need Factor				
Pregnancy Complications	No	6.3	7.3	86.4
	Yes	8.8	11.5	79.7
	Total	7.1	8.6	84.4

Note: 1. Caste has been classified into three categories: *SC/ST* includes Schedule Caste and Schedule Tribe, *OBC* includes Other Backward Classes and rest are classified into *Others* category.

2. Regions of Uttar Pradesh were made according to NFHS-3 Classification (see Appendix 1).

Table 3. Multinomial logit regression analysis of odds of choices of delivery location i.e. public, private or home (n=22,451), Rural Uttar Pradesh, 2002-04

		<u>Odds Ratios</u>		
		Public Vs Home	Private Vs Home	Public Vs Private
Predisposing factors				
Birth Order	2 or less@			
	More than 2	0.65***	0.61***	1.06
Mother's Age	<20yrs@			
	20-29 yrs	0.91	1.09	0.84
	>30yrs	1.01	1.18	0.86
Mother's Education	Illiterate			
	<=5years@	1.12	1.24	0.91
	6 to 10 years	1.32***	1.68***	0.79
	>10 years	2.29***	2.65***	0.86**
Husband's Education	Illiterate			
	<=5years@	1.34***	1.17	1.14
	6 to 10 years	1.47***	1.37***	1.07
Religion	>10 years	1.55***	1.69***	0.92
	Hindu@			
Caste ¹	Non-Hindu	0.80**	1.00	0.80
	SC/ST@			
	OBC	1.23***	1.36***	0.90
	Others	1.54***	1.46***	1.06
Enabling Factors				
Standard of Living Index	Low@			
	Medium	1.37***	1.50***	0.91
	High	1.68***	2.53***	0.67***
Antenatal care visits	No ANC @			
	3 or less	2.54***	2.21***	1.15
	More than 3	4.00***	4.03***	0.99
Distance from Nearest Primary health centre	<=5 km@			
	6-10 km	0.88*	0.93	0.95
	10-20 km	0.70***	0.91	0.77**
	>20 km	0.63**	0.74	0.85
Presence of Government health facility	No @			
	Yes	1.00	0.86	1.16
	Western@			
Regions ²	Central	1.38***	0.60***	2.28***
	Eastern	1.52***	0.84***	1.82***
	Bundelkhand	1.93***	0.72***	2.66***
Need Factor				
Pregnancy Complications	No@			
	Yes	1.32***	1.59***	0.83***

Note: 1. Caste has been classified into three categories: *SC/ST* includes Schedule Caste and Schedule Tribe, *OBC* includes Other Backward Classes and rest are classified into *Others* category.

2. Regions of Uttar Pradesh were made according to NFHS-3 Classification (see Appendix 1).

*** p<0.001, ** p<0.05

Though, the presence of government health facility in the village does not have impact on institutional delivery but distance from public health facility is negatively associated with choice of delivery at public facility over home delivery.

In comparison to Western region of Uttar Pradesh, women belonging to other regions have significantly higher odds of delivering at public facilities over home; on the other hand it has been observed that all the regions have lower odds of delivering at private facility over home as compared to western region. Choice of public facility over private one, for institutional delivery is significantly higher in all the three Central, Eastern and Bundelkhand region as compared to Western Uttar Pradesh.

Severity of need (pregnancy complications) favours private facility over public. However, compared to home deliveries, women with pregnancy complications had 32% higher odds of delivering at public facility (OR=1.32, p<0.001) and 59% higher odds of delivering at private facility (OR= 1.59, p<0.001).

In order to avoid ambiguity in interpretation of MNL regression, Figure 2 (a) and 2(b) presents predicted probabilities in form of predicted percentages for selected predictor variables.

Figure 2a. Adjusted effects of predisposing factors on the order of delivery location in rural Uttar Pradesh 2002-04

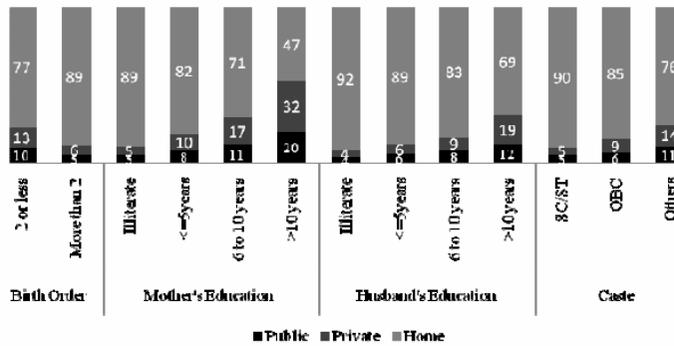


Figure 2b. Adjusted effects of enabling and need factors on the choice of delivery location rural Uttar Pradesh, 2002-04

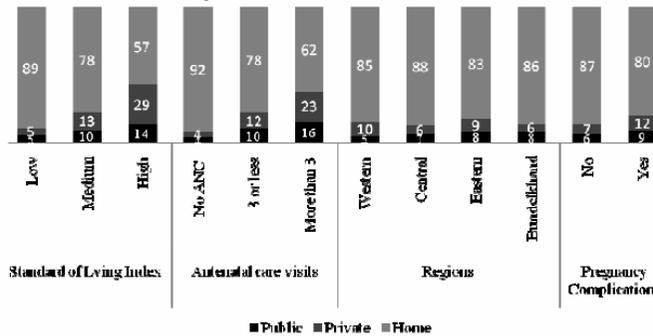


Table 4 presents the reasons for not utilizing facilities for delivery by availability of public health facilities for delivery by regions of Uttar Pradesh. Majority of women reported that they do not perceive it necessary to deliver at facility in all the regions irrespective of availability of public health facility. In Western and Central region women do not avail institutional delivery due to opposition of family members (18% and 16%) while in Eastern and Bundelkhand region the second major barrier in institutional delivery is direct as well as opportunity cost related with it (16% and 18%). Lack of knowledge is also another important issue in Central Uttar Pradesh. It has been observed that presence of facility does not make any huge difference in magnitude of barriers in all the regions.

Table 4: Reasons for not delivering at facility by availability of public health facilities and regions, Rural Uttar Pradesh, 2002-04.

		Western	Central	Eastern	Bundelkhand	
Villages with Government facilities for Deliverycare		Notneeded	66.2	55.2	63.2	53.2
	Yes	Direct/Indirectcost	8.0	10.0	16.1	18.0
		Poor quality and transportation	3.5	5.7	4.0	9.4
		Family didnotallow	17.6	15.5	6.8	7.8
		Better careathome	2.5	2.7	5.2	8.3
		Lackofknowledge	2.3	10.9	4.7	3.2
		Notneeded	73.4	60.3	63.9	66.2
		Direct/Indirectcost	8.3	7.6	12.9	11.9
		Poor quality and transportation	2.3	4.5	5.4	6.7
		Family didnotallow	11.4	14.2	7.4	5.9
	Better careathome	2.7	2.3	4.4	6.1	
	Lackofknowledge	1.9	11.1	6.0	3.3	

Discussion

A major strategy outlined in national population policy to reduce maternal mortality is to promote institutional deliveries by strengthening the public health system. An another strategy is to introduce diverse categories of health care providers, promoting the involvement of private health care sector in form of partnership. Of the 16% of institutional delivery in Rural Uttar Pradesh which is lower than the national average, equal numbers took place in public and private facilities. This analysis indicates some important predictors of institutional delivery and choice of institution (public or private). It has been observed that region has large effect on choice of institution. Women belonging to western region are more attracted to private facility if they have to go for institutional delivery, in comparison to other region of state especially Central and Bundelkhand region. Possible explanation behind this may be the economically better off condition of this region and family and community pressure; Central region women reported lack of knowledge as one of the major reason for the non-utilization of facility while women from Bundelkhand emphasised on cost related reasons, which indicate towards low accessibility of the public health services or community's less trust in government health services.

Analyses show that among the predisposing factors, birth order, maternal education and paternal education and caste affect the choice between public/private and home deliveries. Education leads to better health awareness, and this may sensitize the family to the quality of health care provided at various facilities.⁽¹⁶⁾ It is generally believed that private facilities provide better care than public facilities. Despite rigorous efforts to integrate these schedule caste and tribes into society, much work need to be done in the rural Uttar Pradesh as chances of home deliveries are higher in comparison to other social groups, over public/private.

Among the enabling factors, number of antenatal visits and location (region) affected the choice between home and private/public facilities, while a higher standard of living affected the choice of institutional deliveries over home delivery and also favours private facility over public. The better off class have the resources to pay for the price of private care, and given the perception of better quality at private facilities. Need defined as pregnancy complication in the study comes out to be a significant determinant of institutional delivery (public/private over home) and also for private over public sector use.

However, analyses suggest that among the reasons for non-utilization of facilities, perceived 'need' for institutional deliveries are found to be very low. This may not be improved without effective intervention and motivation from the provider side. Cost concerns are also another important barrier in seeking institutional delivery. Sometimes, in public health care institutions cost of travel and opportunity cost in terms of time became higher than actual delivery cost. The third major barrier is familial pressure to deliver at home while only in central region due to lack of knowledge institutional deliveries in government facilities are hindered.

Appendix 1. Classification of Districts of Uttar Pradesh into regions, NFHS-3, 2005- 06.

Regions	Districts
I (Western)	Bijnor, Ghaziabad, Meerut, Moradabad, Rampur, Saharanpur, Muzzafarnagar, Agra, Aligarh, Bareilly, Budaun, Bulandshahr, Etah, Farrukhabad, Firozabad, Mainpuri, Pilibhit, Shahjahanpur, Etawah, Mathura, Auraiya, Baghpat, Goutam Buddha Nagar, Hathras, Iyotiba Phule Nagar, Kannau

II (Central)	Kheri, Hardoi, Rae Bareli, Sitapur, Barabanki, Fatehpur, Kanpur Dehat, Kanpur Nagar, Lucknow, Unnao
III (Eastern)	Allahabad, Gonda, Pratapgarh, Sultanpur, Bahraich, Faizabad, Azamgarh, Basti, Deoria, Gorakhpur, Jaunpur, Maharajganj, Mau, Siddharthnagar, Ballia, Gazipur, Varanasi, Mirzapur, Sonbhadra, Ambedkar Nagar, Balrampur, Chandauli, Kaushambi, Kushinagar, Sant Kabir Nagar, Sant Ravidas Nagar Shrawasti
IV (Bundelkhand)	Banda, Lalitpur, Hamirpur, Jalaun, Jhansi, Chitrakoot, Mahoba

References

1. Andersen, R.M., (1995). Revisiting the Behavioral Model and Access to Medical Care: Does it Matter? *Journal of Health and Social Behaviour*, Vol.36, No.1, pp.1-10.
2. Faundes A, Rosenfield A & Pinotti JA (1988). Maternity care in developing countries: relevance of new technological advances. *Int J Gynecol Obstet*, Vol.24, pp.103-109.
3. Population Policy of Uttar Pradesh, (2000). Department of health and Family Welfare. Government of Uttar Pradesh.
4. Giri, K., (1995). "Discussion," *Int J Gynecol Obstetr*. 50, Supplement, S43.23
5. Tsu, V. D., (1994), "Antenatal screening: its use in assessing obstetric risk factors in Zimbabwe," *Journal of Epidemiol Community Health*, Vol.48, pp.297-305.
6. Thaddeus, S., & Maine, D., (1994). "Too far to walk: maternal mortality in context," *Social Science & Medicine*. Vol. 38, No.8, pp.1091-1110.
7. Jejeebhoy, S.J., & Rao, S. R., (1995). "Unsafe Motherhood: A Review of Reproductive Health," in M. Das Gupta, L. Chen and T. Krishnan, eds., *Women's Health in India: Risk and Vulnerability* (Bombay, India).
8. Sheriff A. & Singh G., (2002). "Determinant of Maternal health Care Utilization in India : Evidences from a Recent Household Survey", Working Paper Series No. 85, NCAER, New Delhi.
9. Chatterjee, M., (1990). *Indian Women: Their Health and Economic Productivity*. Report No. 109, World Bank Discussion Papers. Washington, D.C., World Bank.
10. Bhatia, J. & Cleland, J., (1995). "Determinants of maternal care in a region of South India," *Health Transition Review*, Vol. 5, pp.127-142.
11. Magadi, M.A., Madise, N.J. & Rodrigues, R.N., (2000). "Frequency and timing of antenatal care in Kenya: explaining the variations between women of different communities," *Soc Sci Med*. Vol. 51, pp.551-561.
12. Nuwaha, F. & Amooti-kaguna, B., (1999). "Predictors of home deliveries in Rakai District, Uganda," *African Journal of Reproductive Health*, Vol.3, No.2, pp.79-86.
13. Bloom, S.S, Lippeveld, T & Wypij, D., (1999). "Does antenatal care make a difference to safe delivery? A study in urban Uttar Pradesh, India," *Health Policy & Planning*. Vol. 14, No.1, pp. 38-48.
14. International Institute for Population Sciences, (2002-04). District level Household Survey: Uttar Pradesh. International Institute for Population Sciences, Mumbai.
15. International Institute for Population Sciences (IIPS) & Macro International, (2007). *National Family Health Survey (NFHS-3), 2005-06: India: Volume II*. Mumbai: IIPS
16. Navaneetham K, Dharmalingam A, (2002): Utilization of maternal health care services in Southern India. *Soc Sci Med*, 55(10):1849-1869.