What Determines Institutional Delivery in Rural Uttar Pradesh, India? Focussing towards the Choice of Delivery Location

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This study examines the association of individual and community-level characteristics with the choice of delivery location (home, public or private facility) for the most recent live birth of currently married women in Rural Uttar Pradesh, India. District Level Household Survey-Reproductive and Child Health Survey (DLHS-RCH, 2007-08) data on 30,856 currently married women belonging to 2827 villages in Uttar Pradesh, is used to assess effect of the village infrastructure and availability of public health services on choice of delivery location. Anderson Behavioural Model of health service use has been utilized through Multinomial Logistic regression analyses. Result indicates that other than usual individual risk factors, presence of government health facility, distance to nearest primary health centre and functioning of maternity benefit schemes in the villages has significant impact on choice of delivery location, where as presence of village health worker may not found to be associated with institutional delivery.

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Introduction

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 seems 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.

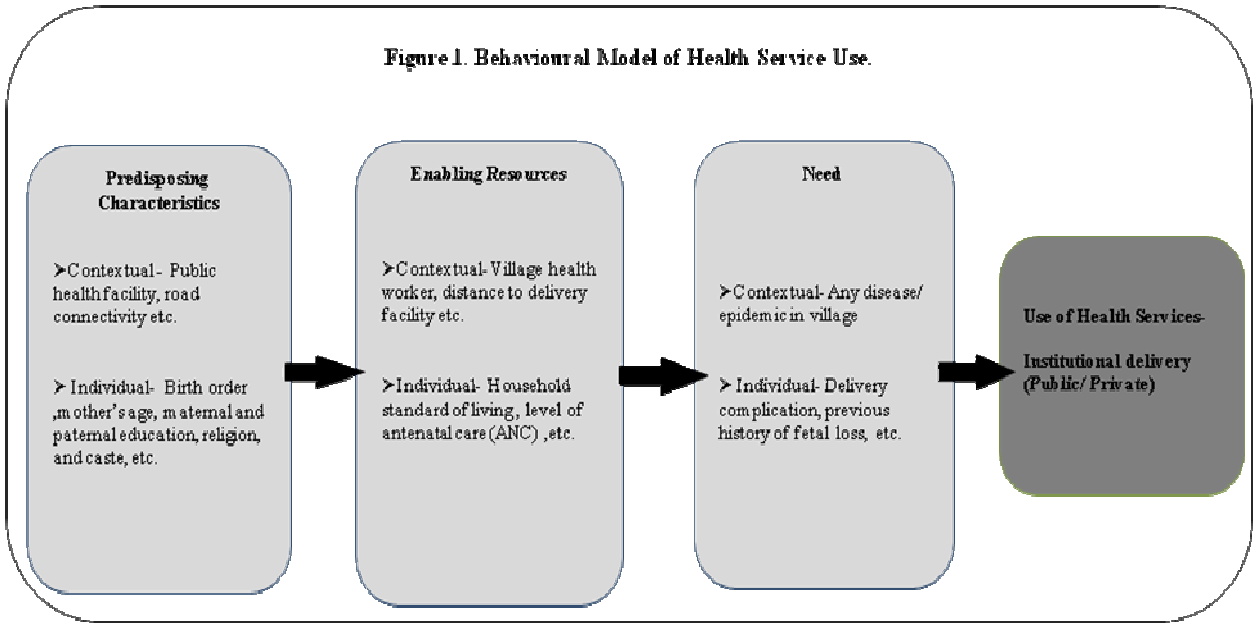
Utilization of health services is affected by a multitude of factors including not only availability, distance, cost, and quality of services, but also by socioeconomic factors and personal health beliefs. In an attempt to understand the factors that determine women's utilization of health services, [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 were they reside. Thus, it is important to tease out the two types of institutions – public and private in Rural 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-(DLHS-II).

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.



The framework presented in Figure 1. stresses that improving access to care is best accomplished by focusing on contextual as well as individual determinants [1]. By contextual we point to the circumstances and environment of health care access. Context includes health organization and provider-related factors as well as community characteristics. Among the *predisposing* factors, demographic characteristics (age, gender, marital status) reflect the propensity of individuals to use services. Social structure (education, occupation, caste/ 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 like road connectivity etc. *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 distance needed to be travelled. 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. If the community has recently suffered due to some disease/ epidemic then it also calls for immediate utilization of services.

Data and Methods

The District Level Household Survey (DLHS-3) (2007-08) data for Uttar Pradesh have been used for the present analysis. This is the third survey in the district level household survey in India, in addition to previous surveys; DLHS-3 provides information related to the programmes of the National Rural Health Mission (NRHM). Unlike other two rounds in which currently married women age 15-44 years were interviewed, DLHS-3 interviewed ever-married women (age 15-49). In DLHS-3, along with ever-married women age 15-49, never married women (age 15-24) are also included as respondents. DLHS-3 adopts a multi-stage stratified probability proportion to size sampling design. 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 [(14)].

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 63,012 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=30,856). 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 (maternal age, mother's education, religion, and caste, road connectivity to village, public facility for delivery care etc. Enabling factors are household standard of living (SLI), level of antenatal care (ANC) had been taken, availability of village health worker, distance to nearest primary health centre (PHC) and Implementation of Janani Surakasha Yojana (Central Government's maternity benefit Scheme). Though the potential need for the institutional delivery is universal but the delivery complication and previous history of fetal loss are critical avenue for intervention thus take as proxy of individual need, along with any disease/ epidemic reported in the village in last one year for community need for health service utilization.

Table 2.1 Description of live births according to village and health facility level- predisposing, enabling and need variables.

	% (N= 30,856)
Predisposing	
Road connectivity	
No	12.63
Yes	87.37
Availability of Public Health facility	
No	83.37
Yes	16.83
Enabling	
Availability of ASHA[#]	
No	13.94
Yes	86.06
Distance from Nearest PHC	
<=5 km	44.8
6-10 km	31.91
10-20 km	19.3
>20 km	3.96
Village having JSY[@] beneficiaries	
No	23.95
Yes	74.05
Need	
Any disease/epidemic reported in last one year	
No	84.16
Yes	15.84

Note : # ASHA- Acredited Social Health Activist (Village health worker)

@ JSY- Janani Surkasha Yojana (Maternity benefit Scheme for institutional delivery). Both ASHA and JSY have been launched in Nattional Rural Health Mission 2005.

Table 2.2. Description of live births according to individual level- predisposing, enabling and need variables.

Variables	% (N= 30,856)
Predisposing variables	
Birth Order	
<=2	38.65
>2	61.35
Mother's age	
<20yrs	7.18
20-29 yrs	62.56
>30yrs	30.27
Mother's Education	
Illiterate	65.55
Literate	34.65
Religion	
Hindu	84.15
Non-Hindu	15.85
Caste[1]	
SC/ST	24.57
OBC	57.38
Others	18.05
Enabling	
Standard of Living Index	
Low	33.51
Medium	33.52
High	32.97
Level of ANC use	
Low	38
Moderate	42.3
High	19.7
Any motivation for Institutional delivery	
No	65.28
Yes	34.72
Need	
Previous history of Fetal loss	
No	77.81
Yes	22.19
Delivery Complication	
No	34.03
Yes	65.97

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.

Preliminary Tables & Results

Table 3.1. Adjusted percentage from MNL regression for the choice of delivery location according to village facilities and availability of health facilities.

	Public Facility(n=2,781)	Private Facility(n=3,715)	Home(n=23,349)
Predisposing			
Road connectivity**			
No	10.4	7.1	82.5
Yes	9.8	13.0	77.2
Availability of Public Health facility***			
No	9.6	12.5	77.9
Yes	11.3	11.1	77.6
Enabling			
Availability of ASHA[#] *			
No	9.4	12.6	77.9
Yes	9.9	12.2	77.9
Distance from Nearest PHC**			
<=5 km	11.1	13.6	75.3
6-10 km	9.5	11.9	78.6
10-20 km	7.9	10.1	82.0
>20 km	8.9	8.3	82.8
Village having JSY[@] beneficiaries**			
No	7.8	13.0	79.2
Yes	10.6	12.0	77.4
Need			
Any disease/epidemic reported in last one year*			
No	9.6	12.5	77.9
Yes	11.2	11.0	77.9

*** p<0.001, ** p<0.05, * p<0.1

Among the 30,856 currently married women, who gave birth in last three years, the majority delivered at home i.e. 78 %, within private facility and public facility approximately 12% and 10 % respectively. Table 3.1 presents adjusted percentage from the multinomial logistic regression in context of village health facility and infrastructure. All enabling and need variables were also significantly associated with the choice of provider leaving aside the presence of village health worker, which do not show impact on institutional delivery. Among contextual factors presence of delivery care facility and road connectivity plays a significant role in utilization of institution for delivery.

Table 3.2. Adjusted percentage from MNL regression for the choice of delivery location according to individual risk factors.

	Public Facility(n=2,781)	Private Facility(n=3,715)	Home(n=23,349)
Predisposing variables			
Birth Order* **			
<=2	13.7	17.9	68.4
>2	7.4	8.5	84.1
Mother's age* **			
<20yrs	13.6	14.0	72.4
20-29 yrs	11.0	13.5	75.5
>30yrs	6.8	9.2	84.0
**Mother's Education ** **			
Illiterate	7.4	7.8	84.8
Literate	14.7	20.9	64.4
Religion			
Hindu	10.7	12.0	77.3
Non-Hindu	5.7	13.2	81.1
Caste **			
SC/ST	8.7	7.5	83.8
OBC	9.3	11.5	79.1
Others	13.3	21.2	65.5
Enabling			
Standard of Living Index* **			
Low	7.1	5.8	87.1
Medium	9.4	9.5	81.1
High	13.2	21.8	65.0
Level of ANC use* **			
Low	4.2	6.1	89.7
Moderate	10.6	11.5	77.8
High	18.4	24.7	56.9
Any motivation for Institutional delivery* **			
No	2.6	4.1	93.2
Yes	23.2	27.0	49.8
Need			
Previous history of Fetal loss*			
No	9.9	11.8	78.3
Yes	9.9	13.8	76.3
Delivery Complication* **			
No	8.1	8.8	83.2
Yes	10.8	14.1	75.1

*** p<0.001, ** p<0.05, * p<0.1

Among the individual level risk factor (Table 3.2), predisposing factors- higher birth order, religion, OBC and SC/ST status were associated with home delivery while lower birth order and literate mothers were associated with institutional delivery especially with private facility. All the enabling and need variables are significantly associated with choice of delivery location but finding indicates that any kind of motivation for delivery care multiplies the chances of institutional delivery. Delivery complication has a strong impact on private facility utilization rather than going for public health care facility.

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 22 % of institutional delivery in Rural Uttar Pradesh which is lower than the national average (38 %), only 10 % took place in public facilities. This study indicates some important predictors of institutional delivery and choice of institution (public or private). It has been observed that accessibility of village infrastructure and health facility has large effect on choice of institution. Women belonging to higher standard of living are more attracted to private facility if they have to go for institutional delivery.

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 needs 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.

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, (2007-08). 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.