Antenatal Care in Rural Madhya Pradesh: Povision and Inequality

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Introduction

Antenatal care

Reducing maternal mortality and morbidity has a major focus for the developing world since the launch of the Safe Motherhood Initiative in 1987 (WHO, 1996). Over recent years there has been some debate as to the effectiveness one aspect of maternity services, that of antenatal care (Carroli, et al 2001, Bergsjø, 2001). The main purposes of antenatal care are to prevent certain complications, such as anaemia, and identify women with established pregnancy complications for treatment or transfer. Tetanus toxoid vaccination of the mother prevents neonatal tetanus as protective antibodies are passed across the placenta. The key principle is to plan services according to need, while recognising that women may develop complications in pregnancy or childbirth at any time.

Despite the limitations of antenatal risk assessment the basic functions of detection of pre-eclampsia, anaemia and other incipient complications remains essential. In addition, other less tangible benefits may be realised which are not easily evaluated in isolation. Antenatal consultations provide opportunities for health education, health promotion and social support at both the individual and community level. Especially in the rural setting, accessing antenatal care is an important step in bringing women into contact with the health care system. This contact has facilitated women's access to medical care for future health needs, including postnatal care (Sugathan, et

al, 2001). Within a context of limited resources there is a need to ensure value for money: overall, antenatal care is considered to represent a cost-effective component of maternity services as part of 'safe motherhood' interventions to reduce mortality and morbidity (Jowett, 2000).

Recognising that socio-cultural factors are likely to be critical determinants of care seeking and service utilisation in the context of pregnancy, the objective of this paper is to examine factors associated with use of antenatal care facilities in the rural areas of Bihar, Madhya Pradesh, Rajasthan and Uttar Pradesh (the latter including Uttaranchal). The paper also examines factors associated with access to specific critical components of care. A final objective is to study the differences, if any, in the pattern of antenatal check-ups and services received through health facilities versus home visits.

Data and Methods

Data from the 1998-99 National Family Health Survey (NFHS-2) were utilized in the present study. This survey was undertaken by the International Institute for Population Sciences, Mumbai on behalf of the Government of India, Ministry of Health and Family Welfare. This was a nationally representative population based sample survey of 90,303 ever-married women aged 15-49 from 26 states comprising 99 percent of India's population. The survey methods are described in detail together with univariate tabulations in an overview report (International Institute for Population Sciences and ORC Macro, 2000).

The states of Bihar, Madhya Pradesh (MP), Rajasthan and Uttar Pradesh (UP) were selected for analysis with special emphasis on MP in the present report. The NFHS-2 collected information about antenatal care, components of antenatal care, women's autonomy, fertility, family planning and women's socio-economic background. These details are available for the last births of all women interviewed in the survey. This paper considers antenatal check-ups for women pertaining to their last birth only. In this paper 'antenatal check-up' means that a pregnant woman either visited a health facility or was visited at home by a health worker. An 'antenatal visit' does not necessarily mean that a woman received any antenatal care services. Therefore, 'antenatal check-up' and 'antenatal care services' are different: the former pertains only to the visit and the later relates to services actually received, for example blood pressure measurement.

Logistic regression analysis was applied to study the association between occurrence of antenatal check-ups and a set of independent

variables. The dependent variable used in the analysis is whether or not women received an antenatal check-up with a Yes/No response. The set of independent variables hypothesised to have associations with antenatal care that were included in the analysis are (1) women's education (2) women's socio-economic characteristics (3) women's demographic characteristics (4) women's exposure to media, and (5) household factors. Women's socio-economic characteristics include education, an index of autonomy, and working status. The autonomy index was constructed using seven questions asked during the survey about various dimensions of women's autonomy. These were: decision about items to cook; who makes decisions on women's health care; who makes decisions on costly purchases; who makes decisions on a woman's stay with her parents; permission is required to go to market; permission required to visit friends; permission required to keep money aside. Each item was assigned a score 1 or 2; 1 to a situation where women is not a decision maker and 2 where the women is the decision maker. Thus the score for each person ranged between 7 and 14. A score 7-10 was taken to indicate low autonomy and a score 11-14 to indicate high autonomy. Demographic characteristics included age at marriage, number of children ever born, and family planning use. Household characteristics include standard of living, caste, and religion. In order to identify multicollinearity among the variables 'tolerance values' were generated, and in none of the cases those were less than 0.2. Similarly none of the variance inflation factors (VIF) was greater than 10.

Two models were constructed for the analysis. The first model included the antenatal check-ups received through visits to a health facility only either private or public. The second model included antenatal check ups received through both visits to a health facility and visits to the women at her residence by the health visitor.

In the National Family Health Survey, those women who had received antenatal check-ups (either through visit to a health facility or through the home visit by the health visitor) were further asked about the services they received at least once during their antenatal check-ups in the last pregnancy. Critical antenatal services potentially influencing pregnancy outcomes were further analysed through the logistic regression analysis. The services included in this analysis were urine testing, measurement of blood pressure, blood testing, abdomen examination, internal examination, tetanus toxoid vaccination, and obtaining iron and folic acid tablets. The dependent variables were Yes/No answers to each antenatal service and the independent variables were the same that were used in the logistic regression for uptake of antenatal check-ups.

Results

Antenatal check-ups

Table 1 provides information about antenatal check-ups in MP. Overall, in MP more than half of women received antenatal care during their last pregnancy, with 12% receiving check-ups through home visits by health workers. Across the four states, of those who were see 62% of women were seen by a nurse/midwife and 55% by a doctor. In Bihar and Uttar Pradesh more women were seen by doctors than by nurses or midwives. Among those women who attended at least one antenatal check-up, the average number of antenatal visits was 2.4; the lowest was in UP and the highest in Rajasthan, indicating that many are not achieving the RCH programme guideline of at least 3 antenatal visits during pregnancy. Regarding the timing of antenatal visits, only 38% women made their first antenatal visit during their first trimester of pregnancy, 44% in the second trimester, and remaining 18% in the last trimester. Although there were some differences across the states, the pattern was similar. This contrasts with the recommendation of a commonly cited Indian reference text of one visit each during the third, sixth, eighth, and ninth months of pregnancy (Park and Park, 1989).

Components of antenatal care. Those women who had at least one antenatal check-up during their last pregnancy were further asked whether they received any of the specific services listed in Table 2. Among women who visited a health facility for at least one antenatal check-up, more than 50% reported to have received tetanus toxoid vaccination, abdominal examination, iron and folic acid tablets, and advice on diet during the pregnancy. The service with the highest uptake was tetanus toxoid vaccination. Among women visited by a health worker the only service that was received by more than 50% of women surveyed was tetanus toxoid vaccination. In general, women visited at home by the health visitors for antenatal check-ups received substantially fewer antenatal services compared to women who visited a health facility. In particular, blood pressure, blood tests and urine tests were provided to less than 10% of women visited by health workers compared to 40% of those who visited a health facility. Those who both visited a health facility and were visited by a health worker had a higher rate of internal examination those who consulted in either setting alone. Women obtaining check-ups from both sources were more likely to receive tetanus toxoid vaccination, abdominal examination, assistance with delivery, internal examination, explanation of danger signs in pregnancy and family planning advice compared to women who received antenatal check-ups through either of the sources alone.

The analysis identified some women who reported receiving components of antenatal care despite having not attended an antenatal consultation. In particular, many had received tetanus toxoid. This reflects the wide availability of the vaccination through other routes such as village pharmacies. However, the likelihood of having been vaccinated was still greater among those who had attended antenatal checkups (60% versus 89%).

Antenatal check-ups by background characteristics. Table 3 shows antenatal check-ups by background characteristics of women. Uptake of antenatal check-ups increased with husband's and women's education. The likelihood of antenatal check-up did not vary significantly with women's autonomy. Interestingly, uptake was higher among non-working women compared to working women. Antenatal check-ups were more likely among women who married at the age of 19 or above compared to women married at a younger age. The likelihood of an antenatal check-up was unaffected by larger family size but was more likely for women who had ever used a modern family planning method. Women who reported exposure to media were more likely to have had a check-up than those who were not. Among the household factors, a higher standard of living was associated with a greater likelihood of antenatal check-up in all the states. Religion and caste showed unique state specific features: among all the religious groups Muslims in MP were the most likely to access antenatal care. With regard to caste, members of 'other backward classes' had higher uptake of antenatal care compared to 'scheduled castes' and 'scheduled tribes'.

Multivariate analysis. Results from the logistic regression analysis are given in Table 4, in which two models for each state are presented.

1. Women's socio-economic characteristics. As expected, women's educational attainment is positively associated with antenatal care in the two models, being apparent from secondary level. Some variation in the importance of women's educational status is evident between models for antenatal care with and without home visits. The striking finding is that the marked difference between the 'no education' group and others was not reduced when modelling care including home visits. A possible interpretation is that health workers tend to visit more educated women for antenatal care.

In general, women's autonomy was positively related to use of antenatal care in MP. The odds of 'high autonomy' women receiving antenatal care were 1.4 relative to those with 'low autonomy'. However, autonomy was no longer predictive in models including antenatal care provided via home visits. Thus, there may be an underlying tendency for health workers to visit 'low autonomy' women at home in these two states, perhaps reflecting a recognition of the constraints on such women to leave the home.

In contrast to the univariate findings, possibly indicating an adverse effect of work on access to care, in multivariate models women's work status was non-significant. Considering whether antenatal care was delivered through visits of health workers did not change the relationship in either magnitude or direction.

2.   Demographic characteristics. Age at marriage was positively associated with access to antenatal care, with odds of 1.4 among women married at 19 or more compared to those married at less than 19 years of age. Parity was negatively associated with use of antenatal care. The odds of women with two or more children (i.e., one or more children at the time of receiving antenatal care) receiving antenatal care were 30% lower compared to women with one child (i.e., no children at the time of receiving antenatal care). The influence of parity did not change after the inclusion of home visits in the model. Use of family planning was not associated with antenatal care in MP

3.   Exposure to media. Watching television every week substantially increased the odds of women seeking antenatal care. This was the second strongest factor after education that positively influenced antenatal care. Inclusion of home visits did not alter the findings.

4.   Household characteristics. The household standard of living was significantly associated with women's use of antenatal care, but this became significant only when home visits were included. This may indicate a preference for health workers to visit households with a higher standard of living.

In MP the odds of receiving antenatal care were 30-40% lower for members of 'scheduled tribes' relative to 'scheduled castes'. Muslim women in MP had 3.7-4.9 times greater odds of using antenatal care compared to Hindus.

Discussion

The present study shows continuing inequity in access to antenatal care in Madhya Pradesh. An important limitation of this study is that the impact of nationally driven service initiatives implemented since the survey, especially the Reproductive and Child Health (RCH) programme, cannot be assessed. The present findings show population sub-groups less likely to receive care, and also indicate wide variations in the content of antenatal care delivered either through clinics or home visits.

Variables positively associated with receiving antenatal care include women's educational attainment, older age at marriage, low parity, and

access to television. Caste and religion were also significant factors. In the present analysis the construct of autonomy did not prove a powerful explanator of variation in access. However, we combined questionnaire items to create a single autonomy variable that may have masked the influence of some of the individual items or underlying factors. In an urban north Indian context 'freedom of movement' was an important predictor of antenatal care seeking whereas 'control over finances' and 'decision making power' were non-significant in multivariate models (Bloom et al 2001). Social conditions do vary between the different states and between communities in each state, highlighting the need for state level policy formulation that takes such conditions into account.

Higher parity was associated with reduced use of antenatal care, as also seen in the study cited above. In south India in a context of very high rural uptake of antenatal care, women were less likely to obtain antenatal care commencing in the first trimester in their second or third pregnancies compared to their first, but in fourth or subsequent pregnancies early care seeking was again the norm (Matthews et al. 2001). Reduced uptake of antenatal care for second or third pregnancies may reflect both women's perceptions of risk and service provision: women who have experienced a previous pregnancy without complications may feel little need to seek care, and as pre-eclampsia in particular is less common in subsequent compared to first pregnancies health workers may consider parous women to need less attention. Practical issues such as the difficulty in attending a health facility when caring for small children also need consideration.

If, as suggested by the present study and others, both social dynamics and biological factors are influential in individual antenatal care seeking, community level perceptions of the value of antenatal care assume considerable importance. Rural antenatal care has historically been provided through the state, with more recent emphasis on the involvement of private practitioners in the RCH programme. Rural women also have access to practitioners of Indian traditional medical systems; care seeking in this sector was not explored in the NFHS-2. Care seeking will reflect both perceptions of illness and wellness in relation to a normal physiological event, and perceptions of the value and quality of health providers. Similar considerations apply in other contexts where normal human behaviour is medicalised, especially family planning, where the tools of social marketing have been used to link cost, value and quality in design of service provision. Stephenson and Tsui (2002) applied a multilevel modelling approach to north Indian data to demonstrate the inter-relationships between individual variables such as parity and education, facility and community level variables

such as health infrastructure, the operation of health campaigns and the size of the village population. Individual-level variation was evident in contraceptive use, STI treatment, antenatal care and place of birth after controlling for demographic and socioeconomic factors. Facility level and community level influences were different for the four types of service. Analysis of unexplained heterogeneity in the resulting models showed that community level variation in the use of antenatal care was greater for women with secondary or higher educational attainment. Such findings indicate the complex interplay of drivers of service access and the need for careful planning of interventions that take due account of individual and community factors.

The variable content of antenatal care provision is demonstrated in the present study. Many components of care shown to be lacking do not require expensive equipment or extensive training, but indicate deficiencies in training and supervision of health workers. Whereas a reluctance to undertake internal examination antenatally is not likely directly to impact negatively on birth outcomes, failure to examine the abdomen represents a missed opportunity to detect obstetric abnormalities and refer for delivery under medical supervision. Failure to measure the blood pressure or test the urine means that pre-eclampsia, usually asymptomatic, will not be detected with a consequent risk of eclampsia. Provision of iron and folic acid supplementation, with or without blood testing for anaemia, represents one of the simplest and cheapest 'safe motherhood' interventions in this context. Antenatal anaemia results directly in maternal death due to the increased circulatory demands of pregnancy, and indirectly through reducing the maternal reserve should antepartum or postpartum haemorrhage occur. For example, in a hospital series of maternal deaths and 'near miss' episodes in Haryana, severe anaemia was responsible for 2/31 deaths and 35/224 cases of major morbidity (Khosla et al. 2000).

The data indicate that skill mix in service provision may not be optimal: around 62% of those who had received antenatal care reported consultations with a nurse/midwife, and 55% with a doctor. Reorientation of the current service model should emphasise the role of non-medical staff undertaking those components of antenatal care most likely to prevent maternal complications, and free up medical attention for those with established complications. Critical assessment is also required of the advice components within antenatal care as currently provided, such as birth preparedness and awareness of danger signs. There is potential to link health education components with understanding of the community level dynamics: when women attend consultations with family members or are seen at home, those

family members also receive the advice and influence women's responses to it. There are some indications from the present study of reluctance either by staff to undertake home visits or by women to be visited at home by health workers. Further research on consulting dynamics including observation of consultations, exit interviews at facilities and interviews at home is required. Provision of iron and folic acid supplementation for pregnant women could be a suitable topic for community mobilisation and/ or community based distribution, thus reducing dependence on the health system for access to this simple but effective intervention.

In conclusion, pregnant women from poor and uneducated backgrounds, with at least one child were the most unlikely to receive antenatal check-ups and services in MP. Basic antenatal care components are effective means to prevent a range of pregnancy complications and reduce maternal mortality. The findings indicate substantial limitations of the health services in overcoming socio-economic and cultural barriers to access.

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Table 1. Percentage of rural women who received at least one antenatal check-up during their last pregnancy, northern states, India, 1998-99

Antenatal care uptake status	Bihar	Madhya Pradesh	Rajasthan	Uttar Pradesh	All four states
Received by visit to a facility	21.0	37.6	26.8	24.6	26.1
Received through visit of a health worker	6.3	12.4	11.0	3.7	6.9
Both	5.7	6.1	5.4	2.1	4.2
Not received	67.0	43.9	56.8	69.6	62.8
Total	100.0 N=3064	100.0 N=1950	100.0 N=1471	100.0 N=4884	100.0 N=11369

Table 2.   Percentage of rural women receiving specific components of antenatal care, northern states, India, 1998-99

Antenatal Care Component	Only among women who visited a health facility	Only among women visited by a health worker	Both visited a health facility and visited by a health worker	Among all women who received antenatal care	Among all women eligible for antenatal care
Tetanus toxoid	88.3	90.1	94.4	89.3	59.5
Abdomen examined	65.9	27.8	70.9	59.4	21.9
Iron folic acid	63.6	46.4	61.6	60.2	30.8
Diet	54.5	42.2	50.0	51.7	19.1
Blood test	41.7	9.1	40.2	35.5	13.1
Blood Pressure	40.6	6.1	34.6	33.6	12.4
Urine test	38.4	5.7	37.1	32.2	11.9
Weight	28.1	5.1	25.0	23.5	8.6
Internal examination	23.3	4.9	36.9	21.5	7.9
Danger signs	24.0	9.1	25.7	21.4	7.9
Newborn care	23.8	10.3	23.5	21.3	7.8
Family Planning	14.6	12.9	18.7	14.8	5.5
Height	10.3	3.0	7.0	8.6	0.1
Ultrasound	8.4	0.4	3.8	6.4	2.3
X-ray	3.8	0.1	2.9	3.0	1.1
Amniocentesis	0.8	0.3	0.4	0.7	0.3

Note: N=3454 for the first four columns; N=11369 for the last column.

Table 3. Percentage* of rural women who received at least one antenatal check-up by background characteristics, Madhya Pradesh, 1998-99

Characteristics	Madhya Pradesh
Husband's education	
No education	45
Primary	53
Secondary	65
High	76
Women's socio-economic status	
Education	
No education	48
Primary	68
Secondary	84
High	93
Women's autonomy	
Low	56
high	57
Women's work status	
Not working	62
Working	52
Demographic factors	
Marriage	
18 years or less	54
19 years or more	73
No of children ever born	
1 child	47
2 or more children	53
Family planning use	
Never used	54
Ever used	61
Exposure to media	

Characteristics	Madhya Pradesh
No	48
Yes	74
Household factors	
Standard of living index	
Low standard	47
High standard	62
Religion	
Hindu	55
Muslim	89
Others	65
Caste	
Scheduled caste	58
Scheduled tribe	44
Other Backward Classes	60
Others	70
	N = 1950

*Both through visit to a health facility and by home visit.

Table 4.   Logistic regression showing variables influencing the odds of receiving antenatal care, rural Madhya Pradesh, 1998-99

Characteristics	Madhya Pradesh	
	Excluding Home visit	Including home visits
Husband's education		
No education @		
Primary	1.2	1.1
Secondary	1.2	1.3*
High	1.7**	1.5*
Women's socio-economic status		
No education@		
Primary	1.2	1.5**
Secondary	2.6**	3.2**
High	8.0**	5.1**
Autonomy (high)	1.4*	1.0
Work status (working)	0.9	1.1
Demographic factors		
Age at marriage (19+)	1.4*	1.4*
No of children (2+)	0.7**	0.7**
FP use (Ever use)	1.2	1.1
Exposure to media (Yes)	1.8**	1.8**
Household factors		
Standard of living (high)	1.1	1.3*
Caste		
Scheduled Caste@		
Scheduled Tribe	0.6**	0.7**
Other backward classes	0.9	0.9
Others	0.9	0.9
Religion		
Hindu@		
Muslim	3.7**	4.9**
Others	0.5	0.8
	N=1950	

**p<0.010; *<0.05; @ reference category.

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