Antenatal Care, Care-seeking and Morbidity in Rural Karnataka, India: Results of a Prospective Study

The potential for improved health promotion is immense

By Zoe Matthews, Shanti Mahendra, Asha Kilaru and Saraswathy Ganapathy*

"Pregnancy is special, let's keep it safe" was the theme for World Health Day in 1998. Even if agreement existed on the best way to ensure a safe pregnancy in a resource-poor setting, provision is only half the story; the level and nature of the demand for a "safe" pregnancy also needs evaluating.

* Zoe Matthews, Department of Social Statistics, University of Southampton, Southampton, United Kingdom of Great Britain and Northern Ireland; Shanti Mahendra, Asha Kilaru and Saraswathy Ganapathy, Belaku Trust, Bangalore, India.

How women themselves perceive the dangers of pregnancy and how they react to those dangers are important questions to answer.

The objective of this prospective study was to identify the socio-economic determinants of antenatal care-seeking among rural women in a South Indian setting. The extent and nature of the antenatal mobidities suffered by these women are also described. The results give their responses to sequential questionnaires administered during pregnancy and beyond. All those who became pregnant in 11 South Indian villages within a 25-month period from August 1996 to September 1998 were followed as part of the study. Responses were collected during pregnancy itself, thereby reducing the recall error inherent in many cross-sectional studies. This article presents survey results for 282 women interviewed two or more times during pregnancy, with the second interview taking place during the latter part of the third trimester. Occasional supporting qualitative information is also given based on in-depth interviews with pregnant women and their families, as well as with health-care providers and other key informants.

Background to the study

The study took place in the state of Karnataka, which has a rural profile typical of South India. Early marriage and consanguineous marriages, especially between first cousins, are very common in this part of the country. Recent rapid fertility declines at all ages have brought the total fertility rate to 3.09 children per woman for rural residents, but short birth intervals still predominate - almost half are less than two years in duration. Literacy levels in the state are just a little higher than the national average of 52 per cent, with levels for men exceeding those for women by over 30 per cent (IIPS, 1993). This is a progressive rural setting for a developing country in South Asia; the fertility transition is well advanced in this part of India but maternal health is still very poor. Within India, which shows a considerable diversity of maternal health care provision, Karnataka falls between the extremes of good and poor health infrastructure. It is therefore a state with the potential for substantial improvement in maternal health.

Antenatal care

Antenatal care refers to pregnancy-related care provided by a health worker either in a medical facility or at home. In theory, antenatal care should address both the psychosocial and medical needs of the woman in the context of the health care delivery system and the surrounding culture (WHO, 1996). Rodhe (1995) states that antenatal care has two major functions. It can be used for early detection of some complications such as high blood pressure and

malpresentation. However, more critical in resource-poor settings is the opportunity that antenatal care providers have in transmitting information to pregnant women: it enables them to recognize problems when they occur, decide when to leave home to seek help; and identify where to go for the attention that they might need. It is important that this information is known not only by the pregnant woman, but also by her family. They must be able to look ahead, to be informed and motivated about complications and referral, and be prepared to arrange transport. Antenatal visits can play a critical role in preparing a woman and her family for birth by establishing confidence between the woman and the health-care provider, and by individualizing promotional health messages (WHO, 1996).

Scarce resources in some developing countries have led many commentators to suggest that unnecessary antenatal visits should be reduced in favour of fewer, more effective visits (Villar and Bergsjo, 1997; Khan-Neelofur and others, 1998). A recent antenatal care trial showed that four visits can produce maternal and child health outcomes that are just as favourable as more frequent antenatal contact regimes (Villar, 2000). This is the first evidence-based challenge to the British-inspired regular medical contact model developed in the 1930s and since thought of as a gold standard (London, 1992). It is a positive finding for resource-poor health service infrastructures, as the reduced four-visit scheme was shown to be 9-20 per cent cheaper than more frequent antenatal contact regimes in state-run developing country settings (Villar, 2000). However, the results of the trial are based on a controlled delivery of care elements spaced in an optimal way among the four visits. These elements included a haemoglobin test, gestational age estimation, blood pressure measurement, weight and height measurement, rapid syphilis test and treatment of symptomatic sexually transmitted diseases (STDs), urine test for protein, determination of blood type, tetanus toxoid immunization, iron and folate supplementation, recommendation for emergencies, advice for delivery, detection of foetal heart rate, recommendations for breastfeeding and contraception, accurate completion of antenatal card details, encouragement to retain and present the antenatal card, detection of breech presentations and, if necessary, referral. The inclusion of these elements was based on established associations between care procedures and maternal or perinatal outcome (Villar and others, 1998).

The recommended content of antenatal care thus has three main categories:

- Assessment (including history-taking, physical examination and laboratory tests to identify problems or risk factors)

- Health promotion (including advice on nutrition, planning the birth information about danger signs and contingency planning, subsequent contraception and breastfeeding)
- Care provision (including iron and folate supplements, tetanus toxoid immunizations, psychosocial support and record-keeping)

Commonly used risk factors in maternity care include height, weight, age, parity and previous history. All of these have some correlation with the risk of complications (Rolde, 1995). They identify populations of women who tend to have a higher proportion of complications, but not individual risk. Other risk factors commonly identified, such as antenatal bleeding, high blood pressure, STDs, malpresentation and severe anaemia, are in fact complications in themselves. All of the above have for a long time been used in antenatal care to identify women at high risk of complications in pregnancy and labour, and in need of referral to a hospital. This strategy, although necessary, has diverted crucial attention from the many "low-risk" women who go on to develop complications and comprise 50 per cent or more of all cases of maternal mortality.

To enable this complex of services in pregnancy to be delivered effectively, the study of the determinants of antenatal care-seeking is currently an established focus of investigation. In most health-care situations, services are static and patients must travel in order to use them. However, outreach setvices often exist, the function of which is to seek out pmgnant women. This is the case in both rural and urban areas of India, for municipal and state-run services, particularly in the antenatal period. Thus, if a maternal care contact is made, it has not necessarily been sought. Therefore, it is more appropriate to speak of "care contact" than "care-seeking". Another feature of maternal care-seeking is the length and transitional nature of the obstetric period. Even during the antenatal phase, the perceived importance and urgency of care-seeking change. Of course, women themselves are not necessarily ill during this period; childbearing is a healthy process that, for most women, is not problematic. However, the possibility that a complication may occur is potentially so serious that routine checks are highly desirable. A substantial minority of women, especially in poor, undernourished and anaemic populations, do suffer a huge range of problems during pregnancy. Care-seeking should occur for a mix of routine preventive, educational and problem-related reasons.

Maternal health care in India and in rural Karnataka

Health care service provision in India is very diverse, with rural services achieving considerably less coverage than their urban counterparts. In

Table 1. Rural maternal health care indicators from selected states of India

Indicators	Uttar Pradesh	Karna-taka	Kerala	India
No antenatal care (per cent)	60	17	2	42
Median number of antenatal visits	2.9	4.1	8.4	3.5
Median months pregnant at first visit	5.7	4.3	3.2	5.1
Institutional births (per cent)	6	26	85	16
Births attended by a doctor or nurse (per cent)	12	40	88	25
Births attended by a traditional birth attendant (per cent)	34	27	10	39

Source: International Institute for Population Sciences (IIPS), 1993.

rural Karnataka, maternal health care indicators compare favourably with those of rural India as a whole, but nevertheless, only 26 per cent of births are institutional and antenatal care is not universal. Table 1 gives estimates of indicators from rural Karnataka, rural Uttar Pradesh (a state with low provision of services) and rural Kerala (a state that is known for superior maternal care). These estimates are taken from the Indian National Family Health Survey carried out in 1992/93 (IIPS, 1993).

Indian maternal and child health and family planning services are integrated within the broad umbrella of the Family Welfare Programme (FWP). This Programme, currently in its fifth decade, was designed to provide integrated preventative, promotive and curative services for men and women (Measham and Heaver, 1996a). The more recent Child Survival and Safe Motherhood Progmmme was launched in India in August 1992. This FWP offshoot was specifically designed to improve the health status of women and children and to reduce maternal, infant and child mortality rates. The goals of the initiative were to monitor indicators such as the proportion of pregnant women receiving three antenatal visits, and the proportion of deliveries conducted by trained attendants (Measham and Heaver, 1996b). More recently, these initiatives have been succeeded by the Reproductive and Child Health Prograrmne, although during the time of the study this programme had not yet been implemented.

As prart of the FWP in nual areas of India, maternal and child health services are delivered mainly by Government-run primary health centres and subcentres. Female health workers, who are auxiliary nurse midwives (ANMs), provide maternal and child health services in the villages. In practice, a subcentre is often an extension of the ANM's own residence. Registering

pregnant women and assessing their health throughout the pregnancy is the responsibility of the ANM either at their homes or at an antenatal clinic. If pregnant women encounter complications which are beyond the level of the health worker's competency or resources, the ANM must refer the woman to the primary health centre. However, those centres have only limited resources, including capacity for antenatal and postnatal care, so that complicated cases must be referred again.

The private health sector in India is very strong; charitable or mission institutions also play an important role. In terms of health care during the obstetric period, private antenatal care is often sought for problems and check-ups in pregnancy, but private delivery care is accessible only by higher socio-economic groups. With the recent profusion of practitioners of modem systems of medicine, some lacking recognized medical qualifications, it can be difficult for service-users to know whether the practitioner that they have contacted is properly qualified for providing maternal care (Bhatia and Cleland, 1996).

Study design and setting

The study was carried out in 11 villages surrounding a *taluk* (group of villages) headquartets town about 60 km from Bangalore. These villages cover a population of approximately 25,000 in about 6,000 households. The closest of the study villages to the *taluk* headquarters town is about 8 km away and the most distant is about 25 km away. The study villages had been randomly selected from the villages in the *taluk* for an earlier study; a larger village and a tribal village were later added in order to capture health-seeking behaviour in a wide range of rural settings.

The sample

All women in these villages who were already pregnant at the start of the study or who became pregnant during the study period were enrolled until the required total for the study was reached. Case identification was carried out by means of village health workers and the case load was crosschecked with local nursery school teacher (*anganwadi*) and ANM records to identify any missed cases. The survey was completed within 25 months of the start date. More than 300 women were enrolled in the study, but only 282 women were interviewed late enough in pregnancy (during the eighth month or later) for an almost complete exposure for reporting of morbidities and care contacts to be realized. By the time they had reached such a late stage of their pregnancies, most respondents had been interviewed two or three times.

The questionnaires

An initial questionnaire covering background characteristics, household data and pregnancy histories was administered, in most cases, during the first or early second trimester of pregnancy. Two more interviews were held during the pregnancy, mainly during the late second and the third trimesters. These covered morbidities, nutrition, health-seeking behaviour and intentions for delivery. In subsequent parts of the study (not covered in this article), delivery experiences and postpartum information were also collected from these women. Apart from some brief comments on the comparison between planned and actual delivety locations, this article focuses on the antenatal period.

The survey was carried out in women's homes; each of the sequential series of questionnaires took around 30-40 minutes to administer. Eight trained graduate interviewers were used for data collection and all were fluent in Kannada, the language spoken within the study area. Morbidity questions were treated with particular care, the women's perceptions of ill-health being elicited initially without prompts or pre-set categories, and only subsequently was recourse made to a more structured set of questions. Corroboration of morbidity status from health personnel was not sought, as a range of practitioners - often without mainstream medical training - was involved. The design of the questionnaire was carried out concurrently with medical anthropological studies on local morbidity taxonomies.

Characteristics of the study population

Almost three quarters of the sampled women in the study villages were between 18 and 24 years old at the start of their pregnancies; a small proportion was less than 18 years old. In terms of education, just over one half of the respondents had received at least some schooling. Despite the mismatch of literacy levels in some households, the general picture is of low female literacy within the study group, which is typical of this district as a whole (Census of India, 1992). All women were engaged in household work but only a few cited salaried work or trading as a primary occupation, and less than 10 per cent cited waged agricultural work as their primary occupation. Apart from household duties, the majority of the women had some secondary occupation. This was generally agricultural in natute, either work on the family's own land or caring for livestock. Most belonged to households with small landholdings; one quarter of the households were landless. Many of the women were married to relatives, usually a maternal uncle or a cousin, which is the norm in the area. More than a third of the women were pregnant for the first time, another third for the second. Fourth or subsequent pregnancies were reported

by less than 10 per cent of the women. The reason given for repeated pregnancies was the desire for a male child. The predominant caste in the villages is Gowde, from the "other backward caste" categoty. A substantial minority of scheduled castes and scheduled tribes (SC/ST) make up almost one third of the sample. Women from the Lambani tribe, located only in the "tribal" village, are part of this group, and they showed very different characteristics from the other women in the sample, both in terms of health-care-seeking behaviour, and morbidity. Although they are part of the SC/ST category, they are considered separately in this analysis.

A geographical categorization was created to locate the villages within areas that had access to the same ANM or subcentre. Group 1 consists of the four villages on the western side of the *taluk* that are served by one subcentre. Group 2 consists of a more disparate group of five villages that are served by a subcentre in the central village of the group. There remained a large village, situated in the southernmost part of the study area, that is well served by a number of health care providers. Lastly, the tribal village, consisting of Lambani tribespeople only, was considered as a separate category.

Results

Timing, frequency and type of antenatal contacts

At first glance, the situation with regard to antenatal care utilization is encouraging, with all but three of the studied women reporting some contact. In this context, "contacts" refers to visits to or from trained health personnel: government doctors, ANMs, private or mission hospital clinics or private providers. The qualitative interviews suggested that the women feel it is good to be checked early in pregnancy, as the doctor can thus predict that the rest of pregnancy and delivery will be problem-free.

A high number (56 per cent) of reported antenatal contacts occurred in the first trimester, which puts the median number of pregnancy months at first contact safely in the first trimester. This compares well with the equivalent median of 4.3 months for rural Karnataka (IIPS, 1993). A similarly favourable comparison can be made between the proportions who saw no health care provider at all during pregnancy: 1.1 per cent in this study compared with 17 per cent in rural Karnataka as a whole (IIPS, 1993).

The timing of the first antenatal contact is associated with various socio-demographic factors (table 2). The Lambani (tribal) group are much more prone to late first antenatal contact, as are those with less education, those on

Table 2. Factors associated with timing of first antenatal care contact in rural Karnataka

Factor	Percentage with antenatal care contact in the fast trimester	N
Caste[a]		
Gowda	57.2	138
Lingayat	61.1	18
Lambani	38.5	13
Scheduled caste/tribe	52.1	73
Other backward caste	62.5	40
Education[b]		
No schooling	51.5	130
Grade l-5	51.5	33
Grade 6-8	63.0	54
Grade 9+	61.5	65
Number of pregnancies[b]		
1st	67.3	107
2nd	51.0	104
3rd	37.2	43
4th or higher	60.7	28
Age (in years)[b]		
14-17	73.0	37
18-19	53.9	76
20-24	57.5	127
25+	40.5	42
Land and livestock		
No land and no livestock	57.1	35
Marginal land and no livestock	51.5	40
No/marginal land and some livestock	57.1	35
Some land and some livestock	57.1	112
Extensive land and much livestock	51.7	60
Value of possessions (rupees)[b]		
<l,000	52.2	134
l,00l-5,000	57.0	100
5,001-15,000	55.6	27
>15,000	76.2	21
Location[a]		
Large village	62.3	53
Tribal village	38.5	13
Village group 1	53.4	133
Village group 2	59.0	83
Previous problem[a]		
Any previous antenatal problem	62.9	35
No previous antenatal problem	45.7	140
Any previous intra/postnatal problem	60.0	25
No previous intra/postnatal problem	47.3	150
Any previous problem	60.8	51
No previous problem	44.4	124
Total	**56.0**	**282**

[a] Significant association at 1 per cent level (as tested by a Pearson's chi-squared statistic; adjustments were made for sparse cells).

[b] Significant association at 5 per cent level (test as above).

Table 3. Percentage distribution of women according to number of contacts with health care providers during pregnancy in rural Karnataka

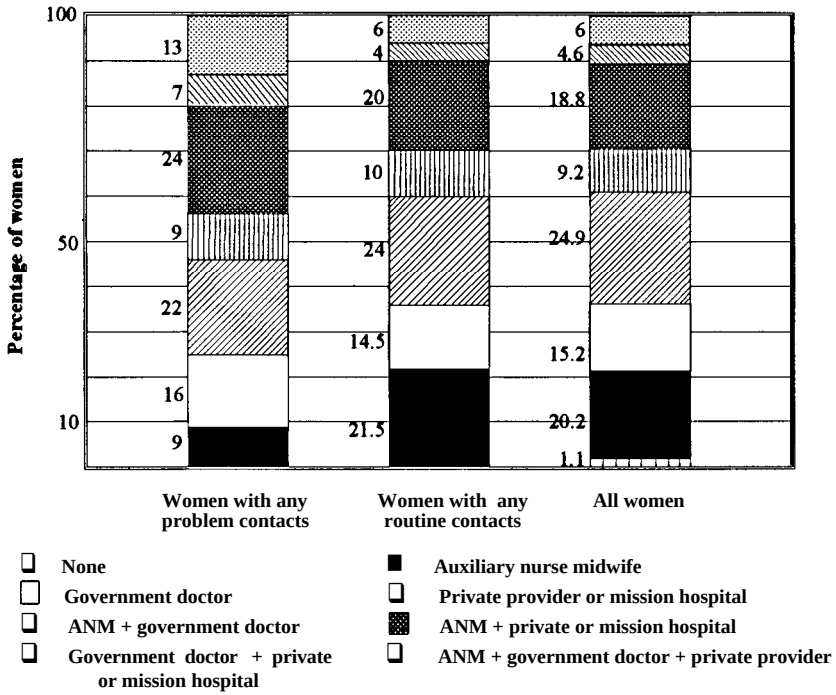
Number of contacts	Contacts that included routine care	All contacts
0	7	1
1	37	27
2	39	16
3	11	29
4	6	17
5	0	9
6	0	1
Total	**100**	**100**

their second or third pregnancy (although not those on their fourth pregnancy or more), older pregnant women and those with no previous obstetric problems. Wealth, as measured by the value of possessions, does not have a marked effect, except for the very wealthy, who have a much higher probability of contact during the first trimester.

Table 3 shows the frequency and reasons for antenatal care visits. For each visit, women were asked the reason for this visit, and multiple reasons could be recorded. From the left-hand column of the table it can be seen that a large proportion (93 per cent) of the women had health-care contacts that were either exclusively routine or included both routine and problem care. In fact, 63 per cent of the women had contacts which they stated were exclusively for routine care (this is not shown in table 3). However, of those with routine care as part of their contact, only 6 per cent went on to have four provider contacts, the great majority having only one or two contacts. Increased frequency of contact is more likely to be for problem care because, when problem care is included as a reason for contact, the median number of visits increases from just above one to over two visits. This compares unfavourably with the rural Karnataka median of 4.1 visits (IIPS, 1993).

Figure 1 shows that the type of health care provider chosen by those women whose contacts included routine visits is a little different from those who have problem care as part of their contact profile. Overall, 55 per cent of the women at some point in their pregnancy saw the ANM, either exclusively, or alongside contacts with government doctor, private or mission hospital clinics and private providers. However, women who needed problem care were less likely to rely on the ANM alone, and had usually also made contact with

Figure 1. Health care providers sought in pregnancy by contact type, in rural Karnataka



private practitioners. The impression gleaned from qualitative interviews is that care from private sources is considered far superior to that from government services.

Content of antenatal care

Table 4 shows a mixed picture of the content of antenatal care. Government health care personnel provide tetanus toxoid immunizations and iron and folate supplements, but carry out very few other recommended procedures. A surprisingly high proportion of the women who had been prescribed iron supplements (85 per cent) reported taking them "regularly". This finding differs from most other studies, and there is reason to question the high compliance rates cited here. The mistaken but widespread belief that iron pills cause the child to be dark-skinned often prompts women to discontinue the course, since a fair complexion is highly prized in India.

Table 4. Reported content of antenatal care during any visit during pregnancy in rural Karnataka

Services received	Percentage of those receiving any care (n = 279)
Assessment	
Blood pressure	57.3
Urine analysis	41.2
Blood taken	46.6
Weight taken	50.2
Abdomen palpated	81.7
Vaginal examination	23.7
Care provision	
Iron and folic acid prescribed	96.4
Tetanus toxoid administered	97.5
Health promotion	
Advice on diet	44.1
Advice on breastfeeding	3.9
Advice on danger signs	2.9
Advice on contraception	11.5
Told about postnatal checks	2.5

Note: **Three women had no antenatal care contact.**

Where women in this study had their weight recorded, haemoglobin estimated or urine checked, the procedure was done by private practitioners, a finding that helps to explain the preference for private care. Apart from perfunctory advice on diet (to eat more fruits and vegetables or "strengthening food", which was frequently impossible for the women in view of their limited financial circumstances), the advice and information aspect of antenatal care was neglected by almost all care providers (table 4). Less than half of the women had urine tests, and only just over half had blood pressure recorded or weight checked.

Prevalence of prenatal morbidities and care-seeking

The precise definition of obstetric morbidity is unclear (Fortney and Smith, 1999); further, there is no consensus on grading the severity of such mobidities, nor on how best to structure the enquiry in order to elicit information on self-reported morbidity, despite a great many suggested approaches including prompted lists, unprompted questions, different recall periods, different question wordings and so on. In some studies, the severity of morbidity is categorized into three groups: grades 1, 2 and 3 with diminishing severity. Bhatia and Cleland (1996) categorize swelling of the hands, hypertension, convulsions, vaginal bleeding and fever as grade 1

morbidity. Srinivasa and others (1997) add malaria, but exclude hypertension and fever. The definition of fever usually carries with it a number of days, or whether the fever is accompanied by "rigour", but there is no consistency between the studies. The definitions of morbidities in grades 2 and 3 vary widely, with the inclusion of problems in grade 3 being very varied indeed.

This study avoids categorization, and gives details of many individual morbidities so that comparisons can be made by cumulating the problems in any desired grouping (table 5). As a guideline, the morbidities listed at the start of the table printed in italics (fever, vaginal bleeding, hypertension, severe headaches and malaria) could be considered the most severe. Fever, vaginal bleeding, swelling of face or hands, and malaria were reported by 5.6 per cent, 0.4 per cent, 4.2 per cent and 0.7 per cent of the women respectively. Almost 10 per cent of the women reported one or more of these symptoms and the great majority of these women sought care, mostly from private practitioners, although the government doctor also had some (table 5). High blood pressure, a serious indication, was reported by only one woman, although as the testing is inadequate, it is unlikely to represent the true prevalence.

More than 60 per cent of the women reported some morbidity; 347 episodes in all were reported by 176 women. Most of this was what could be classified as non-severe, but was nevertheless of sufficient concern for 8-100 per cent of the women to seek care, depending on the problem. Gastro-intestinal problems such as inability to digest were reported by 41 women, and 31 reported nausea, resulting in reduced food intake by many. Abdominal pain and anaemia were the most frequently reported problems. Abdominal pain is thought by women to be a possible symptom of an impending miscarriage, and 78 per cent of women reporting this sought some medical care for it. Anaemia is usually diagnosed (though laboratory confirmation is rarely carried out) by the health care provider: thus, the true prevalence may be higher than the 22 per cent reported here. From qualitative reports, health-care-seeking depends largely on whether the symptoms are recognized as illness, or felt to be "normal" (frequently confused with "common") for pregnancy.

Self care

Unlike in neighbouring districts (Hutter, 1994), there is no overt practice in this region of reducing the diet to ensure easy delivery. However, the concept of a need for increased food intake during pregnancy does not exist either. Some food taboos were reported, but they did not involve common foods. A substantial minority reduced their intake, usually because of symptoms such as a feeling of heaviness, or burning sensation in the stomach

Table 5. Antenatal morbidity and care-seeking behaviour by problem type in rural Karnataka

Antenatal problem	Number of women reporting the problem (percentage of all women)	Number of women seeking professional care (percentage of all women reporting the problem)	Percentage of women seeking care with specified types of provider among all those who sought care				
			Auxiliary nurse midwives	Public health centrcs	Government doctor	Private doctor	Other
High fever/ fever with rigour/ fever for 3 or more days	16 (5.6)	15 (93.7)	13.3	6.6	20.0	40.0	20.0
Vaginal bleeding	1 (0.4)	1 (100.0)				100.0	
High blood pressure[b]	1 (0.4)	1 [a](NA)					
Severe headaches	8 (2.8)	5 (62.5)		40.0	20.0	40.0	
Malaria	2 (0.7)	2 (100.0)				100.0	
Anaemia[b]	62 (21.9)	62 (NA)					
Abdominal pain	60 (22.6)	47 (78.3)	12.7	10.6	27.6	46.8	2.1
Inability to digest	41 (14.5)	3 (6.7)	25.0		50.0		
Nausea	31 (10.9)	24 (77.4)	16.7	4.2	20.8	58.3	
Backache	19 (6.7)	12 (63.2)	16.7	8.3	8.3	58.3	8.3
Burning on urination	13 (4.6)	5 (38.5)			40.0	20.0	20.0
Urine incontinence	4 (1.4)	1 (25.0)			100.0		
Tiredness	13 (4.6)	5 (38.5)			20.0	60.0	20.0
Varicose veins	13 (4.6)	4 (30.8)			25.0	75.0	
Abnormal vaginal discharge	12 (4.2)	11 (91.6)	18.2			72.7	9.1
Giddiness	11 (3.9)	6 (54.5)			16.7	83.3	
Blurring of vision	10 (3.5)	2 (20.0)				100.0	
Heaviness/womb falls out	3 (1.0)	0					
Night blindness	3 (1.0)	0					
Beethi shanke[c]	2 (0.7)	2 (100.0)					10.0
Constipation	2 (0.7)	0					
Mouth of uterus open[b]	2 (0.7)	2 [a](NA)					
Other obstetric problems[d]	16 (5.6)	10 (62.5)	20.0		20.0	50.0	10.0
Shortness of breath	2 (0.7)	1 (50.0)				100.0	
Total[e]	176 (62.0)						

Note: Problems printed in italics at the top of the table correspond roughly to definitions of serious morbidity given by previous authors (see text). All problems were reported in the eighth or ninth months of pregnancy covering the whole of the previous antenatal period.

[a] Data not available on one case.

[b] Anaemia, mouth of uterus open and high blood pressure were diagnosed by a health care provider.

[c] A local, culturally defined syndrome associated with mental health problems.

[d] Other obstetric problems were: decrease in foetal movements, difficulty in passing urine, weight loss and swollen face/hands/feet.

[e] 347 episodes of morbidity were reported by 176 women out of the total sample of 282 women.

after a meal. Most women reported carrying out heavy activity until late into their pregnancy, the most common being fetching water, cleaning cattle sheds and carrying loads. If they stopped such activities, it is rarely because they saw a need for more rest in pregnancy. Most women, especially for their first pregnancy, went to their natal home during the seventh month of pregnancy, and their work load there was much reduced. Some community members recommend normal activity up to the end of pregnancy as this is believed to make the delivery easier. Most women take "green medicine", a herbal concoction derived from tree bark, to ensure a healthy baby and prevent inauspicious or spirit-related abnormalities in the newborn.

Planning for delivery

At least 75 per cent of maternal deaths are avoidable (WHO, 1996) and major obstetric complications can strike unpredictably. Planning for delivery is thus very important, but was not common in this study group. Although facilities for caesarean section and blood transfusion are some distance away in Bangalore, they are accessible. Therefore, it is feasible to advise people to make contingency plans and act on them if necessary. The qualitative reports reveal a belief that planning for emergencies is prophetic, and so adverse eventualities should not be contemplated. Interviews with women after delivery show that there was a significant level of switching from their original delivery intentions. The majority of the women (87 per cent) planned to deliver at home. Even women who visited private doctor for antenatal care generally planned home deliveries, largely because of high hospital costs or the absence of a woman doctor in the public health centre. In the event, more than 30 per cent of the women who planned to deliver at home went to the public health centre or hospital, often because of anticipated or actual complications. This "switching behaviour", due to unexpected events during labour, amounted to 36 per cent of women delivering at an institution or en route, a substantial increase on the 11 per cent who had originally planned institutional deliveries. Apart from switching towards institutional delivery in response to morbidity, the other major change between planned and actual outcomes concerned the switch from deliveries that were planned to take place with the ANM in attendance, to those that were eventually attended only by a relative, friend or *dai* (traditional birth attendant). In fact, nearly one third of the women who had planned to have an ANM assist at their deliveries finally had a *dai* or an experienced relative in attendance, since the ANM was either not available or unwilling to attend if women went into labour at night.

Delivery choices wem clearly made on the basis of perceptions of the likely quality of care, as well as cultural comfort. A striking finding was the propensity for women in village group 2 to plan deliveries with the ANM,

compared with relatively few from village group 1, despite their closer proximity to the subcentre. The ANM in village group 2 was clearly regarded very highly and was a desirable birth attendant. In contrast, women from the tribal village consistently planned home or public health centre births, and none envisaged assistance from the local ANM. In general, women prefer to deliver at home for reasons such as support, familiarity, tradition, as well as the feeling that birth is a normal phenomenon that does not need an institutional setting (for more details, see Matthews and others, 2000).

Summary and concluding discussion

The study shows early and widespread use of antenatal care, but it also reveals the content of that care to be far short of that recommended as a result of the recent WHO antenatal care trial (Villar, 2000). Initial contact is commendably early, even in comparison with surrounding areas, but only women with problems report an adequate frequency of contact. Morbidity in pregnancy is widespread, although it is difficult to make direct comparisons with other studies. Care-seeking for problems is also common, mostly from private practitioners, while deliveries are carried out mostly by the public sector, or *dais* and lay people. This mix of public and private uptake derives from both the outreach work carried out by the state system and the preference among community members for private providers. Both types of provider may learn lessons from these health-seeking tendencies and much scope for collaboration exists, at least with regard to widely acceptable and transferable record-keeping. A system of antenatal cards kept by women themselves is already in place. Clearer and mote detailed notes would enhance their utility; the system should be extended to include the notes of private practitioners. These changes combined with a community programme for transport in the case of emergencies could result in great strides being made in the improvement of maternal health in this community, where family members are clearly prepared to respond to morbidities.

The most thorough aspect of antenatal care is routine preventive provision, including tetanus toxoid immunization and the distribution of iron and folate supplements, though the level of compliance with iron supplementation among this highly anaemic population is in doubt. The assessment dimension of antenatal care is less well covered. The prevalence of history-taking is very low, although many providers, especially those in the private sector, do carry out physical examinations such as measuring weight and palpating the abdomen. The detection of risk factors and the level of effective record-keeping for referrals are unlikely to be optimal.

Considering that this population has the advantage of early and nearly universal antenatal coverage, the potential for improving health promotion is considerable. The current level of delivery planning is minimal and very little advice is given to pregnant women about aspects of pregnancy such as food intake, activity, danger signs in pregnancy, postnatal checks and breastfeeding. Whether women are able to act on such recommendations must also be carefully considered. If there were appropriate training programmes for health workers and effective community education, much useful information could be conveyed. Such education should reach the whole community, and take into account the provisions and duties required both of natal and conjugal families.

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