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# Determinants of maternal care in a region of South India*

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## Abstract

**A cross-sectional survey was conducted during 1993 in urban and rural areas of Karnataka State, India. The survey included 3595 currently married women aged under 35, who had at least one child under five. Nine out of ten women had at least one antenatal consultation during their most recent fertile pregnancies. Most consultations were with doctors and there was minimal use of the services provided by paramedical staff of the primary health care system. Of all respondents, 38 per cent (57% urban and 29% rural) delivered in a hospital, and a majority of institutional deliveries were in private hospitals. Surgical interventions were made in more than one-third of hospital deliveries. There was a marked imbalance between antenatal and postnatal care as fewer than one-fifth of the mothers had a postnatal checkup. The educational level, economic status and religion of the mother are significant predictors of use of maternal health services. The relationship of problems during pregnancy and delivery with subsequent health-related behaviour is also examined.**

One of the dominant themes of the International Conference on Population and Development held in Cairo in September 1994 was reproductive health. This has been defined as a state in which

> People have the ability to reproduce and regulate their fertility; women are able to go through pregnancy and childbirth safely; the outcome of pregnancy is successful in terms of maternal and infant survival and well being; and couples are free to have sexual relations free of the fear of pregnancy and of contracting disease (Fathalla 1988).

Maternal health services have a potentially critical role to play in the improvement of reproductive health. There is little doubt that access to skilled assistance and well equipped health institutions during delivery can reduce maternal mortality and morbidity and improve pregnancy outcomes. The effectiveness of routine antenatal and postnatal care is less certain. However, a few hospital based studies (Melrose 1984; Boes 1987a, b) and some community

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studies (Kwast et al. 1989; Bhatia 1993) have identified lack of antenatal care as a risk factor for maternal mortality. Analysis of Demographic and Health Surveys (DHS) data from Morocco and Tunisia has shown that higher levels of health care use are associated with better reproductive health outcomes (Obermeyer 1993). There is also some evidence from India that women registered for antenatal care are less likely to experience perinatal and neonatal mortality than those not registered (Srinivasa and Venkatesh 1982; Ramachandran 1989).

The DHS program has made available nationally representative data on the receipt of antenatal and natal care for a large number of developing countries; for India, the 1992-93 National Family Health Survey performed the same function (IIPS 1994). The analysis in this paper goes further than is possible with DHS-type data, by examining the extent to which maternal health behaviour is influenced by the experience of problems in the antenatal and natal periods. Its specific objectives are to describe the health care received by a sample of south Indian women in their last fertile pregnancy; identify the socio-economic determinants of receipt of health care; and identify links between use of services at different stages of the reproductive process and risk factors for adverse outcomes.

## Background

The study was conducted in the South Indian state of Karnataka which according to the 1991 Census has a population of 44.8 million, 5.3 per cent of the total Indian population. The male, female and combined literacy rates are 67, 44 and 56 as against the all-India averages of 63,39 and 52 per cent respectively. In the early 1990s, over 80 per cent of pregnant women received at least one antenatal check and 38 per cent of the deliveries were institutional. A little over two-fifths (44%) of married couples are protected against pregnancy through contraception, mainly female sterilization. Thus, in health and family planning programs, Karnataka is progressive compared to many other Indian states. Health, according to the Constitution of India, is a state matter and the states have freedom to adapt their own health services to local conditions. However, most states follow the standard pattern handed down to them by the government of India, albeit with slight variations. Karnataka State has 20 districts and, in each, a district health and family welfare officer (DHFWO) is responsible for overseeing all the health and family welfare activities in the district. These officers are assisted by specialist staff specifically responsible for various programs such as family welfare; maternal and child health including immunization; and communicable disease control. The district hospital is under the control of a district surgeon who is responsible for providing curative and promotive activities including referral services.

At the subdistrict level, assistant district health and family welfare officers (ADHFWOs) are responsible for supervision of medical officers of primary health centres, primary health units and the field staff. A hospital at the subdistrict level is also under the control of an ADHFWO. Each is equipped to deal with obstetric emergencies and should have on its staff a female obstetrician.

The primary health centres, staffed by two medical officers, provide all the basic health services, but they are not equipped for emergency deliveries and few of them have a female doctor. According to the guidelines provided by the Government of India, by the year 2000 there will be a primary health centre for every 30,000 population in the plains and 20,000 population in hilly and tribal areas. The primary health units are unique to Karnataka: each provides services to a population of 15,000 to 20,000 and is staffed by a doctor and an auxiliary nurse-midwife (ANM). The state government plans to upgrade these institutions to primary health centre level in phases by providing minimal additional inputs.

Under each primary health centre there are six to eight subcentres, one for every 5,000 population in the plains and one for 3,000 population in hilly and tribal areas. An ANM and a

male worker look after the health and family welfare activities in the subcentre area. The ANM plays a pivotal role in the provision of health services, and in particular maternal and child health services to the rural population. She is expected to enrol all pregnant women in her area and provide at least four antenatal visits, supervise domiciliary deliveries and provide postnatal care to the mother and the newborn. Since the facilities at the primary health centre, subdistrict and district-level hospitals are inadequate, it is not the policy of the government to encourage normal deliveries in institutions. However, ANMs and other functionaries are specifically instructed to identify high-risk pregnant women during antenatal care and refer them for institutional deliveries. In addition, the ANM is supposed to keep track of cases of difficult labour and arrange to move them to the nearest referral hospital.

In addition to the health facilities provided by the government, there is a strong private medical sector. A large number of private medical practitioners of both traditional and modern systems of medicine are practising in rural and urban areas, many of whom possess no recognized medical qualifications. There are also traditional practitioners who use herbs, oils and incantations and who formerly had little or nothing to do with allopathic medicine. However, they are increasingly using modern medicines and it is difficult for the people to distinguish between a qualified and an unqualified practitioner. These private practitioners also provide family planning and abortion services to their clients (Bhatia 1973; Bhatia et al. 1974). They are very popular among the rural people and their number increases every day (Chuttani et al. 1973; Bhatia et al. 1975). Besides these practitioners, there are now many private hospitals and maternity homes, even in small towns. People find it convenient to use their services because of their easy accessibility. Furthermore, though on paper government health services are free, patients often have to incur certain expenses and do not see much advantage in using services provided by the government. Another major reason for the emergence of a flourishing private sector is that the perceived quality of services at government facilities, particularly those provided by the primary health centre system, is below the expectations of potential users.

## Materials and methods

The present study is a part of a major research effort, funded by the Ford Foundation, to investigate the ways in which mothers' education influences child survival. The main study has several components: anthropological studies; investigation of primary schools in three states of India; a cross-sectional survey; and a prospective study. The aim of the anthropological studies was to develop hypotheses and instruments for subsequent quantitative work. During these in-depth investigations it was found that the mother's health is intricately related with that of the child. It was decided therefore to collect detailed information in the cross-sectional and prospective studies on different aspects of mothers' health. This paper is based on data from a cross-sectional survey conducted during 1993 in a subdistrict of Karnataka state situated about 70 kilometres from the capital Bangalore. According to the 1991 Census, the subdistrict has a total population of about 117,000; it has one town with 47,000 inhabitants. The study population comprised mothers aged less than 35 years who had at least one child under five years of age. All eligible women living in the town and the 48 villages having a population of at least 500 persons were included in the sample. A complete list was prepared and attempts were made to interview all of them. To maximize the response rate, at least three call-backs were made, including visits early in the morning and late at night to contact respondents who worked away from home. The achieved sample size was 3595 (2398 in rural areas and 1197 from the town), representing a high overall contact and response rate of over 95 per cent.

Interviewing was by experienced female interviewers who had degrees in social sciences or related subjects and were familiar with the local culture. The female respondents were

asked questions about the problems, consultations and treatments during their most recent live birth. As mentioned, all respondents had a surviving child under five years of age, thus the recall period ranged between about two months and 60 months, with a median value of 21 months. Exploratory analysis showed that the length of the recall period was unrelated to the number or nature of problems reported by women. Accordingly, there was no need to restrict analysis to women with a recent delivery.

The effects of socio-economic, demographic and health-related variables on health-care-seeking behaviour during pregnancy, delivery and the postnatal period were analysed by logistic regression techniques. The dependent variables are represented by receipt of routine antenatal checkup, timing of first checkup, source of antenatal care (private or government), whether or not delivered through caesarean section, and receipt of postnatal checkup. Regressions were performed on each of these dependent variables.

This analysis was not designed to test any formal theory of health-seeking behaviour. Nevertheless, each independent factor was selected for inclusion in the regression analysis for an explicit theoretical reason. Two factors, caste-religion and education, represent the social identity of the respondent. For a host of obvious reasons, length of exposure to formal schooling is expected to be conducive to use of obstetric services. Any influence of the other factor, caste-religion, may be more subtle. The non-Hindus in this sample are mainly Muslims and most public and private sector practitioners in Karnataka are Hindus; insofar as this difference represents a social barrier to use of services, Muslim women may make less use of obstetric health services than Hindus. With regard to Hindus themselves, the possible relationship of caste to service use is likely to be positive. High-caste Hindus, because of their higher educational level, better economic status and participation in community development activities, command considerable influence and thus have greater access to medical and health-care facilities. Conversely low-caste Hindus may be subject to social barriers of a more Western type: fear that they will be treated with arrogance or indifference by practitioners. The relationship of caste to use of services is thus uncertain.

While any effects of social identity on access to services are indirect, other factors provide more direct measures of access. Urban-rural residence is included as an indicator of geographical proximity to services. The one town in the study area is the site of the subdistrict hospital and there are far more private practitioners here than in the villages. Economic status[1] captures a different dimension of access, namely ability to pay. It is expected to be a powerful predictor of the choice between private and public sector provision. Finally, the autonomy[2] of women, namely self-reported freedom of movement and decision-making power, represents a further perspective on access. Women with high autonomy are expected to face fewer domestic and familial barriers to service use than less autonomous women.

Other variables included in the multivariate analysis reflect need or motivation to use services. Thus we expect women who experience problems or complications to make greater use of services, and similarly women with a prior history of abortion, stillbirth or early child loss. Life-course factors such as age at pregnancy and pregnancy order may be negatively

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[1] Economic status: this variable was determined on the basis of the imputed financial value of consumer durables such as radios, televisions, fans, refrigerators, furniture, washing machines, bicycles, two-wheel and four-wheel motor vehicles, and agricultural implements such as tractors and threshers. After the total monetary value of these possessions in each household was calculated, the households were categorized into three groups of approximately equal size.

[2] Autonomy: each respondent was asked several questions to obtain information about her status in the household. These questions pertained to economic and financial decision making; mobility; communication with the husband on sensitive matters; and her active involvement in important household affairs. The responses elicited were numerically scored and women were categorized into three groups.

related to use of services. The expectation is that young primigravidae will be more diligent in seeking antenatal care and skilled assistance at delivery because their unfamiliarity with reproduction may engender a greater sense of anxiety, and thus of need. A final measure of motivation is represented by the personal hygiene scale[3]. Women who are more concerned about their hygiene are likely to have a greater propensity to use obstetric services than other women.

An important feature of the study is the introduction of self-reported obstetric problems into the battery of explanatory factors. A detailed analysis of obstetric morbidity in this study population may be found elsewhere (Bhatia and Cleland, n.d.). However, a brief account of the nature and incidence of problems reported by women is needed to place in context the results on service use.

To measure obstetric morbidity, a comprehensive list of conditions and their symptoms was prepared. Piloting and pre-testing were then undertaken to ensure that these symptoms were described in everyday terminology that women could understand. In the main survey, the checklist of symptoms was administered to respondents in sequence, starting with the antenatal and ending with the postnatal period.

A total of 18 per cent of all respondents reported at least one morbid symptom during pregnancy and 10 per cent reported symptoms of a potentially serious nature, such as pre-eclampsia, and infection (Table 1). During the delivery itself, nearly 8 per cent of women reported conditions that were potentially life-threatening, the most common of which were prolonged labour and haemorrhage. Postnatal disorders were reported more commonly; altogether 23 per cent indicated one or more problems. Symptoms of possible infection were reported by nearly 17 per cent while 11 per cent recalled more acute and immediately dangerous symptoms such as haemorrhage and loss of consciousness.

**Table 1**
**Main categories of obstetric problems, reported by women**

| Antenatal | Percentage |
|---|---|
| Potentially life threatening conditions (e.g. swelling of hands and face, hypertension, fever for 3+ days) | 10.2 |
| Severe vomiting | 9.6 |
| Associated conditions (varicose veins, urinary problems) | 2.6 |
| **Natal** | |
| Potentially life threatening conditions (e.g. labour >18 hours, excessive bleeding, loss of consciousness) | 7.6 |
| **Postnatal** | |
| Potentially life threatening conditions (e.g. excessive bleeding, loss of consciousness) | 10.8 |
| Symptoms of infection (e.g. high fever, discharge, lower abdominal or pelvic pain) | 16.6 |
| Associated conditions (e.g. depression, painful urination) | 4.8 |

There is considerable overlap in the reporting of these symptom categories. Furthermore, some categories were reported by small numbers of women. For these reasons, the effect of

[3] Personal hygiene: each respondent was asked about her personal hygiene practices such as bathing, washing and combing the hair, washing and changing of clothes, clipping of nails, washing of hands after defaecation and before meals, materials used for bathing and washing. The responses were numerically scored and the respondents divided into three groups.

morbidity on service use is ascertained by comparing women who had any problem or disorder with those who reported no problems.

All variables were categorical in nature or grouped, and for each variable, one category was selected as the reference category. Regression analysis estimates the coefficient for each of the remaining categories of the variable. Results are presented in terms of odds ratios, which express the magnitude of the effect of each category on the outcome, relative to the reference category.

## Findings

### *Patterns of health care*

The patterns of health care during pregnancy, delivery and postnatal period by urban-rural residence of women are shown in Table 2. Nine out of ten pregnant women, both in urban and rural areas, reported consultation with a health-care provider during the antenatal period. This level of coverage is slightly higher than that obtained in the 1992-93 National Family Health Survey. In a little more than half the cases, the first consultation was made during the first trimester, while another one-third of women sought consultation during the second trimester of pregnancy. The proportion of women consulting a health professional during the third trimester is relatively small, eight per cent. There are significant urban-rural differentials in the timing of consultation ($\chi^2 = 22.28$, $p < .001$); more urban than rural women consulted during the first trimester.

For nearly half the pregnant women, the main purpose of first consultation was a routine checkup; an additional 32 per cent wished to confirm their pregnancy. Approximately one-sixth of respondents were visited by health workers in their homes. The remaining six per cent visited a health care provider on the first occasion because they had a problem during the pregnancy. The proportion of women consulting a practitioner for pregnancy confirmation is significantly higher in urban than rural areas, however, a larger proportion of rural women received domiciliary visits from health workers. These urban-rural differentials are statistically significant ($\chi^2 = 92.43$, $p < .001$).

In the rural areas 26 per cent of those women who received any antenatal care consulted an auxiliary nurse-midwife and 72 per cent, a doctor. In urban areas, however, almost all consultations were with doctors. The proportion of women consulting a private doctor is significantly higher in urban areas. No attempt was made to ascertain the formal qualifications of doctors and it would be incorrect to assume that all are fully trained allopathic practitioners.

Among the majority who received any antenatal care, the mean number of consultations was 3.7. As shown in Table 3, 96 per cent of women had more than one consultation and over one-third claimed five or more consultations. Analysis by purpose of visit indicates that women who initially go for a routine check or pregnancy confirmation are particularly likely to have subsequent consultations.

**Table 2**
**Health care during pregnancy, delivery and postnatal period by urban-rural residence of women.**

| | Urban | | Rural | | Total | | |
|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | $x^2$ |
| **A health professional seen during pregnancy** | 1066 | 89.1 | 2164 | 90.2 | 3230 | 89.8 | 1.23 |
| Timing of first visit | | | | | | | |
| First trimester | 664 | 62.3 | 1159 | 53.6 | 1823 | 56.4 | 22.28*** |
| Second trimester | 324 | 30.4 | 819 | 37.8 | 1143 | 35.4 | |
| Third trimester | 78 | 7.3 | 186 | 8.6 | 264 | 8.2 | |
| **Purpose of first consultation with health professional** | | | | | | | |
| Routine checkup | 440 | 41.3 | 1052 | 48.6 | 1492 | 46.2 | 92.43*** |
| To confirm pregnancy | 455 | 42.7 | 577 | 26.7 | 1032 | 32.0 | |
| Had a problem | 63 | 5.9 | 144 | 6.7 | 207 | 6.4 | |
| Others (including domiciliary visits by health professionals) | 108 | 10.1 | 391 | 18.1 | 499 | 15.4 | |
| **Type of health professional consulted** | | | | | | | |
| ANM | 17 | 1.6 | 562 | 26.0 | 579 | 17.9 | 362.31*** |
| Govt. Doctor | 474 | 44.5 | 910 | 42.1 | 1384 | 42.8 | |
| Private Doctor | 558 | 52.3 | 647 | 29.9 | 1205 | 37.3 | |
| Others, including *dais* | 17 | 1.6 | 45 | 2.1 | 62 | 1.9 | |
| **Received tetanus toxoid during pregnancy** | 1058 | 88.4 | 2184 | 91.1 | 3242 | 90.2 | 6.51* |
| **Received folic acid** | 1034 | 86.4 | 2140 | 89.2 | 3174 | 88.3 | 6.31* |
| **Place of delivery** | | | | | | | |
| Home | 510 | 42.6 | 1705 | 71.1 | 2215 | 61.6 | 289.12*** |
| Primary Health Centre | 0 | 0.0 | 5 | 0.2 | 5 | 0.2 | |
| Govt. Hospital | 294 | 24.6 | 348 | 14.5 | 642 | 17.9 | |
| Private Hospital | 393 | 32.8 | 340 | 14.2 | 733 | 20.4 | |
| **Person assisted (home delivery)** | | | | | | | |
| Doctor | 7 | 1.4 | 10 | .6 | 17 | .8 | 26.39*** |
| ANM/LHV | 62 | 12.2 | 298 | 17.5 | 360 | 16.3 | |
| Trained *dai* | 15 | 2.9 | 126 | 7.4 | 141 | 6.4 | |
| Elderly lady/Untrained *dai* and others | 426 | 83.5 | 1270 | 74.5 | 1696 | 76.6 | |
| **Receipt of postnatal checkup** | 306 | 25.6 | 356 | 14.8 | 662 | 18.4 | 61.05*** |
| **Total number of respondents** | 1197 | | 2398 | | 3595 | | |

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

**Table 3**
**Number of professional consultations during pregnancy, by purpose of first consultation.**

| Number of consultations | Purpose of first consultation | | | | |
|---|---|---|---|---|---|
| | Routine check-up | To confirm pregnancy | Had a problem | Others (including domiciliary visits) | All |
| | % | % | % | % | % |
| One | 4.8 | 1.3 | 8.2 | 6.6 | 4.2 |
| Two | 14.4 | 3.5 | 10.3 | 22.7 | 11.9 |
| Three | 35.8 | 21.7 | 18.5 | 47.5 | 32.0 |
| Four | 15.1 | 13.7 | 15.5 | 11.7 | 14.2 |
| Five + | 29.8 | 59.7 | 47.4 | 11.4 | 37.7 |
| N | 1435 | 1004 | 194 | 480 | 3113 |

The relationship between receipt and nature of antenatal care and occurrence of problems during pregnancy is complex. Certainly, it is to be expected that women with problems will be more likely to seek medical advice but it is also likely that some problems or symptoms will be detected only during consultations. In this study, among women with at least one antenatal problem, 83 per cent consulted a doctor, and a further 13 per cent were seen by a paramedic leaving a residue of only 4 per cent who received no antenatal attention. Among the larger group of women who reported no problem during pregnancy, the corresponding percentages are 70, 19, and 12.

Nine out of ten pregnant women reported that they had received tetanus toxoid and folic acid prophylaxis. The proportions of such women are slightly higher in rural areas, but are nevertheless statistically significant ($\chi^2$ = 6.51 & 6.31; $p < .005$).

Of all respondents, 38 per cent (57% urban; 29% rural) delivered in a hospital. This figure is identical to the all-state estimate from the 1992-93 survey. Urban women were much more likely to prefer private to public facilities for childbirth than were rural women. For home deliveries, information was sought about the person assisting the delivery. Because respondents are unlikely to be able to distinguish between trained and untrained *dais*, the name of the *dai* was ascertained where relevant. Names were then cross-checked against lists of women who had received training to establish their status. The responses indicate that, both in urban and rural areas, 77 per cent of home deliveries were conducted by untrained *dais* and elderly ladies; trained assistance was available only in a few cases, most notably by ANMs or Lady Health Visitors, who together supervised 16 per cent of all home deliveries. Only six per cent of women reported assistance from a trained *dai*.

Table 4 presents a preliminary analysis of the links between types of person seen at first antenatal consultation, experience of problems during pregnancy and place of delivery. As expected, there is a considerable degree of continuity in the nature of obstetric care. Large majorities of women who had no antenatal care or were seen by a paramedic (typically an ANM) delivered at home, 88 and 85 per cent, respectively. This proportion falls to 67 per cent among those who consulted a government doctor and further to 35 per cent for those who saw a private practitioner. There is also a degree of continuity in the choice between public and private sectors. Nearly half of those consulting a private practitioner at the first antenatal visit delivered in a private institution, compared to only eight per cent among women who consulted a government doctor.

**Table 4**
**Place of delivery, by type of first antenatal consultation and presence of antenatal problems**

| Type of consultation/ problem | Place of delivery (%) | | | |
|---|---|---|---|---|
| | **Home** | **PHC/Govt. hospital** | **Private hospital** | **N** |
| No consultation | | | | |
| Problem | 80.0 | 16.0 | 4.0 | 25 |
| No problem | 88.9 | 7.9 | 3.2 | 343 |
| All | 88.3 | 8.4 | 3.3 | 368 |
| Consulted paramedic | | | | |
| Problem | 72.0 | 13.4 | 14.6 | 82 |
| No problem | 86.9 | 8.5 | 4.5 | 550 |
| All | 84.9 | 9.2 | 5.9 | 632 |
| Consulted govt. doctor | | | | |
| Problem | 56.8 | 32.3 | 10.9 | 229 |
| No problem | 69.1 | 23.7 | 7.2 | 1153 |
| All | 67.0 | 25.1 | 7.8 | 1382 |
| Consulted private doctor | | | | |
| Problem | 26.0 | 15.0 | 59.0 | 307 |
| No problem | 38.0 | 18.1 | 43.9 | 897 |
| All | 35.0 | 17.3 | 47.7 | 1204 |

Regardless of the nature of medical supervision and advice during pregnancy, those who experienced antenatal problems were more likely to seek an institutional delivery than those who reported no problems. Differences between the two groups are not large, however, but are explored further in the multivariate analysis.

Whereas antenatal coverage is impressively high, receipt of a postnatal check is much less common. Approximately one quarter of urban and one-seventh of rural women reported a checkup during the six weeks postnatal period. This differential is statistically significant ($\chi^2 = 61.0$, $p < 0.001$).

The relationship between socio-economic characteristics, biomedical or demographic risk factors and health-care seeking behaviour are now assessed through multivariate statistical techniques. The results are summarized in Table 5.

### *Predictors of antenatal care*

It will be recalled that women received antenatal care either by visiting a provider or at home from outreach staff: the purpose of the consultation varied between routine checkup, confirmation of pregnancy and treatment of a problem. A visit to a provider for checkup or confirmation of pregnancy without any perceived problem indicates a degree of conscious effort and motivation on the woman's part to take care of her own health as well as that of the newborn. Furthermore Table 3 shows that the majority of such women have at least two consultations during pregnancy. What are the characteristics of women who demonstrate such health consciousness? To answer this question, the appropriate logistic regression was performed only for respondents who reported no antenatal problem.

**Table 5**
**Logistic regression of health care during pregnancy, delivery and postnatal period by selected characteristics of women**

| Characteristics | | (Total sample) | Odds ratios | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 Routine antenatal check up | 2 Check during first trimester | 3 Private source of antenatal care | 4 Institutional delivery | 5 Delivery in private institution | 6 Caesarean section | 7 Post natal check up |
| Residence | Urban | 1197 | 0.92 | 1.05 | 2.18*** | 2.57*** | 1.42** | 1.30 | 1.35* |
| | Rural[a] | 2398 | | | | | | | |
| Caste | Non-Hindus[a] | 333 | | | | | | | |
| | High | 182 | 0.53* | 0.97 | 0.79 | 0.59* | 0.52* | 1.11 | 1.10 |
| | Middle | 2128 | 0.83 | 1.01 | 1.04 | 0.86 | 0.92 | 1.74 | 1.21 |
| | Low | 951 | 0.53*** | 0.89 | 0.59*** | 0.51** | 0.64 | 1.25 | 1.09 |
| Education | None[a] | 1888 | | | | | | | |
| | 1 - 5 | 504 | 1.59*** | 1.12 | 1.45** | 1.99*** | 1.17 | 1.46 | 1.10 |
| | 6 + | 1203 | 1.71*** | 1.44*** | 2.54*** | 3.17*** | 1.49* | 2.23* | 1.58* |
| Economic status | Low[a] | 1194 | | | | | | | |
| | Middle | 1188 | 1.07 | 1.11 | 1.59*** | 1.23* | 1.87*** | 1.59 | 1.24 |
| | High | 1208 | 1.16 | 1.17 | 2.62*** | 1.55*** | 3.07*** | 1.43 | 1.20 |
| Age at pregnancy | < 18 | 211 | 0.44*** | 0.81 | 0.74 | 0.94 | 0.73 | 0.75 | 0.83 |
| | 18 - 24[a] | 2096 | | | | | | | |
| | 25 + | 1263 | 1.08 | 1.04 | 1.14 | 1.27* | 1.18 | 0.96 | 1.46** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Pregnancy order | 1 | 674 | 1.83*** | 1.39** | 1.26* | 2.47*** | 1.24 | 1.84* | 1.19 |
| | 2 - 4[a] | 2518 | | | | | | | |
| | 5 + | 403 | 0.55*** | 0.63*** | 0.77 | 0.41*** | 0.79 | 0.20* | 1.16 |
| Autonomy | Low[a] | 1626 | | | | | | | |
| | Medium | 1224 | 1.18 | 1.00 | 1.23* | 1.04 | 1.61** | 0.85 | 1.04 |
| | High | 745 | 1.40 | 0.96 | 1.12 | 1.20 | 1.49** | 1.07 | 1.32 |
| Personal hygiene | Low[a] | 1317 | | | | | | | |
| | Medium | 1101 | 1.28* | 1.47*** | 1.89*** | 1.34** | 1.44* | 0.85 | 0.94 |
| | High | 1177 | 2.15*** | 2.14*** | 2.28*** | 1.98*** | 1.85*** | 1.18 | 0.90 |

| Characteristics | | (Total sample) | Odds ratios | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1 Routine antenatal check up | 2 Check during first trimester | 3 Private source of antenatal care | 4 Institutional delivery | 5 Delivery in private institution | 6 Cesarean section | 7 Post natal check up |
| History of abortion/still birth/neo-natal death | Yes | 823 | 1.28* | 1.27* | 1.27* | 1.61*** | 1.40* | 3.12*** | 1.09 |
| | No[a] | 2772 | | | | | | | |
| Place of delivery | Home | 2214 | | | | | | | 0.50*** |
| | Private | 733 | | | | | | 2.57*** | 1.88 |
| | Government[a] | 647 | | | | | | | |
| Antenatal problems | Yes | 366 | | | 1.64*** | 1.91*** | 1.52* | 1.49 | 1.23 |
| | No[a] | 3229 | | | | | | | |
| Natal problems | Yes | 274 | | | | | | 6.16*** | 2.40*** |
| | No[a] | 3321 | | | | | | | |
| Surgical interventions in delivery | Yes | 467 | | | | | | | |
| | No[a] | 3128 | | | | | | | 1.25 |

a Reference category

b includes only women with no problems

c includes only women with any antenatal visit

d includes only women having an institutional delivery

| | |
|---|---|
| * | p< 0.05 |
| ** | p< 0.01 |
| *** | p< 0.001 |

The results are shown in the first column of Table 5. Among the social and economic factors, education and the index of personal hygiene emerge as strong positive predictors. The effects of economic status and autonomy are in the expected direction but are much weaker and do not attain statistical significance. The non-Hindus, mainly Muslims, are much more likely to seek routine antenatal care than Hindus. The explanation may lie in the possibility that high-caste Hindus generally confine themselves to their homes while lower-caste women, many of whom work as agricultural labourers, have insufficient time for checkups. On the contrary the participation of the Muslim women in the labour force, particularly as agricultural labourers, is generally lower and it is much easier for them to find time to seek medical care.

All the risk factors for adverse obstetric outcomes are significantly related to the probability of seeking antenatal care. A total of 823 women reported a prior foetal loss or neonatal death; this figure was derived from the complete pregnancy histories that formed part of the questionnaire. These women are more likely to receive an antenatal check (OR = 1.28) than women without prior losses. Pregnancy order is very strongly related to health-seeking behaviour. As hypothesized, primigravidae are much more likely to report an antenatal check (OR = 1.83) than women having their second, third or fourth pregnancy. However multigravidae are much less likely to seek routine care; obstetric experience clearly inculcates a degree of casualness with regard to preventive checks. Only 211 women in the entire sample were aged less than 18 years at the time of the pregnancy. Net of the effect of pregnancy order and other factors in the model, these high-risk young mothers are significantly less likely than older mothers to receive routine care during pregnancy . After 18 years, however, age is unrelated to health behaviour.

The timing of an antenatal check is important. Some pregnancy-related problems, if not diagnosed and treated early, may endanger the mother and foetus. The predictors of a first trimester check, among women receiving any preventive health care during pregnancy, are shown in the second column of Table 5. Education again emerges as an influence, though it is only the highest educational group, comprising women with six or more years of schooling, whose behaviour differs from uneducated women. Self-reported hygiene is again a powerful predictor. It appears that this variable represents a socio-psychological dimension of considerable influence on health-related behaviour, independently of education, economic status and caste. Pregnancy order and a history of adverse obstetric outcomes are also significantly related to the timing of antenatal checks.

Public sector sources of antenatal consultation, checkup and treatment include subcentres, primary health centres located in the rural areas, and subdistrict and district hospitals and maternity homes in the urban areas. As mentioned earlier, a large number of private medical practitioners, both qualified and unqualified, also practise in both rural and urban areas, and several small nursing or maternity homes and hospitals are located in the study area. The private sector in India in general and Karnataka in particular is becoming increasingly strong and government services often remain underused. Who uses private rather than government facilities? The results of logistic regression, shown in column 3, indicate that urban residents, those with higher levels of education and economic status, hygiene-conscious respondents, women having their first pregnancy, and those with a previous history of stillbirths or abortions are more likely to seek antenatal care from private sources than women with other characteristics. Furthermore, women experiencing problems during pregnancy are also likely to seek private medical care.

Clearly resort to private-sector care reflects ability to pay: hence the strong effect of economic status which was not a predictor of receipt of any type of antenatal care nor of its

timing. At the same time, the fact that personal hygiene, education and risk factors for adverse outcomes are also significantly related to choice of private over public sector care suggests that women believe that they will obtain a higher quality of service from private than from government practitioners.

### *Predictors of place of delivery and use of instruments*

The 1992-93 National Family Health Survey shows that 26 per cent of all births in India in the early 1990s occurred in institutions; the diversity between states is very wide, ranging from 6 per cent in Nagaland to 88 per cent in Kerala. The coverage in Karnataka, at 38 per cent, is well above the average and places the state in sixth position out of 25 states. Column 4 of Table 5 shows the net predictors of institutional delivery among this study population. Almost all factors selected for analysis have a statistically significant relationship. Urban residence, high educational and economic status and high hygiene consciousness all exert strong net influences. In line with the results for antenatal care, Muslims are more likely than Hindus to deliver in a hospital.

The links between age and place of delivery are weak, but pregnancy order emerges as a strong influence, with adjusted odds of 2.47 for primigravidae relative to women having a second to fourth pregnancy. Approximately ten per cent of the sample reported a problem during pregnancy, the most common of which were severe vomiting, swelling of hands and face, hypertension and fever. These women are much more likely to seek an institutional delivery than problem-free women. This is an important finding because it implies that women make an appropriate response to symptoms of possible disorders or are referred by practitioners. Similarly, a history of prior obstetric problems is significantly related to the probability of having an institutional delivery.

As noted earlier, the number of private nursing homes in urban India is increasing rapidly. Determinants of the type of institution used by women for childbirth are assessed in column 5, where the analysis has been restricted to women having institutional delivery. The factors that influence the private-versus-public-sector decision are similar to those that influence the institutional-versus-home decision. Thus, factors such as urbanity, education, pregnancy order and other risk factors for adverse pregnancy outcome are more decisive for the latter decision than the choice of a private over a public institution. The clear exceptions are autonomy and, not surprisingly, economic status.

Surgical interventions in delivery all over the world are on the increase. In this study, surgical interventions were made in more than one-third of hospital deliveries; episiotomy was performed in 23.5 per cent of cases, and 8 per cent of these women were delivered through caesarean section. The results of logistic regression analyses indicate that higher levels of education, pregnancy order, a history of abortions or stillbirths, delivery in a private hospital and problems during delivery are strong predictors of caesarean section: the women with these characteristics are two to six times more likely to deliver through caesarean section than other women. The effects of economic status are in the expected direction but are relatively modest and are not statistically significant. It may be inferred that ability to pay is not a major influence on the decision to deliver by caesarean section. The index of personal hygiene is also unrelated to the type of delivery.

### *Predictors of postnatal checkup*

While nine out of ten women had a consultation with a health care provider during pregnancy, less than one-fifth had a checkup within six weeks of delivery. The characteristics positively and significantly associated with postnatal checkups are shown in column 7: urban residence, six or more years of education, 25 and more years of age, delivery in a private

hospital and problems during delivery. It is rather surprising that neither the personal hygiene score nor pregnancy order, strong predictors of antenatal and natal care, are related to the probability of seeking a postnatal check.

## Discussion

There is widespread belief that care during pregnancy, delivery and the postnatal period can improve the health of the mother and the infant. Although the effectiveness of preventive antenatal and postnatal care is not clearly established, there are certain conditions whose early detection can reduce maternal mortality and reproductive morbidity. In developing countries where the prevalence of several treatable diseases is very high, maternal health services provide a unique opportunity to detect and treat these diseases. Although certain obstetric emergencies cannot be predicted through antenatal screening, women at least can be educated to recognize symptoms leading to potentially serious conditions and take immediate action. Furthermore, through contacts with pregnant and recently delivered women, health workers and professionals can discuss other health-related issues such as family planning, immunization, child health, and nutrition. It is therefore important to improve maternal health services through more effective and efficient delivery systems. An adequate knowledge of health-care seeking behaviour of women during the entire reproductive process and their determinants can facilitate the management of such a system.

This study indicates that nine out of ten women had at least one antenatal consultation during their most recent fertile pregnancies: an impressive coverage. Most earlier studies of this topic however have assumed that antenatal services are obtained from health centres or at domiciliary visits by paramedical staff (e.g., Kanitkar and Sinha 1989). In this study, 97 per cent of urban women and 72 per cent of rural residents consulted a doctor. Use of the services provided by paramedical staff of the primary health care system was minimal in rural areas. There is thus a need for radical reappraisal of the role of paramedical staff at health centres and subcentres in the provision of maternal health care. Furthermore, a large number of consultations were with private medical practitioners. Realistic planning of maternal health services must take into account the existence of such practitioners and devise appropriate strategies to upgrade their skills, regulate their activities and in all possible ways enhance the quality of their contribution to better reproductive health.

Despite the fact that most women see a medical practitioner during pregnancy, the study found that a majority of the deliveries take place at home and are attended by untrained *dais* and elderly ladies. Probably most of them lack knowledge of aseptic techniques of delivery and many follow superstitious customs and practices which may endanger the health of the mother and the child. India was the first developing nation to recognize these dangers and to start training traditional birth attendants. Since 1978, the United Nations Fund for Population Activities and other international agencies have provided funds for traditional birth attendant training schemes in India. Thousands of traditional birth attendants were trained and it was proposed to have at least one in each village; it is therefore well worth exploring why they are not used by the community. Similarly, ANMs supervise rather few deliveries in this population.

Of the deliveries that took place in hospitals, the majority were in private institutions. Private nursing or maternity homes and hospitals are becoming increasingly popular even among the rural people because of the poor reputation of the government hospitals. People willingly incur substantial expenses at these institutions rather than availing themselves of cheaper services from government facilities. The need is obvious to improve the quality of government hospitals.

The study revealed a marked imbalance between antenatal and postnatal care. Less than one in five of all respondents received a postnatal check, despite the fact that self-reported

morbidity in the six weeks following childbirth was rather high. There thus appears to be an important gap in Karnataka's maternal health services, that warrants further investigation.

The analysis of determinants or predictors of use of maternal health services not only confirmed some expected patterns but also yielded some surprising results. It is not surprising, for instance, that women's education is such a pervasive influence or that resort to private services is heavily conditioned by economic status. In another study in South India clear differences were observed between educated and uneducated mothers in seeking medical treatment for children (Caldwell, Reddy and Caldwell 1983). Similarly the large urban-rural differential in the prevalence of institutional deliveries was anticipated for reasons of greater access though it is interesting that rural women were just as likely as urban women to seek antenatal care.

The strong religious differential in this subdistrict of Karnataka was unexpected. The common view is that Muslim women are less likely than Hindus to make use of medical services, but in this study, the reverse was true. A further interesting finding concerns the consistently strong effect, net of all obvious confounding factors, of self-reported hygiene. Few studies have attempted to measure such individual attributes and the results imply that there exists a considerable heterogeneity among women that is not captured by more conventional socio-economic indicators and therefore goes unobserved in most analyses.

Women's autonomy on the other hand, failed to emerge as a strong predictor of use of antenatal or delivery services. However, it was significantly related to the choice of private rather than public sector care. This relationship probably has no connection to mobility but may reflect the fact that women who have greater decision making power are more able than other women to exercise a preference for more expensive private care.

A final distinctive contribution of this study is its examination of the relationship between obstetric problems and subsequent health-related behaviour. The results are encouraging, in that women who experienced problems during pregnancy were more likely to seek medical supervision or delivery at an institution. Similarly, those who experienced difficulties during delivery, most commonly prolonged labour or excessive bleeding, were more likely to go for a postnatal check.

Surgical interventions were made in 13 per cent of deliveries. If this proportion is recalculated only for hospital deliveries, 34 per cent of women were delivered with the aid of surgery, eight per cent by caesarean section. Caesarean sections are increasing all over the world: levels ranging between 27 and 32 per cent have been reported in some Caribbean and Latin American countries (Janowitz et al. 1985; Webster et al. 1992). The results also indicate that the probability of caesarean section is several times higher in private hospitals than in government hospitals: similar findings have been reported elsewhere (Taffel 1989). Surgical interventions in delivery necessitate longer hospital stays, higher expenses and increased morbidity and mortality rates. In addition, they represent a growing burden on scarce medical resources in developing countries. The increasingly high levels of caesarean section in private hospitals are also indicative of commercialization of medical care: there is an urgent need for further studies in this area.

## References

Bhatia,J.C.1973. Abortionists and abortion seekers. *Indian Journal of Social Work* 34,3:275-285.

Bhatia, J.C.1993. Levels and causes of maternal mortality in southern India. *Studies in Family Planning* 24,5:310-318.

Bhatia, J.C. and J. Cleland. n. d. Obstetric morbidity in South India. *Social Science and Medicine* (forthcoming)

Bhatia, J.C., Dharamvir, C.S. Chuttani and A. Timmappaya. 1975. Traditional healers and modern medicine. *Social Science and Medicine* 9,15-21.

Bhatia, J.C., Dharamvir, A. Timmappaya and C.S. Chuttani. 1974. The role of practitioners of indigenous medicine in family planning programme - a study in three states. *Journal of Family Welfare* 20,3:18-27.

Boes, E.G.M .1987a. Maternal mortality in southern Africa,1980-1982.Part I. Pregnancy can be lethal. *South African Medical Journal* 71:158-160.

Boes, E.G.M. 1987b. Maternal mortality in southern Africa,1980-1982. Part II. Causes of maternal deaths. *South African Medical Journal* 71:160-161.

Caldwell, J.C. , P.H. Reddy and P. Caldwell. 1983. The social component of mortality decline: an investigation in South India employing alternative methodologies. *Population Studies* 37,2:185-205.

Chuttani, C.S., J.C. Bhatia, Dharamvir and A. Timmappaya. 1973. A survey of indigenous medical practitioners in five different states in India. *Indian Journal of Medical Research* 61,6:962-967.

Fathalla, M.F.1988. Promotion of research in human reproduction: global needs and perspectives. *Human Reproduction* 3: 7-10.

International Institute for Population Sciences (IIPS). 1994. *National Family Health Survey.* Bombay.

Janowitz, B. et al. 1985. Caesarian delivery in northeast region of Brazil. *Social Science and Medicine* 16:19.

Kanitkar, T. and R.K. Sinha. 1989. Antenatal care service in five states of India. In *Population Transition in India*,Volume 2, ed. S.N.Singh et al. Delhi: B.R.Publishing.

Kwast, B.E., M. Bekele, S. Yoseph, A. Gossa, L. Mehari, and O. Frost. 1989. Confidential enquiries into maternal deaths in Addis Ababa, Ethiopia 1981-83. *Journal of Obstetrics and Gynaecology of Eastern and Central Africa* 8: 75-82.

Melrose, E.B.1984. Maternal deaths at King Edward VIII Hospital, Durban: a review of 258 consecutive cases. *South African Medical Journal* 65:165-167.

Obermeyer, C.M.1993. Culture, maternal health care, and women's status: a comparison of Morocco and Tunisia. *Studies in Family Planning* 24,6:354-365.

Ramachandran, L.1989. The effect of antenatal and natal services on pregnancy outcome, and health of the mother and the child. *Journal of Family Welfare* 35,5:34-46.

Srinivasa, D.K and S. Venkatesh. 1982. Maternal care receptivity-an innovative approach for the evaluation of MCH services. *Health and Population Perspectives and Issues* 5:2.

Taffel, S.M.1989. Caesarean section in America: dramatic trends,1970 to 1987. *Statistics Bulletin, Metropolitan Insurance Companies* 70:2.

Walker, G.J.A., D.E.C. Ashley, A. McCaw and G.W. Bernard. 1986. Maternal mortality in Jamaica. *Lancet* i:486-488.

Webster, L.A., J.R. Daling, C. McFarlane, D. Ashley and C. W. Warren 1992. Prevalence and determinants of caesarean section in Jamaica. *Journal of Biosocial Science*. 24: 515-525.