Evaluation of Maternal Health Services Being Provided to the High-risk Mothers of Bhavnagar District, Gujarat

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Abstract

Background: Despite substantial progress on maternal and child mortality, neither the Millennium Development Goal 4 nor 5 targets could be met. The global maternal mortality ratio declined by 44% between 1990 and 2015, short of the targeted 75% fall. Objectives: The objective of the study is to evaluate the maternal health services being provided to the high-risk mothers (HRMs) of Bhavnagar district. Methodology: It was a cross-sectional study conducted among the HRMs of Bhavnagar district during the period from March 2017 to August 2018. A total of 90 HRMs were selected and interviewed. Results: All the HRMs were measured for blood pressure and weight; tested for hemoglobin, blood group, and HIV; and examined for pedal edema. None of the HRMs were tested for sickle cell anemia. In the best performing primary health centers (PHCs), all the HRMs were tested for venereal disease research laboratory and hepatitis B surface antigen as against 79.5% of the HRMs from the worst-performing PHCs. About 47.7% of the HRMs from the worst-performing PHCs and 13.3% of the HRMs from the best-performing PHCs made <4 antenatal care (ANC) visits. Conclusions: For most of the ANC services, reason for nonreceipt of the service as given by the HRMs was “service not offered.”

Keywords: Evaluation, health services, high risk, pregnancy, prenatal care

Introduction

Globally, about 10.7 million women died in the 25 years between 1990 and 2015 due to maternal causes. Deaths among pregnant women, children, and adolescents account for more than one-third of the global burden of premature mortality despite the fact that the vast majority of these deaths are preventable.

Improvement of maternal health and decline of maternal mortality ratio requires the availability of health services throughout the period of pregnancy, which includes early antenatal registration, consumption of iron-folic acid (IFA) tablets as prophylaxis and therapy, regular antenatal checkups, monitoring of blood pressure, immunization against tetanus, timely detection of high-risk antenatal cases and their timely referral, delivery in safe and hygienic environment by skilled birth attendant, timely referral in case of obstetric emergency for management of hemorrhage with blood transfusions, availability of cesarean section facility, and minimum three postnatal visits.

However, the greatest challenges in improving maternal and child health are poor coverage with poor quality of health-care services and poor infrastructure. This study was conducted to evaluate the maternal health services being provided to high-risk mothers (HRMs) and also to assess the factors responsible for noncompliance to/nonreceipt of maternal health services among those in Bhavnagar district.

Methodology

It was a cross-sectional study conducted from March 2017 to August 2018. The study population consisted of HRMs, who were registered in the primary health centers (PHCs) of Bhavnagar district. As the coverage of antenatal care (ANC) visits among all pregnant women in Bhavnagar is about 95%, considering the allowable error of 5% calculated sample size was 73. Considering 20% of nonrespondents, the sample size

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was increased to 88 and ultimately the figure was rounded to 90 to select an equal number of HRMs from three subcenters of each of the selected PHCs. HRMs who were not willing to participate in the study and who were not in the 3rd trimester were excluded from the study.

Permission was obtained from the Chief District Health Officer of Bhavnagar district and Institutional Review Board, Government Medical College Bhavnagar, Gujarat, India. In the first stage, five best-performing and five worst-performing PHCs were selected using total composite index calculated from PHC scorecard. The total composite index includes different indices such as pregnancy care group index, childbirth group index, reproductive age group index, and postnatal mother and newborn care group index. In the second stage, from each selected PHC, three subcenters and finally three HRMs from each selected subcenter were selected by simple random sampling using the lottery method. If three HRMs were not available in that subcenter, another subcenter was selected using the lottery method.

A semi-structured questionnaire was designed, pretested, and corrected by a pilot study. The first visit was conducted during the third trimester of the HRMs, and information regarding sociodemographic profile, risk factors for pregnancy, ANC (provided and received), etc., was collected. The second visit was conducted between 42 and 75 days after the delivery to collect the information regarding immunization and postnatal care. If the services were not availed, the reasons thereof were asked to the mother, in which it was specifically asked if the service was offered or not.

All interviews were conducted in a local language and at a place and time convenient to the participant. MAMTA Card was also used to collect and validate the relevant information.

Informed written consent was obtained from all the participants about their HRP by Female health worker/Auxiliary nurse midwifery (FHW/ANM).

All the participants identified as high risk were counseled for referr services and alarming symptoms.

Data entry was done in Epi Info 7 developed by Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia (US) on November 13, 2008 with appropriate data checks to avoid errors in data entry.

**RESULTS**

The difference between the HRMs of worst- and best-performing PHCs was not found statistically significant for age, education, occupation, and socioeconomic class. Hence both the groups were comparable for various sociodemographic variables.

Table 1 presents the details of the registration and identification of high-risk pregnancy (HRP).

It was found that 95.6% and 91.1% of the HRMs of worst- and best-performing PHCs, respectively, got registered before 6 months of pregnancy (early). In the worst-performing PHCs, 60% of the HRMs, whereas in the best-performing PHCs, 53.3% of the HRMs were registered at subcenter.

In the worst- and best-performing PHCs, among all HRMs, 71.1% and 55.6% of the HRMs, respectively, were identified for their high-risk status during their 1st trimester of the pregnancy. About 68.9% and 55.6% of the HRMs of the worst- and best-performing PHCs, respectively, were informed about their HRP by Female health worker/Auxiliary nurse midwifery (FHW/ANM).

It was also found that 52.3% and 86.7% of the mothers from the worst- and best-performing PHCs, respectively, came at least four times for the ANC visits during their entire duration of the pregnancy.

All the HRMs of both the groups of PHCs received ANC services (such as measuring blood pressure, weight, testing hemoglobin level, blood group, HIV, giving tablet IFA, tab Ca, injection TT) at least once during the antenatal period.

About 77.8% of the mothers from the worst-performing PHCs and all the mothers from the best-performing PHCs were tested for the venereal disease research laboratory (VDRL) and hepatitis B surface antigen (HBsAg). The difference between the worst- and the best-performing PHCs was found statistically significant ($P = 0.001$).

Testing for sickle cell anemia was not offered to any of the HRMs in any of the PHCs. The differences between the HRMs of worst- and best-performing PHCs for the receipt of Tablet FA, Balbhog, and iodized salt were not found statistically significant.

Among the HRMs, full ANC was received by 52.3% and 86.7% of the mothers from the worst- and best-performing PHCs, respectively.

Table 1: Frequency of the high-risk mothers of Bhavnagar district for various parameters of registration and identification of high-risk pregnancy ($n=45$)

| Details of pregnancy | Groups | Worst-performing PHCs, $n$ (%) | Best-performing PHCs, $n$ (%) |
|----------------------|--------|-------------------------------|-------------------------------|
| Time of registration | Early  | 43 (95.6)                     | 41 (91.1)                     |
|                      | Late   | 2 (4.4)                       | 4 (8.9)                       |
| Place of registration| Anganwadi| 18 (40.0)                    | 14 (31.1)                    |
|                      | Subcentre | 27 (60.0)                    | 24 (53.3)                    |
|                      | PHC     | 0                             | 7 (15.6)                     |
| Identification of HRP| 1st trimester | 32 (71.1)                | 25 (55.6)                    |
|                      | 2nd trimester | 11 (24.5)                  | 18 (40.0)                    |
|                      | 3rd trimester | 2 (4.4)                       | 2 (4.4)                      |
| Who informed about HRP? | Not informed | 1 (2.2)                        | 0                             |
|                      | AWW     | 5 (11.1)                      | 9 (20.0)                     |
|                      | ASHA    | 7 (15.6)                      | 6 (13.3)                     |
|                      | FHW/ANM | 31 (68.9)                     | 25 (55.6)                    |
|                      | MO      | 1 (2.2)                       | 5 (11.1)                     |

HRMs: High-risk mothers, HRP: High-risk pregnancy, PHCs: Primary health centers, AWW: Anganwadi worker, ASHA: Accredited social health activist, ANM: Auxiliary nurse midwifery, MO: Medical officer, FHW: Female health worker
Table 2 presents the distribution of mothers according to the frequency of ANC services.

It was observed that ANC services were received <4 times by 47.7% and 13.3% of the mothers from the worst- and best-performing PHCs, respectively. The difference observed was statistically significant ($P = 0.000$).

Balbhog was not received at all by 29.5% of the mothers from the worst-performing PHCs and 26.7% of the mothers from the best-performing PHCs. Balbhog was received <4 times by 40.9% and 13.3% of the mothers from the worst-performing PHCs and best-performing PHCs, respectively. The difference found was statistically significant ($P = 0.004$).

Table IFA and calcium (Ca) were received <3 times by 81.8% and 48.9% of the mothers from the worst-performing PHCs and best-performing PHCs, respectively. The difference was found statistically significant ($P = 0.001$).

Table 3 presents the proportion of HRMs (with <4 ANC visits), who received ANC service at every visit.

It was found that 21 HRMs from the worst-performing PHCs and 6 HRMs from the best-performing PHCs made <4 ANC visits. About 85.7% of the HRMs from the worst-performing PHCs and 16.7% of the HRMs from the best-performing PHCs were tested for urine albumin, urine sugar, and blood sugar every time. The difference between them was found statistically significant ($P = 0.005$). In the worst-performing PHCs, balbhog was received every time by 14.2% of the HRMs, whereas in the best-performing PHCs, it was received every time by 66.7% of the HRMs. The difference was found statistically significant ($P = 0.039$). Iodized salt was received every time by only 4.8% and 33.3% of the mothers from the worst- and the best-performing PHCs, respectively. The difference was not found statistically significant ($P = 0.219$).

All the mothers of the both groups of PHCs were measured for blood pressure and weight, tested for hemoglobin, and examined for pedal edema at every ANC visit.

It was found that among the HRMs who had normal delivery in the government facility, 75% and 81.2% of the mothers from the worst- and best-performing PHCs, respectively, were discharged within 2 days of the delivery.

All of the mothers who had cesarean section were discharged from the hospital within 7 days of the delivery.

It was found that 28.9% of the HRMs from each of both types of PHCs were visited by the FHWs <3 times during the postnatal period. It was also observed that 35.6% and 22.2% mothers from the worst- and best-performing PHCs, respectively, were visited by ASHA <6 times during their postnatal period.

Table 4 shows the frequency of reasons for nonreceipt of antenatal care services every time by the HRMs.

About 16.7% of the mothers from the worst-performing PHCs told that testing for urine albumin and sugar was refused by them. Balbhog was refused by 8.3% of the mothers from the best-performing PHCs. For the rest of the ANC services, the reason for nonreceipt of the service given by the mothers was “service not offered.”

### Table 2: Distribution of high-risk mothers according to the frequencies of the various antenatal care services provided

| ANC services                      | Frequency of services | Number of HRMs Worst- performing PHCs ($n=44$)*, $n$ (%) | Number of HRMs Best-performing PHCs ($n=45$), $n$ (%) | $\chi^2$, df | $P$ |
|-----------------------------------|-----------------------|---------------------------------------------------------|------------------------------------------------------|---------------|-----|
| Blood pressure, weight, Hb, and   | 1-3                   | 21 (47.7)                                                | 6 (13.3)                                              | 12.452, 1     | 0.000 |
| pedal edema                       | 4                     | 9 (20.5)                                                 | 13 (28.9)                                             |               |     |
|                                   | >4                    | 14 (31.8)                                                | 26 (57.8)                                             |               |     |
| Urine albumin, urine sugar, and   | 1-3                   | 30 (68.2)                                                | 28 (62.2)                                             | 0.348, 1     | 0.555 |
| blood sugar                       | 4                     | 12 (27.3)                                                | 14 (31.1)                                             |               |     |
|                                   | >4                    | 2 (4.5)                                                  | 3 (6.7)                                               |               |     |
| Balbhog                           | 0                     | 13 (29.5)                                                | 12 (26.7)                                             | 10.930, 2     | 0.004 |
|                                   | 1-3                   | 18 (40.9)                                                | 6 (13.3)                                              |               |     |
|                                   | 4                     | 4 (9.0)                                                  | 11 (24.4)                                             |               |     |
|                                   | >4                    | 9 (20.6)                                                 | 16 (35.6)                                             |               |     |
| Iodized salt                      | 0                     | 37 (84.0)                                                | 37 (82.2)                                             | 0.322, 2     | 0.852 |
|                                   | 1-3                   | 1 (2.3)                                                  | 2 (4.4)                                               |               |     |
|                                   | 4                     | 1 (2.3)                                                  | 3 (6.7)                                               |               |     |
|                                   | >4                    | 5 (11.4)                                                 | 3 (6.7)                                               |               |     |
| Tablet FA                         | 0                     | 10 (22.7)                                                | 9 (20.0)                                              | 0.159, 2     | 0.923 |
|                                   | 1                     | 16 (36.4)                                                | 18 (40.0)                                             |               |     |
|                                   | 2                     | 18 (40.9)                                                | 18 (40.0)                                             |               |     |
| Tablet IFA and Ca                 | 1-3                   | 36 (81.8)                                                | 22 (48.9)                                             | 10.627, 1     | 0.001 |
|                                   | >3                    | 8 (18.2)                                                 | 23 (51.1)                                             |               |     |

*One HRM was excluded from the analysis as she consulted private clinic and did not want to avail any benefit of government health facility. **For calculation of $\chi^2$, rows with frequency of services of 4 and >4 were merged. HRMs: High-risk mothers, ANC: Antenatal care, PHCs: Primary health centers, Hb: Hemoglobin, IFA: Iron folic acid, FA: Folic acid.
### Table 3: Proportion of the high-risk mothers (with <4 antenatal care visits) received antenatal care services at every visit

| ANC services                              | Number of the HRMs (with <4 ANC visits) | Number of the HRMs (with <4 ANC visits) | \( \chi^2 \) (Yate’s correction) | \( P \) |
|-------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------|--------|
|                                           | Worst-performing PHCs, \( n \) (%)     | Best-performing PHCs, \( n \) (%)     | \( n^* \) Received at every visit | \( n \) Received at every visit |
| Urine albumin, urine sugar, and blood sugar | <4: 21 (85.7)                          | 18 (66.7)                              | 7.616                            | 0.005  |
| Balbhog                                   | 3 (14.2)                               | 4 (66.7)                               | 4.218                            | 0.039  |
| Iodized salt                              | 1 (4.8)                                | 2 (33.3)                               | 1.506                            | 0.219  |

*One HRM was excluded from the analysis as she consulted private clinic and did not want to avail any benefit of government health facility. HRMs: High-risk mothers, ANC: Antenatal care, PHCs: Primary health centers.

### Table 4: Frequency of reasons for nonreceipt of antenatal care services every time by the high-risk mothers

| ANC services                              | Reason for nonreceipt | Number of the HRMs |
|-------------------------------------------|-----------------------|--------------------|
|                                           | \( n \) | Worst-performing PHCs\( ^* \), \( n \) (%) | \( n \) | Best performing PHCs, \( n \) (%) |
| VDRL and HBsAg                            | Not offered           | 9                  | 9 (100) | 0 |
| Sickle cell                               | Not offered           | 44                 | 45 (100) | 45 (100) |
| Urine albumin and urine sugar             | Not offered           | 18                 | 36 (100) | 36 (100) |
| Blood sugar                               | Not offered           | 18                 | 3 (1.7) | 13 (100) |
| Tablet FA                                 | Not offered           | 10                 | 9 (100) | 9 (100) |
| Balbhog                                   | Not offered           | 13                 | 11 (91.7) | 11 (91.7) |
| Iodized salt                              | Not offered           | 3 (8.3)            | 37 (100) | 37 (100) |

*One HRM was excluded from the analysis as she consulted private clinic and did not want to avail any benefit of government health facility. HRMs: High-risk mothers, ANC: Antenatal care, PHCs: Primary health centers, FA: Folic acid, HBsAg: HepatitisB surface antigen, VDRL: Venereal disease research laboratory.

**Discussion**

The HRMs from the best-performing PHCs visited for at least 4 ANC more frequently than the mothers from the other group. The difference between the worst-performing PHCs and best-performing PHCs was found statistically significant \((P = 0.001)\). According to the National Family Health Survey (NFHS-4), in India, 51.2% of the mothers had at least four ANC visits. Yeoh et al. in Malaysia observed that 77.7% of the mothers had at least four ANC visits. Khatib et al. in Wardha found that 58.4% of the pregnant mothers had at least three ANC visits. Roy et al. in Lucknow found that 85.5% of the pregnant mothers had at least three ANC visits.

Among the HRMs of worst-performing PHCs, the difference in the number of ANC visits (<4 times) between the age-groups of 25 and 35 years and <25 years was found statistically significant \((P = 0.012)\). However, the difference was not found statistically significant in the HRMs of best-performing PHCs \((P = 0.777)\).

The associations of the other sociodemographic variables such as education, occupation, and socioeconomic class with the frequency of the ANC visits were also not found statistically significant among the HRMs of any group of the PHCs.

Roy et al. in a rural district of Lucknow found that mothers with age more than 25 years, higher socioeconomic status, and early registration were more likely to make three or more number of antenatal visits. Yaya et al. in Ethiopia found that age, education level, occupation, and wealth were significantly associated with the frequency of the ANC visits.

In the present study, all the HRMs received ANC services, tablet IFA, tablet Ca, and injection tetanus toxoid (TT). Khatib et al. found that weight of the 93% of the mothers was measured, 86% of the mothers received tablet IFA, 84% of the mothers received injection TT, and blood testing and urine testing of 80% of the mothers were done.

In the present study, 57.8% and 20% of the mothers from the worst- and best-performing PHCs, respectively, tested every time for urine albumin, urine sugar, and blood sugar. The difference found between the worst- and best-performing PHCs was statistically significant \((P=0.001)\). The mothers from best-performing PHCs were visited more frequently for ANCs, but they might not have been tested every time. This might be the reason for the difference observed.

According to the NFHS-4, full ANC is at least four antenatal visits, at least one TT injection, and IFA tablets or syrup taken for 100 or more days.

In the present study, 52.3% and 86.7% of the mothers from the worst- and best-performing PHCs, respectively, received full ANC. According to the NFHS-4, in India, full ANC was received by 21% of the pregnant women. Khatib et al. found that in Wardha, full ANC was received by 33.6% of the pregnant mothers. Yeoh et al. in Malaysia observed that 63% of the pregnant mothers received full ANC. As the study group consisted of HRMs, it is possible that the ANC visits were not always attended.
services were offered more attentively to them, which could be the reason for the higher ANC coverage in the present study. Regarding nonreceipt of the services, it was informed by the health workers during informal talk with them that logistics required for testing of VDRL, HBsAg and sickle cell anemia, balbhog, and iodized salt were not supplied regularly. All the mothers who had not received tablet FA at all were registered themselves after 3 months of pregnancy.

**Conclusions**

It was found that many of the ANC services were not received regularly or at every visit by the HRMs. It was also found that this had happened mostly because the services were not offered to them and sometimes because the services were refused by the mothers.

**Recommendations**

Further study is required to evaluate why the services were not offered to the HRMs and based on which necessary actions should be taken to deliver each and every service to the women regularly. It can also be recommended that more awareness requires to be created among HRMs regarding the requirement and importance of various ANC services.

**Limitations**

The responses given by the mothers might not be completely reliable. Thereby, information bias and recall bias might have affected the result.

However, as the interviews were conducted during the 3rd trimester and between 42 and 75 days of delivery, the chances of recall bias were minimal in the study. Moreover, the interviews were conducted in the vernacular language at their convenient time and place providing enough time to retrieve all the information required. The information provided by the participants were also verified with the records available in the MAMTA card whenever available.

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**Conflicts of interest**

There are no conflicts of interest.

**References**

1. World Bank Group. Trends in Maternal Mortality: 1990 to 2015. World Bank Group; 2015.
2. Boerma T, Mathers C, AbouZahr C, Chattergi S, Hogan D, Stevens G. Health in 2015: From MDGs, Millennium Development Goals to SDGs, Sustainable Development Goals; 2015. p. 4-11.
3. National Family Health Survey. International Institute for Sciences. India Fact Sheet. National Family Health Survey; 2016. p. 1-6.
4. Yaya S, Bishwajit G, Ekholuenetale M, Shah V, Kadio B, Udenigwe O. Timing and adequate attendance of antenatal care visits among women in Ethiopia. PLoS One 2017;12:e0184934.
5. Khatib N, Zahiruddin QS, Gaidhane AM, Waghmare L, Srivatsava T, Goyal RC, *et al.* Predictors for antenatal services and pregnancy outcome in a rural area: A prospective study in Wardha district, India. Indian J Med Sci 2009;63:436-44.
6. Roy MP, Mohan U, Singh SK, Singh VK, Srivastava AK. Determinants of utilization of antenatal care services in rural Lucknow, India. J Family Med Prim Care 2013;2:55-9.
7. Yeoh PL, Hornetz K, Dahlui M. Antenatal care utilisation and content between low-risk and high-risk pregnant women. PLoS One 2016;11:e0152167.