# A cross-sectional study to evaluate antenatal care service provision in 3 hospitals in Nepal

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**BACKGROUND:** Globally, many mothers and their babies die during pregnancy and childbirth. A key element of optimizing outcomes is high-quality antenatal care. The Government of Nepal has significantly improved antenatal care and health outcomes through high-level commitment and investment; however, only 69% of patients attend the 4 recommended antenatal appointments.

**OBJECTIVE:** This study aimed to evaluate the quality and perceptions of antenatal care in Nepal to understand compliance with the Nepalese standards.

**STUDY DESIGN:** This cross-sectional study was conducted at a tertiary referral and private hospital in Kathmandu and a secondary hospital in Makwanpur, Nepal. The study recruited 538 female inpatients on postnatal wards during the 2-week data collection period from May 2019 to June 2019. A review of case notes and verbal survey of women to understand the pregnancy information they received and their satisfaction with antenatal care were performed. We created a summary score of the completeness of antenatal care services received ranging from 0 to 50 (50 indicating complete conformity with standards) and investigated the determinants of attending 4 antenatal care visits and patient satisfaction.

**RESULTS:** The median antenatal care attendance was 4 visits at the secondary and referral hospitals and 8 visits at the private hospital. However, 24% of the patients attended <4 visits. Furthermore, 117 of 538 patients (22%) attended the first-trimester visit, and 65 of 538 patients (12%) attended visits at all points recommended in the standards. More than 90% of the women had blood pressure monitoring, hemoglobin estimation, blood grouping and Rhesus typing, and HIV and syphilis screening. Approximately 50% of the women had urinalysis at every visit (interquartile range, 20–100). Moreover, 509 of 538 patients (95%) reported receiving pregnancy information, but retention was variable: 509 of 538 patients (93%) received some information about danger signs, 290 of 502 patients (58%) remembered headaches, and 491 of 502 patients (98%) remembered fluid leaking. The antenatal care completeness score revealed that the private hospital offered the most complete clinical services (mean, 28.7; standard deviation, 7.1) with the secondary hospital performing worst (mean, 19.1; standard deviation, 7.1). The factors influencing attendance at 4 antenatal care visits in the multivariable model were beginning antenatal care in the first trimester of pregnancy (odds ratio, 2.74; 95% confidence interval, 1.36–5.52) and having a lower level of education (no school: odds ratio, 0.46 [95% confidence interval, 0.23–0.91]; grades 1–5: odds ratio, 0.49 [95% confidence interval, 0.26–0.92]). Overall, 303 of 538 women (56%) were satisfied with their antenatal care. The multivariable analysis revealed that satisfaction was more likely in women attending the private hospital than in women attending the referral hospital (odds ratio, 3.63; 95% confidence interval, 1.68–7.82) and lower in women who felt the antenatal care facilities were not adequate (odds ratio, 0.35; 95% confidence interval, 0.21–0.63) and who wanted longer antenatal appointments (odds ratio, 0.5; 95% confidence interval, 0.33–0.75).

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This study was approved by the Nepal Health Research Council (reference number 2245), the University of Bristol Faculty of Health Sciences Research Ethics Committee (reference number 79223), and the research ethics committees at the 3 participating hospitals: Paropakar Maternity and Women's Hospital, Kathmandu Medical College, and Hetauda Hospital.

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**CONCLUSION:** Few women achieved full compliance with the Nepali antenatal care standards; however, some services were delivered well. To improve, each antenatal contact needs to meet its clinical aims and be respectful. To achieve this communication and counseling training for staff, investment in health promotion and delivery of core services are needed. It is important that these interventions address key issues, such as attendance in the first trimester of pregnancy, improving privacy and optimizing communication around danger signs. However, they must be designed alongside staff and service users and their efficacy tested before widespread investment or implementation.

**Key words:** accessing care, antenatal care, developing countries, Nepal, pregnancy care, quality improvement, service evaluation

## AJOG Global Reports at a Glance

### Why was this study conducted?

This study aimed to understand antenatal care delivery measured against Nepali national medical standards to identify ways to improve care.

### Key findings

Here, three-quarters of the women attended the minimum 4 contacts, and more than three-quarters of women sought care after the first trimester of pregnancy. All clinical care strategies were delivered at appropriate time points in more than 40% of cases. Most women get information about pregnancy danger signs, but women do not remember them all. Nearly half of the women would prefer more privacy, and more than one-third of them did not participate much in the decision making about their care.

### What does this add to what is known?

Key areas for quality improvement include encouraging women to access services in the first trimester of pregnancy, improving communication around key health messages and respectful care.

## Introduction

Reducing maternal and neonatal morbidities and mortalities is a key element of the Sustainable Development Goals. The maternal mortality ratio in Nepal has dropped from 553 per 100,000 live births in 2000 to 186 per 100,000 live births in 2017,[1] whereas the neonatal mortality ratio has halved from 40 per 1000 live births in 2000 to 20 per 1000 live births in 2015.[2] Despite a shortage in midwives,[3] Nepal has achieved this through high-level political commitment and Substantial investment in free maternity care, incentivized attendance at 4 antenatal appointments, and promotion of skilled attendance at birth.[4] Attendance at antenatal appointments and skilled health personnel have been shown to have a significant impact on reducing perinatal mortality,[5] and incentivization has shown that although women are not likely to initiate care, they attend more frequently,[6] which is important as reduced care results in increased perinatal death.[5]

Antenatal care (ANC) provides an opportunity to identify and manage risk and educate about pregnancy and birth and improves pregnancy outcomes.[7,8] The Nepalese standards at the time of this study[9] recommended that women are seen 4 times during pregnancy; however, the recent World Health Organization (WHO) guidelines recommend 8 contacts,[7] as do the new Nepalese standards.[10] Based on the reproductive health standards of 2007, a summary of the Nepalese recommendations at the time of the study is presented in Supplemental File 1.[9] According to the Nepal Demographic Health Survey, the first antenatal visit is attended by 84% of women, but only 69% of women attend all 4 visits.[11]

Attended birth is one of the most effective interventions for reducing perinatal mortality in low- and middle-income countries.[5] ANC has been shown to facilitate this,[12,13] and Nepalese ANC focuses on encouraging skilled attendance at delivery, preferably in a facility. In the most recent demographic health survey, 57% of women delivered at a facility, an increase of 36% since 2011.[11] Poor interactions with healthcare workers are thought to discourage women from delivering at a facility.[14] Therefore, in addition to the coverage, the quality of ANC is likely to be important.[15] However, until recently, there were only a few studies focusing specifically on the quality of ANC.[15,16]

We aimed to perform a cross-sectional service evaluation of women delivering in hospitals (thus likely to have attended ANC), to assess the current ANC practices in Nepal and women's perceptions of them. We measured the clinical services according to the Nepalese standards at the time of the study (the National Medical Standards for Maternal and Newborn Care, 2007)[9] to identify targets for improvement. Furthermore, we assessed some key elements of respectful care[17] and asked general questions about satisfaction with the ANC.

## Materials and Methods

This study took place in the following 3 hospitals in Nepal: a tertiary referral hospital in Kathmandu with 19,000 deliveries annually, a private secondary care teaching hospital in Kathmandu with 3600 deliveries per year, and a district secondary care hospital in Makwanpur, Nepal, with 2500 deliveries. All hospitals have routine ANC run by doctors, as is the norm in Nepal, and comprehensive emergency obstetrical care. All hospitals accept referrals from the surrounding smaller health facilities, and the referral and secondary hospitals participate in the incentive scheme for

attending 4 antenatal visits. The referral hospital receives countrywide referrals. These 3 sites were selected to access a diverse group of patients and represent different elements of Nepal's health system to provide a diverse snapshot of the current ANC.

Women staying in the postnatal ward for more than 2 weeks from May 2019 to June 2019 were eligible for inclusion in the survey. We obtained written informed consent, and study data collectors examined each woman's handheld maternity record and extracted the information contained within, onto a proforma. The data collected covered the core elements of ANC included in the Nepalese national standards.[9] This included data about the patient, her history, type of care she received, and the information she was provided with, about pregnancy and its danger signs. The English version of the data collection tool is available in Supplemental File 2.

In addition, we carried out a structured interview, in Nepali, to determine the information women recalled about pregnancy and danger signs and their satisfaction with ANC. The English version of the tool is available in Supplemental File 3.

Data collection was piloted with 5 to 10 women, and refinements were made for ease of understanding and usability. A total of 4 research assistants were trained to collect data. We offered participation to every woman delivering in the private and secondary hospitals and from every other woman on the postnatal ward in the referral hospital (because of logistic constraints on staff time).

Data were recorded on paper forms and entered into the EpiData (version 3.1, Epidata Association, Odense, Denmark)[18] by the trained research assistants. Data monitoring was performed by the local project manager to ensure accuracy and integrity. Moreover, it was transferred to Stata (version 15.1; StataCorp LLC, College Station, TX)[19] to conduct all data checking, cleaning, and analyses. Continuous and categorical data were summarized using means, standard deviations, medians, interquartile ranges, counts, and percentages categorized by hospital and overall, as appropriate. To test differences by hospital, we used the analysis of variance to test the means, the Kruskal Wallis test to investigate the medians, and the Fisher exact test to assess whether proportions differed by hospital. *P* values were reported.

In addition, we developed an ANC completeness score based on Nepalese standards, indicating whether clinical services were delivered and whether they were delivered at the recommended time.[9] Details of the score ranged from 0 to 50, with 50 indicating better performance. We acknowledge that there is much debate on the development of a score to measure ANC utilization[20] and that there are many scoring systems to measure ANC quality;[21] however, with the completeness score, we were aiming to provide a quantitative estimate of the extent to which the Nepalese standards were followed. Therefore, we felt that it was possible to develop a score, specifically for this study, and present its composition in Supplemental File 4.

We used logistic regression to identify whether demographic features, such as time to travel to the appointment, attendance in the first trimester of pregnancy, satisfaction, or hospital, were associated with a woman's likelihood of attending 4 or more antenatal visits. All variables hypothesized to have an impact on attending 4 antenatal visits, were included in both univariable and multivariable models. In addition, we assessed whether demographic features and completeness of ANC and whether women were happy with the duration of appointments, privacy, level of decision making, facilities, and the number of appointments were associated with overall satisfaction. Any univariable determinants with a *P* value of <.2 were included in a multivariable model while retaining variables such as hospital, ANC completeness, parity, and time to travel to an appointment, regardless of their statistical significance.

The Family Welfare Division of Nepal, the government department responsible for implementing maternal and child health policies, and the heads of the obstetrical departments of each of the hospitals were involved in setting the priorities for this study. The study was reviewed and refined by the University of Bristol and Nepal Health Research Council's peer review process during an ethical review.

## Results

A total of 538 women participated in the study across all 3 sites (371 referral, 98 secondary, 69 private). A total of 545 women were interviewed; however, 7 of them did not have their ANC cards (4 from the private hospital, 1 from the secondary hospital, and 2 from the referral hospital) and were therefore, excluded. All women who were approached agreed to participate.

### Characteristics of participants

Patient characteristics, by recruitment center, are presented in Table 1. Women attending the private hospital were slightly older and were more likely to be primiparous. They were less likely to be homemakers and more likely to work in the service industry. A large proportion of women attended multiple locations for their ANC; however, more women received their care at the private hospital (74%), whereas only 24% of women received their care at the secondary hospital. Women lived further from the referral hospital and closest to the secondary hospital, to which most women walked.

### Core antenatal care clinical services

The results of the measures of clinical services are presented in Table 2. Services delivered at appropriate times for more than 90% of women across the 3 sites include blood pressure monitoring, hemoglobin testing, blood grouping and Rhesus typing, and HIV and syphilis screening. Some were carried out less reliably; for example, documentation of relevant medical history was not performed at the first visit for 89% of women in the secondary hospital but was more reliably taken at the other 2

**TABLE 1**
**Characteristics of participants by hospital**

| Characteristic | | Referral hospital (n=371) | Secondary hospital (n=98) | Private hospital (n=69) | *P* value |
|---|---|---|---|---|---|
| Age (y), mean (SD) | | 24.3 (4.6) | 23.4 (3.8) | 26.5 (4.4) | <.001 |
| Employment status | Housemaker | 287 (77) | 77 (79) | 40 (58) | <.001 |
| | Service | 21 (6) | 2 (2) | 17 (25) | |
| | Business | 49 (13) | 11 (11) | 10 (15) | |
| | Other | 9 (2) | 8 (8) | 2 (3) | |
| | Manual labor | 5 (1) | 0 (0) | 0 (0) | |
| Percentage who had ANC at this hospital | | 237 (64) | 23 (24) | 51 (74) | <.001 |
| Time taken to travel to ANC | | 30 (20–60) | 20 (10–30) | 25 (15–30) | <.001 |
| Transport to ANC | Public transport | 212 (57) | 52 (53) | 34 (49) | <.001 |
| | Walking | 102 (28) | 45 (46) | 12 (17) | |
| | Private vehicle | 36 (10) | 1 (1) | 14 (20) | |
| | Taxi | 21 (6) | 0 (0) | 9 (13) | |
| Level of education | Illiterate | 15 (4) | 3 (3) | 4 (6) | <.001 |
| | Basic reading and writing | 31 (8) | 0 (0) | 0 (0) | |
| | Grade 1–5 | 53 (14) | 9 (9) | 5 (7) | |
| | Grade 6–10 | 158 (43) | 62 (63) | 20 (29) | |
| | Intermediate | 77 (21) | 21 (21) | 18 (26) | |
| | Bachelors | 28 (8) | 2 (2) | 16 (23) | |
| | Masters | 9 (2) | 1 (1) | 6 (9) | |
| Parity (multiple) | | 134 (36) | 39 (40) | 33 (48) | .175 |

Data are presented as mean±SD, number (percentage), or median (interquartile range), unless otherwise indicated.

*ANC*, antenatal care; *SD*, standard deviation.

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sites. Although fetal heart rate monitoring was undertaken consistently at the secondary hospital, it was less consistent at the other 2 sites.

Although most women had urinalysis for the detection of preeclampsia at least once throughout their pregnancy, Nepalese standards[9] state that it should be taken at every visit. This only happened at 50% of visits, with the fewest in the private hospital and the most at the referral hospital. When considering folic acid, although 88% of women were offered folic acid at their first visit, the benefits are diminished if not offered in the first trimester of pregnancy, and overall, only 22% of women attended a visit during the first trimester.

The mean ANC completeness score was 21.3 of 50.0. The mean scores were 20.6 at the referral hospital, 19.1 at the secondary hospital, and 28.7 at the private hospital (the highest score). The private hospital was on average 8.1 points (95% confidence interval [CI], 6.4–9.8) higher than the referral hospital, whereas the secondary hospital was 1.5 points (95% CI, −3.00 to −0.01) lower than the referral hospital.

## Pregnancy information including danger signs

Information about pregnancy and its danger signs is vital to facilitate early diagnosis and access to a health facility for the treatment of complications. This information includes counseling on family planning, nutrition, breastfeeding, attendance at a minimum of 4 ANC visits, birth preparedness, and promotion of institutional delivery.[22] We collected this data from 2 perspectives: what women report (Figure 1) and what was recorded in the handheld notes (Table 3). There are differences, with women reporting that they receive more information than is documented in the notes. For example, at the secondary hospital, it was recorded that 14% of women received advice on danger signs (Table 3), but more than 90% of women reported receiving information on all the danger signs (Figure 1).

Overall, most women reported receiving some information about pregnancy (93%) and danger signs (93%). However, this may not have been comprehensive, as overall 58% of women remembered information on headaches and up to 98% remembered discussing fluid leaking. The importance of diet and nutrition was almost universally

**TABLE 2**
**ANC attendance and core services**

| Summary statistics by hospital | Referral hospital (n=371) | Secondary hospital (n=98) | Private hospital (n=69) | Overall (N=538) | *P* value |
|---|---|---|---|---|---|
| Number of routine antenatal visits | 4 (3–6) | 4 (4–5) | 8 (7–9) | 5 (4–6) | <.001 |
| Percentage who attended a visit in the first trimester of pregnancy | 15% (57) | 27% (26) | 49% (34) | 22% (117) | <.001 |
| Weeks of gestation at first contact | 20 (15–26) | 16 (13–16) | 13 (8–17) | 18 (13–23) | <.001 |
| Percentage who attended all visits within the specified time frames[a] | 7% (25) | 15% (15) | 36% (25) | 12% (65) | <.001 |
| Blood pressure by percentage of visits | 100 (88–100) | 100 (75–100) | 90 (83–100) | 100 (80–100) | .001 |
| Urine dipstick by percentage of visits | 89 (43–100) | 25 (17–25) | 13 (10–17) | 50 (20–100) | <.001 |
| Hemoglobin estimation at least once | 100% (369) | 100% (98) | 100% (69) | 100% (536) | 1.000 |
| Blood grouping and Rh typing | 100% (369) | 100% (98) | 100% (69) | 100% (536) | 1.000 |
| All supplements offered on first visit | 88% (328) | 81% (79) | 71% (49) | 85% (456) | .001 |
| Screening tests (HIV or syphilis) | 98% (364) | 100% (98) | 99% (68) | 99% (530) | .458 |
| Had VDRL test taken at least once | 98% (364) | 93% (91) | 99% (68) | 97% (523) | .023 |
| Tetanus vaccination | 95% (354) | 80% (78) | 96% (66) | 93% (498) | <.001 |
| Had medical history taken on first visit | 90% (332) | 11% (11) | 96% (66) | 76% (409) | <.001 |
| Pattern of fetal movements discussed | 96% (367) | 72% (71) | 94% (65) | 92% (492) | <.001 |
| Fetal heart rate at percentage of visits (≥20 wk) | 86 (67–100) | 100 (67–100) | 80 (57–100) | 88 (67–100) | .009 |
| Symphysis fundal height at percentage of visits (≥20 wk) | 100 (50–100) | 67 (33–100) | 100 (83–100) | 100 (50–100) | .001 |
| Ultrasound scan before 24 wk | 52% (191) | 27% (26) | 81% (56) | 51% (273) | <.001 |
| ANC completeness score[a] | 20.6±6.5 | 19.1±7.1 | 28.7±7.1 | 21.3±7.3 | <.001 |

Data are presented as mean±standard deviation, percentage (number), or median (interquartile range), unless otherwise indicated.

*ANC*, antenatal care; *VDRL*, venereal disease research laboratory.

[a] Completeness score was calculated using data from Tables 2 and 3 according to visit as presented in Supplemental File 4.

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discussed (98%) with a high rate of information about physical activity (94%). Other information was discussed more variably; for example, sexually transmitted diseases, labor, and breastfeeding were discussed with fewer than 70% of women, and family planning was discussed with 42% of women.

There were key differences in the information retained by women among sites (Figure 1). For example, at the secondary hospital, ≥90% of women remembered about all the danger signs, but headache was only remembered about half the time in the referral and private hospitals.

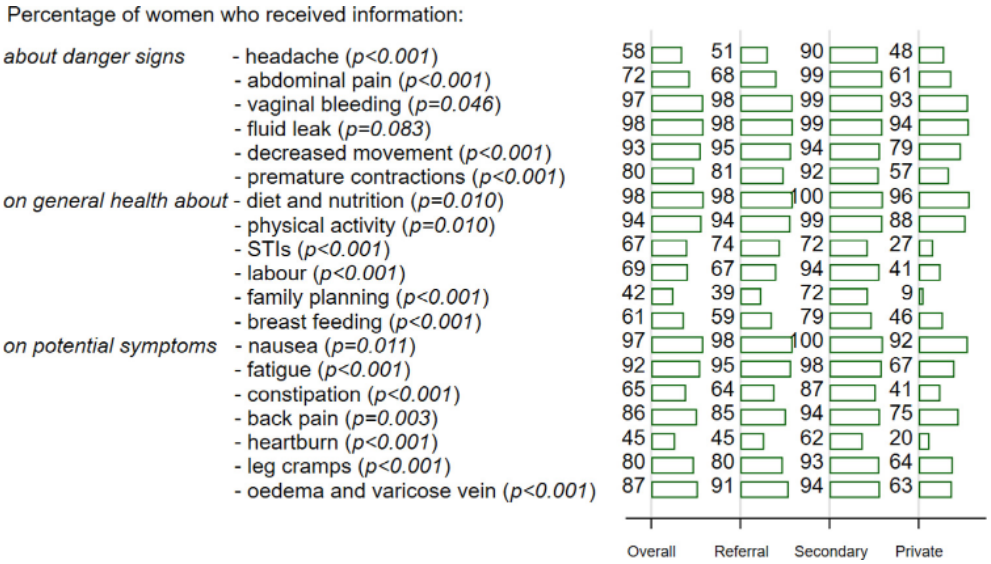
## Antenatal care visits

ANC attendance and core services are displayed in Table 2. The number of visits attended is a key indicator. The median number of ANC visits attended was 5, exceeding the expectations of the Nepalese standards at the time of the study. In the secondary and referral hospitals, the median number of visits was 4; however, in the private hospital, women attended a median of 8 visits. Moreover, 76% of women attended at least 4 ANC visits, the minimum required in Nepal. Of the 538 women who did not attend 4 visits, 11 (2%) attended 1 visit, 54 (10%) attended 2 visits, and 64 (12%) attended 3 visits.

The first-trimester visit facilitates optimal pregnancy planning, and the Nepalese standards[9] state that the first visit should be in the first trimester of pregnancy. In the private hospital, 49% of women attended by the end of their 12th week of gestation. This dropped to 27% of women in the secondary hospital and 15% of women in the referral hospital. Furthermore, most women did not attend their ANC checkups at the time intervals recommended by the Nepalese standards. Across all sites, only 12% of women achieved the recommended schedule, with the most achieving this in the private hospital (36%) and the least in the secondary hospital (7%).

In the multivariable model investigating the factors affecting attending 4 ANC visits, the only 2 factors that seemed to influence it were, beginning the visits in the first trimester of pregnancy (odds ratio [OR], 2.74; 95% CI, 1.36–5.52) and having a lower level of education, with those that did not attend school (OR, 0.46; 95% CI, 0.23–0.91) or attended just

**FIGURE 1**
**Information received about pregnancy and danger signs**




The percentage totals are based on those who received information.

*STI*, sexually transmitted infection.

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the early years of school (OR, 0.49; 95% CI, 0.26−0.92), being less likely to attend 4 ANC visits. The complete results of the univariable and multivariable model are presented in Supplemental File 5.

## Women's perceptions of antenatal care

When asking women their thoughts about their ANC (Table 4), more than 99% of women felt that ANC is important for their health and their baby's health. In the secondary hospital, 43% of women attended as a result of the incentive provided by the Government of Nepal; however, the attendance rate dropped to 35% in the referral hospital and 2% in the private hospital.

**TABLE 3**
**Documented advice received by women at antenatal care**

| Advice | Referral hospital (n=371) | Secondary hospital (n=98) | Private hospital (n=69) | Overall (N=538) | *P* value |
|---|---|---|---|---|---|
| Advice on danger signs | 64 (236/371) | 14 (14/98) | 64 (44/69) | 55 (294/538) | <.001 |
| Nutrition counseling | 1 (3/371) | 1 (1/98) | 61 (42/69) | 9 (46/538) | <.001 |
| STI counseling | 0 (1/371) | 0 (0/98) | 52 (36/69) | 7 (37/538) | N/A |
| Birth preparedness counseling | 8 (29/371) | 5 (5/98) | 3 (2/69) | 7 (36/538) | .326 |
| Contraceptive counseling | 1 (2/371) | 0 (0/98) | 48 (33/69) | 7 (35/538) | <.001 |
| Breastfeeding counseling | 0 (1/371) | 0 (0/98) | 51 (35/69) | 7 (36/538) | <.001 |
| advice on nausea and vomiting | 21 (78/371) | 3 (3/98) | 49 (34/69) | 21 (115/538) | <.001 |
| Advice on constipation | 1 (3/371) | 0 (0/98) | 12 (8/69) | 2 (11/538) | <.001 |
| Advice on back and pelvic pain | 5 (18/371) | 10 (10/98) | 51 (35/69) | 12 (63/538) | <.001 |
| Advice on heartburn | 0 (0/371) | 0 (0/98) | 0 (0/69) | 0 (0/538) | N/A |
| Advice on edema and varicose veins | 74 (275/371) | 1 (1/98) | 73 (50/69) | 61 (326/538) | <.001 |
| Advice on smoking | 1 (4/371) | 1 (1/98) | 54 (37/69) | 8 (42/538) | <.001 |

Data are presented as percentage (number/total number), unless otherwise indicated.

*N/A*, not applicable; *STI*, sexually transmitted disease.

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**TABLE 4**
**Women's perceptions of ANC**

| Variable | Referral hospital (n=371) | Secondary hospital (n=98) | Private hospital (n=69) | Overall (N=538) | *P* value |
|---|---|---|---|---|---|
| General ANC | | | | | |
| Attending ANC appointments is important | 100 (370/371) | 100 (98/98) | 97 (67/69) | 99 (535/538) | .041 |
| For own health | 97 (360/370) | 99 (97/98) | 88 (59/67) | 96 (516/535) | .001 |
| For baby's health | 98 (361/370) | 100 (98/98) | 100 (67/67) | 98 (526/535) | .216 |
| For incentive | 35 (131/370) | 43 (42/98) | 2 (1/67) | 33 (174/535) | <.001 |
| If no, is it because you could not take time off work? | 100 (2/2) | 100 (1/1) | 0 (0/2) | 60 (3/5) | .200 |
| ANC appointments | | | | | |
| Received enough antenatal appointments | | | | | |
| Yes | 57 (212/371) | 67 (66/98) | 81 (56/69) | 62 (334/538) | <.001 |
| Want more | 26 (97/371) | 32 (31/98) | 4 (3/69) | 24 (131/538) | |
| Want less | 5 (18/371) | 0 (0/98) | 7 (5/69) | 4 (23/538) | |
| Unknown | 12 (44/371) | 1 (1/98) | 7 (5/69) | 9 (50/538) | |
| Time spent with healthcare provider | 10 (5–15) | 10 (5–10) | 15 (10–20) | 10 (5–15) | <.001 |
| Range | (2–30) | (2–25) | (5–30) | (2–30) | |
| Happy with the duration of your appointments | | | | | |
| Yes | 63 (235/371) | 64 (63/98) | 68 (47/69) | 64 (345/538) | .877 |
| Want longer | 34 (126/371) | 34 (33/98) | 29 (20/69) | 33 (179/538) | |
| Want shorter | 1 (2/371) | 0 (0/98) | 1 (1/69) | 1 (3/538) | |
| Unsure | 2 (8/371) | 2 (2/98) | 1 (1/69) | 2 (11/538) | |
| Opinion about level of privacy | | | | | |
| Privacy was okay | 15 (57/371) | 9 (9/98) | 77 (53/69) | 22 (119/538) | <.001 |
| Prefer more privacy | 46 (172/371) | 89 (87/98) | 6 (4/69) | 49 (263/538) | |
| There was a lot of privacy | 38 (141/371) | 2 (2/98) | 17 (12/69) | 29 (155/538) | |
| Opinion about your involvement in decisions made about your delivery plans | | | | | |
| Actively participated in plans | 29 (107/371) | 1 (1/98) | 29 (20/69) | 24 (128/538) | <.001 |
| Moderate participation | 32 (118/371) | 68 (67/98) | 38 (26/69) | 39 (211/538) | |
| Involvement not high | 39 (143/371) | 28 (27/98) | 32 (22/69) | 36 (192/538) | |
| I do not know | 1 (3/371) | 3 (3/98) | 1 (1/69) | 1 (7/538) | |
| Information received during pregnancy | | | | | |
| Had own copy of notes | 100 (371/371) | 100 (98/98) | 88 (61/69) | 99 (530/538) | <.001 |
| If yes, were they helpful? | 93 (343/371) | 67 (65/97) | 90 (55/61) | 88 (463/529) | |
| Received information about the reasons why investigations are carried out | 94 (350/371) | 95 (93/98) | 93 (64/69) | 94 (507/538) | .374 |
| Information was too little | 36 (127/350) | 67 (62/93) | 55 (35/64) | 44 (224/507) | |
| Information was moderate | 44 (155/350) | 33 (31/93) | 38 (24/64) | 41 (210/507) | |
| There was a lot of information | 16 (57/350) | 0 (0/93) | 6 (4/64) | 12 (61/507) | |
| I do not know | 3 (11/350) | 0 (0/93) | 2 (1/64) | 2 (12/507) | |
| Received test results | 99 (367/371) | 99 (97/98) | 99 (68/69) | 99 (532/538) | .266 |
| Information was too little | 46 (170/367) | 90 (87/97) | 50 (34/68) | 55 (291/532) | |
| Moderate | 34 (124/367) | 9 (9/97) | 37 (25/68) | 30 (158/532) | |
| A lot of information | 14 (50/367) | 0 (0/97) | 13 (9/68) | 11 (59/532) | |
| I do not know | 6 (23/367) | 1 (1/97) | 0 (0/68) | 5 (24/532) | |
| Received written information after ANC appointments | 59 (217/371) | 14 (14/98) | 65 (45/69) | 51 (276/538) | <.001 |
| If yes, was it useful? | 93 (202/217) | 86 (12/14) | 89 (40/45) | 92 (254/276) | .195 |
| If not, would you like to receive written information | 74 (114/155) | 86 (71/83) | 35 (8/23) | 74 (193/261) | <.001 |

Data are presented as percentage (number/total number) or median (interquartile range), unless otherwise indicated.

*ANC*, antenatal care.

*Merriel. The current quality of antenatal care in Nepal. Am J Obstet Gynecol Glob Rep 2021.*

Women were split about the need for more privacy with 49% preferring more privacy. There were variations among the 3 sites, with the private hospital having high levels of privacy and 89% wanting more privacy in the secondary hospital. In terms of decision making, 36% of women believed that they were not very involved in their delivery plans.

Overall, 62% of women felt that there were enough ANC appointments; this rose to 81% in the private hospital, with only 4% of women wanting more. In the secondary hospital, 32% of women, and in the referral hospital, 26% of women wanted more appointments. Time spent with a healthcare provider ranged from 2 to 30 minutes, 33% of women would have liked longer appointments, and this finding was similar across sites.

Women believed that they received satisfactory information about investigations in 53% of cases and satisfactory information about their test results in 41% of cases. In both cases, the secondary hospital provided too little information to women, and the private and referral hospitals provided relatively more information.

When considering their overall perceptions of ANC (Figure 2), women were asked to rate their care from very satisfied to very unsatisfied; women were generally satisfied or very satisfied with their care, with women attending the private hospital being the most satisfied. Overall, 62% of women would go back to the hospital that they attended in a future pregnancy, and 84% of women would recommend their facility to a friend or family member.

In the multivariable model, the odds of being satisfied with ANC were higher in the private hospital than in the referral hospital (OR, 3.63; 95% CI, 1.68−7.82) and lower if women felt they did not have adequate ANC facilities (OR, 0.35; 95% CI, 0.21−0.63) and wanted longer antenatal appointments (OR, 0.5; 95% CI, 0.33−0.75). The final multivariable model included demographic measures, ANC completeness score, time to travel, parity, hospital, opinions on care, facilities, and the number of appointments. The full results of the univariable and multivariable regression are presented in Supplemental File 6.

## Discussion

### Principal findings

In general, women were positive about their ANC. They understood that it was important, and most women attended the recommended minimum of 4 visits. However, few women had visits in the time frames specified by the Nepalese standards. This was reflected in the ANC completeness score by the fact that even in the best-performing hospital (the private hospital), the mean "score" revealed that women received <60% of the overall clinical assessments at the time points recommended by the Nepalese standards, with the 2 government-funded hospitals achieving fewer than half of the services on time.

This reflects the significant missed opportunity that fewer than a quarter of women seek pregnancy care in the first trimester of pregnancy, where approximately a quarter of the care is due, including identifying potential risks (eg, high blood pressure, diabetes mellitus, screen for Rhesus status and syphilis, and diagnose anemia) and providing interventions (eg, dietary supplements and counseling).

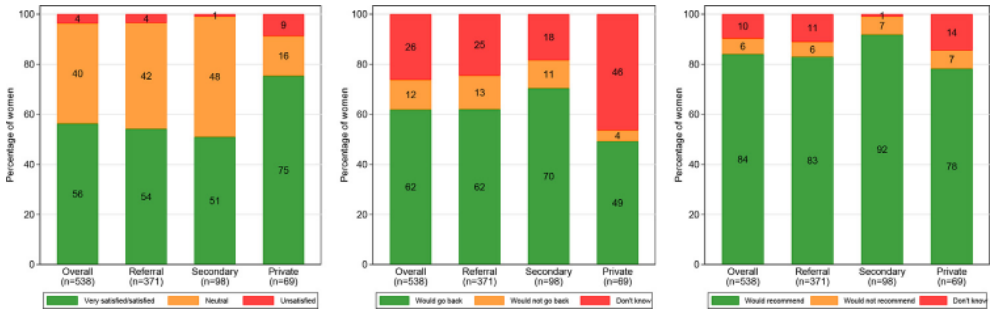
In the regression analysis, it was clear that the hospital had an impact on the attendance at 4 visits, and satisfaction. However, other key elements were receiving clinical services, having long enough appointments, and having more facilities.

Some important interventions were carried out consistently across sites, for example, checking the blood pressure and monitoring for syphilis. However, elements of care, for example, taking a relevant history at the first visit, were carried out less frequently, with the secondary hospital performing particularly poorly. The ANC completeness score reflected these findings as there is a clear difference in achieving the required clinical care across the 3 sites. This means that risk is not reliably identified and that appropriate plans may not be made. Furthermore, many women report that they would like more information, involvement in delivery plans, and privacy.

## Results

The most recent demographic health survey suggested that only 45% of

**FIGURE 2**
**Women's satisfaction with antenatal care**

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women in Nepal attended all 4 antenatal visits.[11] Previous studies in Nepal have suggested that attendance is determined by accessibility, geography, education, family support, ethnicity, and socioeconomic status.[23–26] Our participants somewhat reflected this in terms of those with lower education, being less likely to achieve 4 ANC visits. However, most women lived close to their care, in an urban area, and were well educated. However, only a modest proportion of women received appointments at all time points recommended in the national standards. Furthermore, according to other studies, rural women are less likely to have checkups per standard, which is reflected in our ANC completeness score being the lowest in the secondary hospital compared with the other 2 sites.[26] With the introduction of the new Nepalese standards,[10] women should receive 8 contacts, raising further the expectations of care placed on the staff and system.

Similar to other Nepalese studies, we found some services were carried out well, for example, blood pressure monitoring. Contrary to the reports of Joshi et al[23] that health education was carried out well, we report that not all of the danger signs were adequately communicated. A lack of this knowledge has been identified as a reason for people to not seek care in Nepal.[27] A further missed opportunity was in the first trimester of pregnancy. The lack of coverage of an early visit has been identified as an important issue with implications for both inequalities and outcomes.[28] This may be a particular problem in Nepal as early pregnancy is often concealed,[14,27] and therefore, addressing it may require innovative solutions.

Risk stratification is used to make decisions on the appropriateness of the place of birth.[29] This is carried out in practice, through clear history taking and documentation, 2 areas that this study has identified could be improved across all sites.

Respectful care is vital and providing women with privacy has emerged as an important issue[17] and could contribute to a woman's decision to seek care.[30] Furthermore, more than one-third of women do not feel involved in their care. Cultural issues could contribute to this as family members, especially mothers-in-law, make many health decisions.[31] However, healthcare workers abilities to involve women in their healthcare is likely to have an impact. Disenfranchizing women from decision making may mean that ANC is a negative experience, and it may result in women not attending subsequent visits.

## Clinical implications

Most of the women in the study did attend the recommended 4 visits; however, 24% of women still had <4 appointments. When considering the current reproductive health policy, the government's "Aama Surakshya" incentive scheme received interesting feedback with fewer than half of the women, even at the rural hospital, attending for this reason alone.

In terms of clinical care, it is vital that staff complete all the recommended screening tests and document the mother's history in antenatal cards so that there is clear communication among professionals. Consistently, carrying out urinalysis is important to identify pre-eclampsia and prevent preterm birth. Interestingly, it was least reliably performed in the private hospital but frequently performed in the referral hospital. Interventions, such as dietary supplements, were not offered consistently to women at the first visit, and this presents an important opportunity to maximize the effectiveness of these interventions, especially at the private hospital.

Providing high-quality information is a key element of ANC. Educating women about pregnancy danger signs is sometimes missed. They are mentioned to most women, but specific details are not discussed with half of the women in the referral and private hospitals. It is imperative that danger signs are communicated to women, as awareness can provide the opportunity to intervene, to optimize outcomes. Furthermore, fewer than half of the women receive information about family planning, with sexually transmitted infections and breastfeeding being discussed with only about two-thirds of women. Interestingly, in the 2016 demographic health survey, only 66% of the infants were exclusively breastfed for 6 months,[11] and therefore, there is an opportunity to improve the breastfeeding rate.

Ways of improving the information women receive include harnessing the lessons learned from the implementation of participatory action cycles in Nepal and elsewhere, which supported women in developing knowledge around pregnancy and birth.[32] Furthermore, models, such as group ANC, can not only bring improvements in care but also make care more woman centered, driving demand for services and providing women with peer support.[33]

Women have identified the need for respectful care to be improved. This study addressed only specific elements of respectful care included within the Respectful Maternity Care Charter,[17] including whether women have privacy during their antenatal consultations, whether women could make informed decisions around their care, and whether women are cared for in a clean and safe environment. We have identified that approximately half of women would like more privacy during their care and that this is particularly a problem in the government-funded setting rather than in the private health setting. Furthermore, more than a third of women do not feel that they are fully involved in making decisions about their care. However, three-quarters of women felt that their ANC facilities were adequate. There is limited evidence about how to improve respectful care, especially privacy, but basic ideas include providing hospital bed partitions;[34] however, other initiatives, for example, timed appointments to reduce overcrowding, could be considered.

## Research implications

The participants in this study were women on the postnatal wards and therefore had generally attended ANC. They have identified clear areas for further research, including the need to work with women to develop a way to encourage attendance at ANC in the first trimester of pregnancy; the need to

work with staff and women to develop ways to improve communication in consultations, especially about danger signs; and the need to develop ways to better involve women in decision making. Because this study was conducted postnatally, it will now be important to garner views from women who chose not to attend ANC, to understand the barriers to ANC attendance from their perspective.

## Strengths and limitations

A strength of this study was that we examined care at 3 levels of the Nepalese health system with 1 site being remote from Kathmandu. This allowed us to compare the findings across these settings and the patient populations; furthermore, the means in our findings are generalizable to the diverse population of women receiving ANC in these settings. Although the sample was relatively small, the 538 women who did participate allowed us to gain an understanding of the services that were delivered and how women feel about it. However, because of the different nature of the facilities, it meant that the size and composition of the samples from each site were varied.

Because of the time and financial constraints, we focused on large secondary care units. This may mean that rural women with uncomplicated pregnancies were not accessed. Furthermore, this study only included women who attended for delivery care, which may have skewed the results.

A further limitation was that this survey was confined to patients and, therefore, the perspectives of healthcare workers were not obtained. Because we did not follow-up with in-depth interviews, we were unable to understand the root causes of any of the issues surrounding attendance or understanding, for example, why women do not attend antenatal services in the first trimester of pregnancy.

## Conclusions

Some antenatal services are delivered well. However, to ensure that maternal and newborn outcomes are optimized, there are some areas that need focus. Each contact with a healthcare worker needs to be valuable and meet all its aims in terms of basic clinical service delivery, information sharing, and documentation. To achieve this, focusing on training for staff and investment in health promotion and core services are needed. It is important that these interventions addressing key issues (attendance in the first trimester of pregnancy, improving privacy and optimizing communication around danger signs) are designed alongside staff and service users and that their efficacy is tested before widespread investment or implementation. ■

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## Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.xagr.2021.100015.

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