

Original Research Article

Content of antenatal care and perception about services provided by primary hospitals in Nepal: a convergent mixed methods study

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Abstract

Background: Nepal has made significant strides in maternal and neonatal mortality over the last three decades. However, poor quality of care can threaten the gains, as maternal and newborn services are particularly sensitive to quality of care. Our study aimed to understand current gaps in the process and the outcome dimensions of the quality of antenatal care (ANC), particularly at the sub-national level. We assessed these dimensions of the quality of ANC in 17 primary, public hospitals across Nepal. We also assessed the variation in the ANC process across the patients' socio-economic gradient.

Methods: We used a convergent mixed methods approach, whereby we triangulated qualitative and quantitative data. In the quantitative component, we observed interactions between providers (17 hospitals from all 7 provinces) and 198 women seeking ANC and recorded the tasks the providers performed, using the Service Provision Assessments protocol available from the Demographic and Health Survey program. The main outcome variable was the number of tasks performed by the provider during an ANC consultation. The tasks ranged from identifying potential signs of danger to providing counseling. We analyzed the resulting data descriptively and assessed the relationship between the number of tasks performed and users' characteristics. In the qualitative component, we synthesized users' and providers' narratives on perceptions of the overall quality of care obtained through focus group discussions and in-depth interviews.

Results: Out of the 59 tasks recommended by the World Health Organization, providers performed only 22 tasks (37.3%) on average. The number of tasks performed varied significantly across provinces, with users in province 3 receiving significantly higher quality care than those in other provinces. Educated women were treated better than those with no education. Users and providers agreed that the overall quality of care was inadequate, although providers mentioned that the current quality was the best they could provide given the constraints they faced.

Conclusion: The quality of ANC in Nepal's primary hospitals is poor and inequitable across education and geographic gradients. While current efforts, such as the provision of 24/7 birthing centers, can mitigate gaps in service availability, additional equipment, infrastructure and human resources will be needed to improve quality. Providers also need additional training focused on treating

patients from different backgrounds equally. Our study also points to the need for additional research, both to document the quality of care more objectively and to establish key determinants of quality to inform policy.

Key words: Nepal, antenatal care, quality of care, convergent mixed method

Introduction

Poor quality of care is a major impediment to reducing mortality in low- and middle-income countries (LMICs). Globally 8.6 million deaths are estimated to be due to poor or inadequate access to quality care [1]. Improving the quality of care is particularly significant for maternal and child health (MCH) as 670 000 neonatal and 86 000 maternal lives in LMICs could be saved annually with adequate quality of care [1].

Nepal has made strides in maternal and child mortality over the last three decades. The maternal mortality rate declined from 281 per 100 000 live births to 239 between 2006 and 2016 [2]. Likewise, the under-five mortality rate declined from 61 deaths per 1000 live births to 39 during the same period [2]. Previous studies have attributed this remarkable improvement to a range of factors [3], including the rise in the utilization of antenatal care (ANC). In fact, in 2016, 84% of women seeking ANC received it from a skilled provider (i.e. a doctor, a nurse or an auxiliary nurse midwife), a 40-percentage-point increase from 2006 [2].

Sustaining the momentum in reducing maternal and child mortality, however, will be challenging without commensurate improvement in the quality of care. The limited empirical evidence on the quality of care in Nepal suggests that the quality is poor [4, 5]. For example, Kruk *et al.* report that providers in Nepal spent a median of 6 min during a sick child visit and performed only 2.6 out of 10 necessary history-related items, 2.3 out of 10 examinations and 1.3 out of 5 counseling items [1]. The COVID-19 pandemic has worsened the already-poor quality of care and reduced service utilization. A significant number of frontline workers have contracted the virus, and mental exhaustion and transport challenges associated with the lockdown have impacted service delivery [6]. Indeed, emerging evidence points to a decline in health-care utilization in response to the pandemic [7, 8]. A recent study suggests a significant rise in maternal and child mortality from the pandemic across LMICs, including Nepal, even without a decline in the quality of care [9].

Under the influential Donabedian framework, the quality of care consists of three dimensions: structure, process and outcomes [10]. The framework has been explained in detail elsewhere [11, 12]. Briefly, structure refers to inputs such as the availability of equipment and medicine. Process captures the interaction between providers and users, including the content of care in relation to recommended guidelines. Finally, outcome refers to patients' health and well-being. Many of the prior studies in LMICs have focused on the structural dimension [13]. The recent 'Lancet Global Health Commission on High Quality Health Systems in the SDG Era' suggests the need to move beyond this dimension and proposes that health systems be judged on the processes and outcomes of care that matter to patients [14].

In 2015, Nepal shifted from a unitary form of governance to a federal one whereby lower levels of government receive greater autonomy in health care delivery than before, including in procuring services and recruiting staff. MCH services fall under the umbrella of

basic healthcare services [15], which are envisioned to be managed through local bodies [16]. Therefore, an analysis of the quality of care at the sub-national level is of particular policy significance.

Against this background, the primary objective of our study was to understand current gaps in the process and outcome dimensions of the quality of ANC, primarily at the sub-national level and the variation in quality across the patients' socio-economic gradient.

Methods

Design

We used a convergent mixed methods approach [17], whereby we triangulated qualitative and quantitative data. In the quantitative component, we observed the interactions between providers and women seeking ANC and recorded the tasks that providers performed. We used the Service Provision Assessments (SPA) tool developed by the Demographic Health Surveys (DHS) program [18]. The SPA tool has been used to collect data on health service availability and readiness in a number of LMICs, including Nepal [19]. It consists of a mix of a survey and observations and is publicly available at the DHS' website (<https://dhsprogram.com/Methodology/Survey-Types/SPA-Questionnaires.cfm>). We used the part of the SPA tool pertaining to ANC. We translated the tool to Nepali, the local language, and pilot-tested the Nepali version in two clinics in Lalitpur district. Except for the language and the consent, the entire SPA tool pertaining to ANC was used. However, at the time of the observation, we skipped sections if they were not relevant to the specific woman. For example, questions about newborn and postpartum care were relevant only to women who were in their third trimester, based on the WHO guidelines [20].

In parallel, we collected qualitative data on providers' and users' perceptions on the overall quality of care. Specifically, we conducted focus group discussions (FGDs) with users and providers, including in-depth interviews with medical superintendents. The discussions and in-depth interviews were guided by a semi-structured tool that allowed interviewers to prompt and probe participants' responses (Appendix B). The semi-structured tool was also piloted with two respondents prior to the main study.

A team of local female researchers led by RT conducted the face-to-face interviews, observations and the FGDs, in Nepali and within the hospital premises. RT has over 15 years of experience conducting qualitative research in Nepal, while the other interviewers were trained for two days at the Nick Simon Institute before visiting the hospitals. The research team first approached the respondents informally to establish relationship and to check interest in participating in the study. A written informed consent, in Nepali, was obtained from all participants. Therefore, the participants were aware of the study's objectives and that it was being conducted by Nick Simons Institute and the Pennsylvania State University. The response rate was 100%. The average duration of the key informant interviews and FGDs were 30 and 45 min. Individuals other than the respondents

and the research team were not present during the conversations. The conversations were tape recorded, transcribed and then translated to English. A sample was translated back from English to Nepali to check for quality. Repeat interviews were not carried out, and the transcripts were not returned to the participants for comment.

Sampling

The study participants for both quantitative and qualitative components were sampled from 17 primary, public hospitals across all seven provinces of Nepal (Appendix Figure A1). The hospitals were selected from 84 hospitals where Nick Simons Institute has ongoing operations. The selection was based on a Minimum Services Standard score that the institute tracks thus ensuring that the sample consisted of a mix of good- and poor-performance hospitals [21]. At the time of the survey, the score was increasing from the previous year for seven of the 17 hospitals, decreasing for six, and constant for the remaining four hospitals. The research team visited the hospitals for 2–3 days during August and September of 2019. The only eligibility criterion for participants in the observation and FGDs were that they were visiting the hospital to seek services on the days of the research team's visit. Among providers, the medical superintendents of all 17 hospitals were interviewed. A total of 198 women participated in the quantitative surveys and observations.

Ethical considerations

The study was approved by Nepal Health Research Council (registration number: 655/2018) and the institutional review board of the Pennsylvania State University (Study ID: STUDY00011418).

Statistical analysis

Quantitative

We analyzed the survey data descriptively and assessed the relationship between the quality of ANC and users' characteristics in a regression framework. The main outcome variable was the number of tasks (maximum: 59) performed by the provider during the ANC consultation. The tasks ranged from identifying potential signs of danger (e.g. checking fever and vaginal bleeding) to conducting physical exam (e.g. examining the client's breasts) and providing counseling (Appendix Figure A2). For each patient, we calculated the total number of tasks performed by the provider during the patient's visit.

The predictors included age of the client, employment status, education of both the client and her husband, parity, order of current pregnancy, trimester and province of residence. We estimated coefficients in equations of the form $Y_{ij} = \alpha + \beta X_{ij} + \varepsilon_{ij}$, where Y_{ij} was the number of tasks performed by the provider during client's visit i in hospital j . α , β and ε represent the intercept, coefficient(s) and the error term, respectively. We estimated the coefficients for each predictor, X , first separately (bivariate analysis) and then together in a stepwise manner (multivariate analysis). Given the continuous measure of the outcome, we used ordinary least square regressions—a common form of regression that uses the smallest sum of squared deviations to generate the regression line [22]—confirmed the normality of errors and reported the coefficients. Therefore, β can be interpreted as the increase in the number of items performed by the provider associated with the independent variable. Multiple women seeking care at a hospital might receive similar quality of care. We accounted for this possibility by clustering the standard errors at the hospital level using Stata's `vce (cluster hospital)` command. Not

accounting for such a possibility can potentially overestimate the precision of our coefficient [23]. We performed all analyses in Stata version 16 [24].

Qualitative

A thematic content analysis [25] was conducted manually by ST and RT using the transcripts in English. ST then wrote a descriptive report of the preliminary analysis, after which ST and RT independently generated themes from the data and came to consensus through a discussion. ST coded the data according to these themes in NVivo version 12 [26].

Results

Descriptive statistics

Majority of the women were in the 20–24 years age group (45%) (Table 1). Approximately 46% of the women were visiting the hospital during their first pregnancy. About 40% of the women were in the third trimester of their pregnancy, 30% in the second and the remaining 30% in the first trimester. Nearly 15% of the women had no formal education and only about 51% had completed high school.

Out of the 59 recommended tasks on ANC, providers performed only 22 tasks (approximately, 37.3% of all tasks) on average (Table 2). In terms of the different categories, providers performed at least 50% of the tasks in only three categories: taking medical history, performing physical examination and advising about maintaining a healthy pregnancy. The proportion of recommended tasks performed was lower than 50% in all other categories. The highest gaps existed in areas of malaria and HIV counseling, in which providers performed fewer than 5% of the recommended tasks. WHO recommends that providers ask about aspects of prior pregnancy for non-first births; of the 10 questions providers were supposed to ask (e.g. if there was heavy bleeding during or after the delivery), they asked only about two. Likewise, for women in their third trimester, out of the five tasks recommended by the WHO [20] (e.g. guidance on care for the newborn), providers performed less than one. The proportion of clients who received care, by item, are in Appendix Figure A2.

Bivariate relationships

Comparison of the content of care by client's characteristics—separately for each characteristic—showed that the woman's education, province and semester of pregnancy were associated with the number of tasks performed during consultation (Table 3). Overall, on average, providers performed 3.2 additional tasks on women with some to middle school education, compared to women with no education. They performed 2.7 additional tasks, on average, on women with high school or more education compared to women with no education.

The average number of tasks also varied significantly across provinces, with users in province 5 receiving 2.3 fewer examinations on average than those in province 1 and users in province 3—which includes Kathmandu, the capital—receiving 2.3 additional examinations than those in province 1. Put together, users in province 5 received about five fewer examinations (or, 8.5% of the 59 items) than users in province 3. Finally, women in their second trimester received 2.6 additional examinations, on average, than those in the first trimester.

The differences across education levels, province and pregnancy trimester differed across the categories of tasks; for example, the

Table 1 Women characteristics (*n* = 198)

Variables	Number	%
Age of the client (years)		
≤19	29	14.7
20–24	89	45.0
25–29	59	29.8
≥30	21	10.6
Education level		
No education	29	14.6
Up to middle school	67	33.8
High school or higher	102	51.5
Employment		
Housewife	173	87.4
Working	25	12.6
Parity		
0	90	45.5
1	75	37.9
2+	33	16.7
Husband's education		
Up to primary school	43	21.7
Up to middle school	73	36.9
High school or higher	82	41.4
Current pregnancy		
Primipara	90	45.5
Multipara	108	54.5
Duration of pregnancy		
First trimester	59	29.8
Second trimester	59	29.8
Third trimester	80	40.4
Province		
One	18	9.1
Two	38	19.2
Three	28	14.1
Four	30	15.2
Five	40	20.2
Six	26	13.1
Seven	18	9.1

number of questions asked about prior pregnancy (for those with non-first pregnancy) was 'lower' for those with high school education than for those with no education. (The raw number of tasks performed, by category and characteristic of the woman, are in Appendix Table A1.)

Multivariate relationships

A woman's schooling was strongly associated with her receiving better ANC. After controlling for age, employment status, parity, husband's education, duration of pregnancy and province, women who had up to elementary level schooling were asked three additional questions, on average, than the women who had no education ($P < 0.001$) (Table 4, column 7).

Likewise, quality of ANC varied across provinces. Province 3 had consistently higher quality than other provinces. Women from province 3 were asked two more questions than women from province 1 ($P < 0.05$). Controlling for women's characteristics except their province, women in the second trimester received 2.6 additional

Table 2 Content of care during antenatal care consultation

Content of care categories	Average (number of items asked)	% ^a	
For all women (max 59 items)	21.86	37.1	198
Client history (max 4)	2.44	61.0	198
Danger signs of current pregnancy (max 8)	2.16	27.0	198
Physical examination (max 11)	6.20	56.3	198
Routine tests (max 4)	1.75	43.8	198
HIV counseling and testing (max 4)	0.16	3.1	198
Maintaining a healthy pregnancy (max 3)	2.16	72.1	198
Iron Prophylaxis (max 4)	1.82	45.6	198
Tetanus Toxoid Injection (max 2)	0.77	38.4	198
Deworming (max 2)	0.62	31.1	198
Malaria (max 9)	0.04	0.4	198
Preparation for delivery (max 4)	0.71	17.8	198
Other aspects of interaction (max 4)	3.04	76.0	198
For women not giving their first birth			
Aspects of prior pregnancies (max 10)	1.56	28.5	108
For women in their second or third trimesters			
Newborn and postpartum recommendations (max 5)	0.21	10.5	80

^aPercent is the average number of items completed divided by the maximum. The categories are organized according to the ANC Observation Protocol available from the Demographic and Health Surveys program [19].

examinations than those in the first trimester (column 6). However, this association disappeared once we accounted for the province (column 7).

Qualitative findings

Overall quality of care

The majority of users were not satisfied with the quality of health services provided by public hospitals. These users went to public hospitals mainly because of their geographic proximity. Some users said that they went to private providers as they were unable to receive even basic treatment and medications from public hospitals. Providers also agreed that they were unable to provide adequate care due to factors such as a lack of equipment and supplies, and inadequate qualified human resources.

'There should be good doctors. ... If everything is available then it is good. If all diseases are cured then that is good (laugh) all medicines should be available and all equipment should be available.' (Users, Region 2)

'We are not able to provide some services due to the lack of basic equipment. However, we are trying to manage all those services.' (MeSu, Region 2)

Specific themes

The key themes that emerged from the thematic content analysis were (i) access, (ii) infrastructure and amenities, (iii) human resource, (iv) equipment and drug supply and (v) privacy. We describe them below.

Table 3 Comparison of content of care by client characteristics (bivariate results)

Background characteristics	Content of care											Newborn and post-partum recommendations			
	All combined	Client history	Danger signs of current pregnancy	Physical examination	Routine tests	HIV counseling and testing	Maintaining a healthy pregnancy	Iron Prophylaxis	Tetanus Toxoid Injection	Deworming	Malaria		Preparation for delivery	Other aspects of interaction	Aspects of prior pregnancies
Age of the client (ref: ≤19)															
20-24	0.32	0.08	-0.04	-0.37	0.60	-0.00	0.01	0.38	0.11	0.13	0.08	-0.63*	-0.02	1.10***	-0.33
25-29	-0.52	-0.19	0.15	0.10	0.09	0.05	-0.05	0.13	-0.13	-0.06	0.00**	-0.56*	-0.04	2.15***	-0.35
>30	0.19	-0.20	-0.04	0.53	0.08	0.05	0.02	-0.05	0.00	-0.06	0.00*	-0.08	-0.07	2.67***	-0.20
Education level (ref: no education)															
Up to middle school	3.25***	0.22	0.34	0.28	0.36	0.19**	0.10	0.16	0.28*	0.29	0.10	0.88**	0.04*	-0.10	0.26**
High school +	2.70**	0.38	0.09	-0.33	0.76	0.11	0.18	0.42	0.43**	0.42*	-0.00	0.20	0.05**	-1.00	0.11
Employment (ref: housewife)															
Working	0.97	0.37	-0.14	-0.77**	0.28	-0.09*	0.18	0.57***	0.40	0.39*	-0.04	-0.27**	0.09	-0.54	-0.11*
Parity (ref: 0)															
1	-0.37	0.08	-0.09	-0.18	0.01	0.03	-0.06	-0.03	-0.01	-0.05	0.09	-0.12	-0.04	—	-0.16
2+	-0.15	-0.67**	0.24	0.99***	-0.32	0.08	-0.29	-0.20	-0.31	-0.29	0.00	0.69**	-0.07**	—	0.04
Husband's education (primary school or lower)															
Up to middle school	0.13	-0.13	0.23	0.28	-0.21	0.12	0.02	-0.20	0.02	0.06	-0.16	0.12	-0.01	-1.04**	0.13
High school +	0.24	0.39	-0.55	-0.72	0.60	-0.01	-0.02	0.37	0.43**	0.33*	-0.16	-0.41**	-0.01	-1.33**	-0.05
Province (ref: one)															
Two	-0.85	0.79***	-0.72**	-1.17***	0.13	-0.06	0.20**	-0.05	0.29	0.32	0.00	-0.55	-0.03	-0.69**	-0.51
Three	2.32***	0.86*	-0.31	-0.72*	0.89***	0.08	0.35**	0.38	0.57***	0.68***	0.00	-0.39	-0.08	0.19	-0.53
Four	0.99*	0.77***	-0.43**	-1.12***	0.43***	0.07	0.24***	0.72***	0.47***	0.48***	0.00*	-0.59*	-0.04	-0.10	-0.58*
Five	-2.31***	1.05***	-2.19**	-2.40***	2.20***	-0.04	-0.57	0.43**	0.40**	0.01	0.00*	-1.09***	-0.11**	-1.62***	-0.75**
Six	-0.19	1.77***	-1.28**	-2.61***	2.81***	-0.17	-0.45***	0.63*	-0.04	0.03	0.27***	-1.04**	-0.11**	0.03	-0.74**
Seven	-0.72	1.17***	-1.61***	-2.22***	2.44***	0.11	-0.11	0.61***	-0.17	-0.06	0.00*	-0.78	-0.11**	-1.83***	-0.61

Continued.

Table 3 (Continued)

Background characteristics	Content of care											Newborn and post-partum recommendations			
	All combined	Client history	Danger signs of current pregnancy	Physical examination	Routine tests	HIV counseling and testing	Maintaining a healthy pregnancy	Iron Prophylaxis	Tetanus Toxoid Injection	Deworming	Malaria		Preparation for delivery	Other aspects of interaction	Aspects of prior pregnancies
Duration of pregnancy (ref: first trimester)															
Second trimester	2.63**	-0.15	0.86*	0.49	-0.03	0.02	0.47	0.41	0.10	0.36	0.12	-0.07	0.05	0.69	—
Third trimester	0.97	-1.48***	1.82***	2.73***	-0.63	0.37***	-0.33	-0.91***	-1.24***	-0.86***	-0.00	1.48***	0.02	0.32	—
Number of maximum items	59	4	8	11	4	4	3	4	2	2	9	4	4	10	5
Number of women	198	198	198	198	198	198	198	198	198	198	198	198	198	108	80

* $P < 0.10$,** $P < 0.05$,*** $P < 0.01$.The outcome variable in this table is the number of items asked by the provider during client's visit. Standard errors are clustered at the hospital level ($n = 17$).

Table 4 Multivariate analysis of content of antenatal care (all 59 combined) by client characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Age of the client (ref: ≤ 19)							
20–24	0.32	0.62	0.57	0.35	0.43	0.31	0.42
25–29	–0.52	0.10	0.02	–0.51	–0.42	–0.37	–0.45
≥ 30	0.19	1.33	1.25	0.41	0.46	0.61	0.59
Education level (ref: no education)							
Up to middle school		3.43***	3.41***	3.83***	3.86***	3.88***	3.32***
High school+		2.83**	2.61**	3.21**	3.39**	3.34**	2.92**
Employment (ref: housewife)							
Working			0.84	0.94	0.98	0.61	0.27
Parity (ref:0)							
1				0.27	0.23	0.05	–0.16
2+				1.63	1.61	1.51	1.42
Husband's education (ref: under primary)							
Up to middle school					–0.07	0.07	–0.07
High school+					–0.39	–0.23	0.15
Duration of pregnancy (ref: first trimester)							
Second trimester						2.58**	1.23
Third trimester						0.88	–0.19
Province (ref: one)							
Two							–0.19
Three							2.00**
Four							0.49
Five							–2.15
Six							–0.05
Seven							–0.68
Constant	22.48***	19.11***	19.15***	17.79***	18.06***	16.70***	19.87***
<i>n</i>	198	198	198	198	198	198	198

* $P < 0.10$,** $P < 0.05$,*** $P < 0.01$,

The standard errors are clustered at the hospital level ($n = 17$) using Stata's `vce cluster` command. The outcome variable in this table is the number of tasks performed by the provider during client's visit. For the final specification (column 7), the P -value from the Shapiro–Wilk test is 0.11, thus failing to reject the hypothesis that the data are normally distributed. Details of the analysis are available on request.

Access

Access to MCH services was limited in rural areas, although this was changing in recent years. Most hospitals provided basic MCH services. However, some of the hospitals could not perform a C-section and did not have oxygen machines or blood banks, so they referred complicated pregnancies to other hospitals.

'Operation is done and that woman survived, otherwise women used to die. Lots of people survive if they are taken to the hospital. Pregnant women and postnatal mothers have survived. Lots of people died when there was no facility at the hospital. Newborn babies used to die before. Now, they rarely die.' (Users, Region 2)

'No, we don't perform CS, we conduct only normal delivery.' (MeSu, Region 3)

Infrastructure and amenities

The current services were inadequate due to insufficient infrastructure. Often times a separate room for ANC was not available. Operation theater and delivery rooms were also congested, and the theater was sometimes non-functional.

In rare instances where the space was sufficient, other amenities, such as electricity, were missing. Many hospitals were not able to provide spaces for staff and patients, while users had to stay outside or in the hallways, even during the winter. Providers said that many hospital buildings were not big enough. They had to manage services in a single or a shared room.

'We have to have separated ANC and PNC rooms. In reality they are not separate. We also provide delivery and family planning services there [same room]. We perform implants there in the delivery room. Safe abortion service, CAC, and PAC are also provided there. If a separate room was available for these services, it would have been easier and safer.' (Service Providers, Region 2)

'Delivery is conducted in another place but after delivery, they keep postnatal mothers with other patients. The hospital is big but there is no light at the gate. The hospital earns [collects fees] money by charging patients but even a single light doesn't work.' (Users Region 3)

'This is a district hospital. So many patients come here...now there is a surgery facility so that those patients need separate beds.' (Users, Region 1)

Human resources

The shortage of health care workforce was a shared concern among providers and users. Medical superintendents mentioned that they were unable to provide the needed services due to the lack of sufficient number of staff, particularly specialists and nurses. Users agreed that there was a lack of 'good doctors' in the hospitals, thus emphasizing the quality of doctors.

'We are lacking human resources. There are no consultants or MOs available according to the government-sanctioned posts. Only 12 each and every department is lacking some staff.' (MeSu, Region 1)

'First of all, there is not enough manpower...it is said that this is a 50 bedded hospital which is being constructed but no doctor can work here because in the hills there are not so many people. Mainly there are no good doctors. Most of the work is done by the OJT doctors. Good doctors do not work here.' (Users, Region 2)

Equipment and drug supply

Users mentioned frequently that the hospitals lacked essential drugs and functional equipment. They complained that, at most, they received only the most essential medicines such as paracetamol, oral rehydration solution, and iron and folic tablets. For this reason, they preferred not to go to public hospitals. Conversely, providers said they were providing the services despite the shortage of essential equipment and medicines. They complained that the budget was diverted toward local governments from hospitals, which hampered the purchasing of equipment, essential drugs and supplies.

'Why should we go to the government hospital? They will send us to a pharmacy [private] to buy the medicines. We have to buy all medicines, so why should we bother going there? They will give only paracetamol [basic]. I have never been there [hospital] as the medicine for fever is not available there. If available, it does not work properly.' (Users, Region 3)

'We only get paracetamol for free and the rest we have to buy. while having diarrhea, we get metronidazole and jeevan jal [ORS]. Only those medicines, we can get for free of cost. Family planning devices [temporary] also are free. We have to buy other medicines outside [medical shops] from the syringe and other things too.' (Users, Region 1)

'Equipment is not enough in the hospital. Since the budget is gone to another side [local government], we are not able to provide even BP set as it is needed..... equipment is necessary in the lab and emergency.' (MeSu, Region 1)

Privacy

Both users and providers were concerned about privacy. Both mentioned that privacy was maintained for some services such as ANC. However, maintaining privacy was not always possible due to the lack of space. A few hospitals were able to maintain patients' privacy, while others did not have sufficient space or rooms.

'There is no privacy. Places are not good to maintain privacy. If we go to Nepalgunj, they maintain privacy very well. There is nothing here. No facility available here.' (Users, Region 1)

'There is a separate room for ANC, delivery and no entry for other personnel except nurse and doctors. There is privacy maintained in the lab too because there are separate rooms in the lab and it is secret.' (MeSu, Region 1)

'We do not have a separate room for counseling and so while conducting counseling in front of others, it is not that effective. There are also issues regarding privacy. Privacy has also not been maintained.' (Service Providers, Region 2)

Discussion

Statement of principal findings

The quality of ANC in Nepal's district hospitals is poor, with providers performing only a fraction of the tasks recommended by the WHO. The quality varied by users' education and geographic location. Women with no education received a poorer quality of care than their educated counterparts, and those in province 3 received a better quality of care than those in other provinces. Other potential determinants, such as husband's education and women's occupation, were not associated with the number of tasks performed by providers.

The qualitative component provided additional insights into the overall quality of care. Specifically, users were not satisfied with the quality of care they received. Providers agreed that they were unable to provide the needed services and pointed to insufficient staffing and lack of equipment, space and drugs.

Strengths and limitations

The key strength of our study is that we applied a robust mixed methods approach on data collected from primary hospitals in all seven provinces of Nepal. We also assessed perceptions of both providers and users. Our findings have two main limitations. First, providers were aware that they were being observed. They may have performed more tasks than they normally would, causing our estimates to be biased upward. Second, the sample of ANC seekers were those who came to the hospitals during the research team's visit. They may not be representative of all pregnant women who seek ANC in those hospitals.

Interpretation within the context of the wider literature

The poor quality of ANC services in Nepal is consistent with findings from other LMICs [1, 5, 27–29]. In Nepal, a recent report has analyzed the quality of ANC using the 2015 Health Facility Survey, which includes the SPA survey [4]. Consistent with our study, the report found that the overall performance of providers was low and differed across different dimensions. The report also found inequity in ANC by the client's age and education.

Implications for policy, practice and research

The Right to Safe Motherhood and Reproductive Health Act, 2075 (2018) aims to 'fulfill the right to safe motherhood and reproductive health of the women conferred by the Constitution of Nepal' (p. 1) [30]. Although the Act is vague in terms of the specific services guaranteed to women, our findings suggest that the current level of services at primary hospitals is far from the Act's vision. More specifically, a critical gap in the quality of care remains. Current supply-side efforts, such as the provision of 24/7 birthing centers, can mitigate gaps in service 'availability'. However, additional efforts, in particular the provision of additional equipment, human resources and infrastructure, will be needed to improve quality.

Additional research is needed in this area, both to assess quality objectively and to establish its key determinants. Direct surveys and observations are only one of the many approaches to measuring

quality. More objective approaches, such as the use of standardized patients [31, 32], are currently gaining traction among health researchers. Likewise, establishing key determinants of the variation in care, such as provider's knowledge and experience, would enable the government to target interventions to specific groups or geographic areas.

Conclusions

The quality of ANC in Nepal's public hospitals is poor, suggesting the need for additional infrastructure, equipment and human resources. The quality varied significantly across geographic and socio-economic gradients. Additional research on assessing quality and identifying key determinants is needed for effective policy design.

Supplementary material

Supplementary material is available at *International Journal for Quality in Health Care* online.

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Contributorship

YA, RS and RT designed the study. RT and ST led the data collection. YA, SN and NJ analyzed the quantitative data, while RT and ST analyzed the qualitative data. All authors contributed to the drafting and revision of the manuscript and approved the final version for publication.

Ethics and other permissions

The study was approved by the Nepal Health Research Council (registration no. 655/2018) and the institutional review board of the Pennsylvania State University (Study ID: STUDY00011418).

Data availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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