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Research Article

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Assessing Quality of Facility-Based Normal Delivery Care in Nepal: Readiness, Functionality, Standards of Care, and Women's Satisfaction

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Abstract

Background: *Maternal mortality remains disproportionately high in low- and middle-income countries, accounting for 95% of global maternal deaths. In Nepal, the maternal mortality ratio remains high at 151 per 100,000 live births (2021). Expanding facility-based deliveries and enhancing the quality of care are crucial to accelerating progress. This study examines changes in facility readiness and functionality of emergency obstetric and newborn care (EmONC) services from 2015 to 2021, adherence to delivery care standards, and factors influencing women's satisfaction with delivery services in 2021.*

Methods: *Data from the Nepal Health Facility Surveys (2015 and 2021) were analyzed. Facility readiness included 457 facilities in 2015 and 804 in 2021. Functionality of EmONC included assessment of 26 and 43 basic EmONC and 21 and 52 comprehensive EmONC facilities in 2015 and 2021, respectively. Standards of care and satisfaction analyses used data from 320 women. T-tests and logistic regression statistical analysis were used.*

Results: *Facility readiness for normal deliveries improved modestly, from 37.9% to 43.7%, with variations across different domains. Comprehensive EmONC facilities were more functional than basic EmONC facilities. Compliance with care standards ranged from 52.4% for human resource competency to 92.0% for functional referral. Women's satisfaction was positively associated with caring behavior, privacy, and visible health statistics.*

Conclusions: *Despite progress in facility-based deliveries, persistent quality gaps hinder maternal mortality reduction. Strengthening quality of care, provider competency, and accountability across Nepal's federal health system is essential for maternal mortality reductions.*

Keywords: Maternal Mortality, Normal Delivery, Readiness, Standards, Satisfaction, Nepal.

Introduction

Background

The burden of maternal mortality remains disproportionately high in low- and middle-income countries (LMICs), accounting for 95% of global maternal deaths [1]. Achieving the United Nations Sustainable Development Goal (SDG) 3.1—to reduce the maternal mortality ratio (MMR) to fewer than 70 deaths per 100,000 live births by 2030—requires both expanded access to facility-based obstetric care and improvements in quality of care (QoC) [2]. Nepal, a South Asian LMIC, has made substantial progress, reducing its MMR from 543 in 1996 to 251 per 100,000 live births in 2021 [3, 4]. Key initiatives, including the Maternity Incentive Scheme, free delivery services under the national Aama (Mother) program, expansion of birthing centers, and deployment of skilled birth attendants, have driven these gains [5]. Despite a rise in facility-based deliveries from 8.2% in 1996 to 79.4% in 2022 [3], Nepal still faces persistent QoC challenges that impede further mortality reductions [6]. Sustained progress toward the SDG target will require an estimated 6% annual reduction in MMR from 2021 levels, underscoring the urgency of prioritizing quality alongside access [7].

QoC encompasses three dimensions: structural, process, and outcome [8]. The structural dimension is the service readiness, measured as the availability of trained staff, guidelines, medicines, and equipment [9], process is measured as adherence to

standards of care, and outcome is measured as client satisfaction [10]. The World Health Organization (WHO) identifies over 300 standards for assessing maternal and neonatal care (10) and estimates that 15% of pregnancies require emergency obstetric management [11]. Emergency obstetric and neonatal care (EmONC), both basic EmONC (BEmONC) and comprehensive EmONC (CEmONC) services are essential for obstetric complications management. The BEmONC and CEmONC services comprises seven and nine signal functions, respectively. This study assesses the quality of normal delivery care in health facilities in Nepal by analyzing changes in facility readiness, availability and functionality of BEmONC and CEmONC services from 2015 to 2021, adherence to delivery care standards, and factors influencing women's satisfaction, with implications for policy, programs, and future research.

Conceptual framework

This study was guided by the WHO framework for improving maternal and newborn care, which outlines eight standards aimed at achieving positive pregnancy outcomes—three related to the provision of care, three to the experience of care, and two to the broader health facility environment. Together, these standards encompass service readiness, care delivery processes, and client experience. Adapting this framework, the study defined the provision of care and facility environment as components of service readiness, and the experience of care as both the process and experiential dimensions of care. These elements represent the key inputs and outputs influencing maternal outcomes. The functionality of BEmONC and CEmONC services was assessed as an outcome of these interrelated standards, which collectively determine women's satisfaction with facility-based delivery care. The adapted conceptual framework is presented in Figure 1.

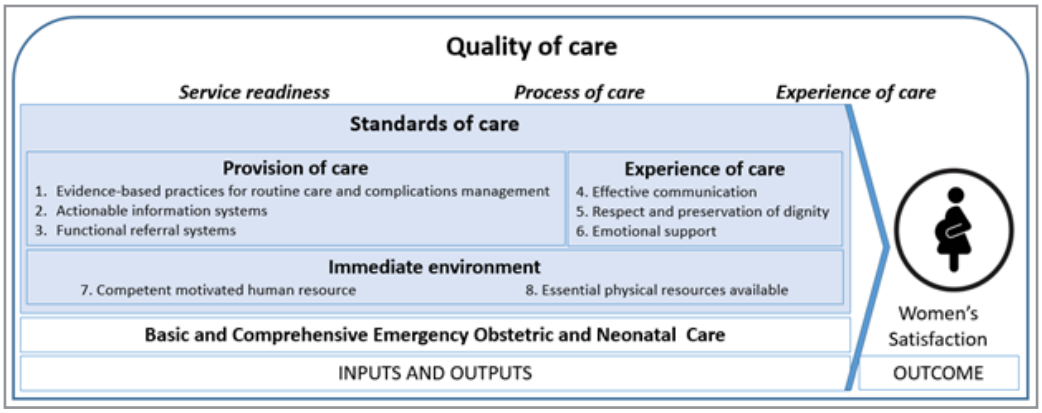

Figure 1: Conceptual framework linking health facility readiness, emergency obstetric and newborn care (EmONC), and the eight WHO standards for improving maternal and newborn care with women's satisfaction with normal delivery services

Methods

Study design

This was a cross-sectional study employing quantitative analytical methods.

Data source

Data were obtained from the Nepal Health Facility Surveys (NHFSs) 2015 and 2021, publicly available at https://dhsprogram.com/Data/. Health facility readiness was assessed using data from 457 facilities in 2015 and 804 facilities in 2021 [12]. Functionality of BEmONC and CEmONC services was assessed using data from 26 BEmONC and 43 CEmONC facilities in 2015, and 21 BEmONC and 52 CEmONC facilities in 2021 [13]. Readiness and functionality data were collected through facility observations and service provider interviews. Data on adherence to delivery care standards and women's satisfaction were drawn from 320 women in the 2021 NHFS who were interviewed after discharge from the facility [14].

Unit of analysis

For readiness and BEmONC and CEmONC functionality, the unit of analysis was the health facility. For compliance with delivery care standards and women's satisfaction, the unit of analysis was the individual woman who received delivery care services.

Study variables and measurements

Health facility readiness index

Health facility readiness was assessed following the World Health Organization (WHO)'s Service Availability and Readiness Assessment (SARA) framework, adapted for this study into five domains:

Training: Availability of at least one trained delivery care provider.
Guidelines: Observed availability of at least one essential childbirth care guideline, checklist, or job aid.
Equipment: Availability of 13 essential items, including emergency transport, delivery pack, suction apparatus, neonatal resuscitation bag and mask, delivery bed, partograph, blood pressure apparatus, latex gloves, sterilization equipment, weighing scale, manual vacuum extractor, and vacuum aspiration kit.
Essential Medicines for Mothers: Availability of injectable uterotonic, injectable antibiotic, injectable magnesium sulfate, skin disinfectant, and intra venous fluid with infusion set.
Essential Medicines for Newborns: Availability of chlorhexidine gel, tetracycline eye ointment, injection gentamicin, amoxicillin syrup, and ceftriaxone powder for injection.

Each indicator/item was coded as 1 (available) or 0 (not available). Domain scores were calculated as the mean of all items within each domain, and the overall readiness index was the mean of the five domain scores, expressed as a scale ranging from 0 to 100. All analyses were disaggregated by management authority (public or private).

BEmONC and CEmONC availability and functionality
Functionality of BEmONC and CEmONC facilities was assessed using the WHO's recommended methodology.

BEmONC availability was defined as health facilities that had ever provided all seven signal functions: i) parenteral administration of antibiotics, ii) parenteral administration of uterotonics, iii) parenteral administration of anticonvulsants, iv) assisted vaginal delivery, v) manual removal of placenta, vi) removal of retained products, and vii) neonatal resuscitation. BEmONC functionality was defined as facilities that had provided all seven signal functions within the preceding three months before the data collection day. CEmONC availability was defined as health facilities that had ever provided all nine signal functions: the seven listed above and viii) cesarean delivery and ix) blood transfusion. CEmONC functionality was defined as facilities that had provided all nine signal functions within the preceding three months before the data collection day. Facilities meeting the criteria were coded 1, otherwise 0. The overall BEmONC and CEmONC availability and functionality indices were computed as the mean of their respective signal function indicators (range: 0–100).

Deliveries Meeting Standards of Care
Delivery care quality was measured against 53 indicators adapted from the eight WHO standards for improving maternal and newborn care.

Standard 1: Evidence-based practices (15 indicators) — included availability of key equipment, trained providers, essential maternal and newborn medicines, use of partographs, immediate postpartum uterotonic administration, newborn thermal care, early breastfeeding, and postpartum counseling.

Standard 2: Actionable health information systems (5 indicators) — included availability of maternal and newborn health registers, health management information system reports, display of health statistics, and quality assurance action plans.

Standard 3: Functional referral system (2 indicators) — included availability of functioning ambulance or emergency transport, and any one type of communication equipment.

Standard 4: Effective communication (6 indicators) — included availability of maternal care information materials, supervision visits, 24-hour on-call service, and provider communication and counseling practices.

Standard 5: Respect and preservation of dignity (8 indicators) — included privacy, mechanisms for client feedback, and women's reported experiences of non-discrimination, respectful care, and provider responsiveness.

Standard 6: Emotional support (3 indicators) — included presence of maternity waiting rooms, allowance for birth companions, and provision of emotional reassurance.

Standard 7: Competent, motivated human resources (5 indicators) — included supervision, routine quality assurance, written job descriptions, promotion opportunities, and provider experience.

Standard 8: Essential physical resources (9 indicators) — included regular electricity and water supply, infection prevention and control equipment, waste management, availability of toilets, newborn corners, and women's reported access to clean water, toilets, and maternity beds.

Each indicator was coded 1 (met) or 0 (not met). The composite score for each standard was calculated as the mean of its indicators (range: 0–100).

Satisfaction with Delivery Care
Women's satisfaction with delivery services was measured using seven indicators rated on a five-point Likert scale (1 = very satisfied to 5 = very dissatisfied) covering: i) waiting time, ii) information provided, iii) provider skill, iv) politeness and empathy, v) facility cleanliness, vi) privacy, and vii) overall care received. A composite satisfaction index was generated, which was dichotomized at the median to categorize respondents into high and low satisfaction groups.

Contextual Variables
For the analysis of determinants of women's satisfaction with delivery care services, three sets of contextual variables were included:

1. **Women's characteristics:** age, caste, education, number of pregnancies, experience of complications (current pregnancy), and experience of stillbirths (previous pregnancies).
2. **Provider characteristics:** provider type and sex of the provider assisting the birth.
3. **Health facility characteristics:** facility type, participation in the Maternity Incentive Scheme, facility ownership type (public/private), and distance to the health facility.

Data analysis and statistical methods

All analyses used weighted data to account for the complex sampling design and non-response rates. Sampling weights provided by the Demographic and Health Surveys Program in the dataset were applied separately for facility-level and women-level analyses. A 95% confidence interval (CI) and a significance level of $p < 0.05$ were used for all statistical tests. All statistical analyses were performed using IBM SPSS Statistics, version 25.

Health Facility Readiness for Delivery Services: Weighted means of the readiness index, its domains, and subcomponents were computed overall and stratified by managing authority for 2015 and 2021. Differences between years were assessed using weighted independent-sample t-tests to test for significant changes over time. Weighted mean differences and corresponding 95% CIs were reported. Detailed analytical procedures are described elsewhere.

BEmONC and CEmONC Availability and Functionality: Mean differences in BEmONC and CEmONC availability and functionality between 2015 and 2021 were assessed using weighted independent-sample t-tests. Statistical significance was determined at $p < 0.05$, with corresponding 95% CIs for the mean difference. Details of the analytical approach are presented elsewhere.

Deliveries Meeting Standards of Care and Determinants of Women's Satisfaction: To estimate the proportion of normal deliveries meeting WHO standards of care, weighted one-sample t-tests ($p < 0.05$) were applied. Weighted means and 95% CIs were computed for each indicator under the eight WHO standards, and average composite scores (range: 0–100%) were calculated for each standard.

Women's satisfaction was measured by aggregating seven Likert-scale items on QoC into a composite satisfaction index using principal component analysis. Loadings from the first principal component were used to construct the index, which was dichotomized at the median to categorize women into higher and lower satisfaction groups.

To examine the association between standards of care, contextual factors, and women's satisfaction, weighted multivariate logistic regression was performed. Multicollinearity was tested using tolerance and variance inflation factor (VIF) values. Bivariate logistic regression was first conducted to assess the independent effects of each covariate, generating odds ratios (ORs). Covariates significant at the bivariate level were included in the multivariate model, and adjusted odds ratios (AORs) with 95% CIs were calculated. Details of the analytical approach are presented elsewhere.

Ethical considerations

This study was conducted as part of a PhD research project approved by the Ethical Review Committee of the Nepal Health Research Council (NHRC) in May 2021 and the Ethics Commission of Ludwig Maximilian University of Munich, Germany, in June 2021. Both the NHFS 2015 and NHFS 2021 surveys received ethical clearance from the NHRC Ethical Review Committee, where written consent was obtained from facility authorities, and oral consent was obtained from all participating providers and clients or their next of kin before participation.

Results

Health Facility Readiness to Provide Normal Delivery Services, 2015–2021

Characteristics of health facilities: In Nepal, out of the 457 and 804 health facilities providing normal delivery services analyzed in 2015 and 2021, most were public basic health care centers, accounting for 85.8% in 2015 and 87.2% in 2021. Private hospitals represented less than 10% of facilities in both survey years, with a declining trend over time.

Changes in Readiness Index: As reported in Table 1, the overall health facility readiness index for normal deliveries remained below optimal levels in both years but showed a significant increase from 37.9% in 2015 to 43.7% in 2021. Readiness varied across the five domains. The essential medicines for mother's domain achieved the highest readiness, exceeding 75% in both years, while the guidelines domain consistently scored below 25% and declined over time.

Readiness by Managing Authority: Readiness improvements were observed across both public and private facilities. The index increased from 37.6% to 43.6% in public facilities and from 39.9% to 45.3% in private facilities between 2015 and 2021, with both changes statistically significant. Among public facilities, all domain-level indicators improved significantly; in private facilities, a notable increase occurred only in the essential medicines for newborns domain [7, 12]. Refer to Table 1.

Table 1: Change in health facility readiness from 2015 to 2021 reported by managing authority

Domain-wise and overall readiness scores	Managing authority	Percent		Mean difference	95% CI of mean difference	p-value
		2015	2021			
Domain 1: Provider trained on delivery care	Public	65.7	73.4	7.7	[2.2; 13.3]	0.0070*
	Private	34.9	43.2	8.3	[-10.8; 27.4]	0.392
	Total	62.6	71.1	8.5	[3.0; 13.9]	0.0020*
Domain 2: Guidelines for essential delivery care	Public	24.1	13.2	-10.9	[-15.7; -6.1]	<0.0001*
	Private	0.5	7.4	6.9	[-0.10-13.9]	0.053
	Total	21.8	12.8	-9	[-13.5; -4.6]	<0.0001*
Domain 3: Equipment and supplies	Public	68.7	77.6	8.9	[7.1; 10.7]	<0.0001*
	Private	80.8	85.5	4.7	[-3.4; 12.9]	0.247
	Total	70.9	78.2	8.2	[6.5; 10.1]	<0.0001*
Domain 4: Essential medicines for mothers	Public	76.8	86.1	9.3	[6.9; 11.7]	<0.0001*
	Private	74.6	82.2	7.6	[-4.6; 19.8]	0.219
	Total	76.6	85.8	9.2	[6.8; 11.6]	<0.0001*
Domain 5: Essential medicines for newborns	Public	41.8	53.2	11.4	[9.0; 13.9]	<0.0001*
	Private	43.9	58.3	14.4	[3.4; 25.3]	0.0110*
	Total	42.0	53.6	11.6	[9.2; 14.0]	<0.0001*
Overall readiness index score	Public	37.6	43.6	6	[4.9; 6.9]	<0.0001*
	Private	39.9	45.3	5.4	[0.6; 10.2]	0.0280*
	Total	37.9	43.7	5.8	[4.8; 6.8]	<0.0001*
Number of total health facilities		457	804	-	-	-

*Significant at p<0.05

BEmONC and CEmONC Signal Function Availability and Functionality, 2015–2021

Characteristics of BEmONC and CEmONC Facilities: Data from 26 BEmONC and 43 CEmONC facilities in 2015, and 21 BEmONC and 52 CEmONC facilities in 2021 were analyzed. Nearly all BEmONC facilities were public—100% in 2015 and 97.7% in 2021. In contrast, only half of CEmONC facilities were public in 2021, down from 63.8% in 2015 [7, 13].

Changes in Signal Function Availability and Functionality: As reported in Table 2, between 2015 and 2021, improvements in availability and functionality of BEmONC and CEmONC signal functions were uneven, with functionality lagging behind availability.

Among BEmONC signal functions, the administration of parenteral anticonvulsants (11.8% in 2015) and assisted vaginal delivery (9.0% in 2021) had the lowest functionality. The administration of parenteral oxytocin remained the most functional service but declined from 93.7% in 2015 to 79.9% in 2021.

For CEmONC facilities, availability exceeded functionality overall, though modest gains were observed across most signal functions. Functionality in caesarean delivery, parenteral anticonvulsant use, and blood transfusion increased over time. The largest gain was noted in caesarean delivery, an increase of 13.1 percentage points, while assisted vaginal delivery showed the sharpest decline of 17.3 percentage points.

Table 2: Changes in availability and functionality of basic and comprehensive emergency obstetric and newborn care (BEmONC and CEmONC) signal functions in Nepal, 2015 and 2021

Signal functions	BEmONC				CEmONC			
	Availability (%)		Functionality (%)		Availability (%)		Functionality (%)	
	2015	2021	2015	2021	2015	2021	2015	2021
Administration of parenteral antibiotics	80.4	72.8	61.5	47.0	87.0	93.8	91.9	91.7
Administration of parenteral oxytocin	97.6	89.5	93.7	79.9	93.7	95.4	100	96.5
Administration of parenteral anticonvulsants	56.6	57.5	11.8	11.0	75.1	87.6	59.7	64.7
Assisted vaginal delivery	54.4	28.5	25.2	9.5	84.1	85.7	73.5	56.2
Manual removal of placenta	85.9	68.8	59.1	35.3	85.0	92.2	78.8	71.2
Removal of retained products of conception	72.5	74.0	50.5	34.1	80.4	90.3	83.5	76.8
Neonatal resuscitation	89.8	81.0	63.7	44.1	87.0	92.7	82.6	73.4
Blood transfusion					93.9	96.4	76.9	80.3
Cesarean delivery					92.9	98.9	79.9	93.0
All 7 (overall) BEmONC signal functions	29.2	15.9	3.9	2.2				
All 9 (overall) CEmONC signal functions					61.3	70.1	35.2	27.9
Total number of health facilities	26	43	26	43	21	52	21	52

Deliveries meeting standards of care

Women, Provider, and Health Facility Characteristics: Data of 320 women who had normal deliveries in health facilities in 2021 were analyzed. The women's ages ranged from 18 to 36 years; 15.8% had never attended school, and nearly one-quarter (24.4%) were multiparous. Among them, 14.3% reported complications during their current pregnancy, and 7.1% had experienced a previous stillbirth. Over half (56.2%) were assisted by nurses during delivery, and 70% gave birth in public hospitals. Most deliveries (85.6%) occurred in CEmONC facilities, and more than four in five women delivered in facilities implementing the Maternity Incentive Scheme.

Deliveries Meeting the Standards of Care: Table 3 presents the weighted proportion of deliveries meeting each of the eight standards of care. Among these, Standard 3: Functional Referral System was met in 92.0% of deliveries, representing the highest adherence. In contrast, Standard 7: Competent and Motivated Human Resources showed the lowest compliance, being fulfilled in only 52.4% of deliveries.

Table 3: Weighted proportions (95% CI) of deliveries meeting all indicators under each standard of care among women observed and interviewed, Nepal Health Facility Survey 2021

Standards	Percent	95% CI
Standard 1. Evidence-based practices	67.6	[66.3, 68.9]
Standard 2. Actionable health information systems	65.3	[63.0, 67.5]
Standard 3. Functional referral systems	92.1	[90.0, 94.2]
Standard 4. Effective communication	76.5	[74.6, 78.3]
Standard 5. Respect and preservation of dignity	81.8	[80.5, 83.0]
Standard 6. Emotional support	85.1	[83.1, 87.1]
Standard 7. Competent, motivated human resources	52.4	[50.5, 54.3]
Standard 8. Essential physical resources	85.9	[84.4, 87.5]
Total number of women	320	

Women's satisfaction with normal delivery care services

As reported in Table 4, overall, 46.0% of women were very satisfied, 37.9% were fairly satisfied, and 12.2% were neutral; fewer than 5% reported dissatisfaction. The highest satisfaction was observed for waiting time (55.4%), provider skill (54.8%), and provider politeness (49.3%). Moderate satisfaction levels were noted for care quality, cleanliness, and privacy, with approximately 40% of women fairly satisfied in these domains. Higher satisfaction was more frequently reported among younger women and those with previous stillbirths or complications during the current pregnancy.

Table 4: Percentage distribution of women by satisfaction with individual indicators and overall average satisfaction, Nepal Health Facility Survey 2021

Indicators of satisfaction	Very satisfied	Fairly satisfied	Neutral	Fairly dissatisfied	Very dissatisfied	Total
Waiting time	55.4	27.9	13.5	2.5	0.7	100
Information provided by the provider	43.0	39.2	13.9	2.6	1.3	100
Skill of the provider	54.8	34.9	9.7	0.5	0.1	100
Politeness of provider	49.3	38.6	8.8	2.6	0.7	100
Cleanliness of the health facility	37.3	40.6	12.5	6.5	3.1	100
Level of privacy	37.2	41.0	17.4	3.8	0.6	100
Care received	44.9	43.0	9.8	0.7	1.6	100
Average of seven satisfaction indicators	46.0	37.9	12.2	2.7	1.2	100
Total number of women	320					

Factors associated with women's satisfaction with delivery care services

Bivariate logistic regression identified seven standards of care and one contextual variable significantly associated with women's satisfaction. Five factors—being attended by a provider when calling for support, experiencing caring behavior from providers, adequate audio-visual privacy, delivery in facilities with delivery care guidelines, and display of health statistics—were positively associated with higher satisfaction levels. In contrast, availability of maternity waiting rooms, presence of information materials, and delivery in facilities implementing the Maternity Incentive Scheme were associated with lower satisfaction.

In the multivariate logistic regression model, all variables except delivery care guidelines remained significant. The effects of the Maternity Incentive Scheme and display of health statistics strengthened in the adjusted model, whereas the influence of maternity waiting rooms diminished.

Table 5: (Weighted) bivariate and multivariate logistic regression for assessing standards of care and contextual factors associated with women's satisfaction with normal delivery services [7, 14].

Independent variables: deliveries meeting the following criteria at health facilities	Bivariate logistic regression				Multivariate logistic regression			
	OR	95% CI for OR		p-value	AOR	95% CI for AOR		p-value
		Lower	Upper			Lower	Upper	
Health facility that implemented the Maternity Incentive Scheme	0.34	0.18	0.65	0.0010**	0.27	0.13	0.55	0.0004*
Standards of care variables								
Health facility with any delivery care guidelines	2.07	1.12	3.84	0.0210*	1.97	0.98	3.96	0.0575
Health facility that displayed health statistics	2.15	1.37	3.38	0.0010*	3.16	1.87	5.33	<0.0001*
Health facility with at least one unit of information materials on maternal care	0.54	0.33	0.86	0.0100*	0.57	0.33	0.97	0.0393*
Health facility with a maternity waiting room	0.36	0.16	0.82	0.0140*	0.35	0.15	0.82	0.0156*
Woman experienced caring and appropriate behavior from the provider	2.67	1.19	5.99	0.0170*	2.59	1.06	6.30	0.0359*
Woman felt comfortable with visual and auditory privacy	2.41	1.28	4.55	0.0070**	2.13	1.04	4.38	0.0399*
Woman was attended to by a provider when she called	8.13	2.04	32.35	0.0030**	5.29	1.18	23.64	0.0292*

OR: odds ratio; AOR: adjusted odds ratio: CI: confidence interval.

Discussion

Health facility readiness to provide quality normal delivery services in Nepal remains limited, with fewer than half of facilities meeting key readiness criteria in 2021—showing only modest progress since 2015. Although most facilities had essential medicines and equipment, critical gaps persisted in delivery care guidelines, provider training, and supply of key obstetric drugs such as magnesium sulfate and tetracycline. Similar readiness challenges have been observed in Nigeria, Ethiopia, and Tanzania, where weak procurement systems and workforce shortages constrain obstetric service delivery [15-17]. Nepal's electronic logistics management information system has yet to overcome fragmented supply chains and capacity gaps, particularly at subnational levels. Readiness levels were comparable between public and private facilities, although private facilities tended to have better supplies and equipment while public facilities benefited from more staff training [18]. Functionality of BEmONC and CEmONC services remains a critical weakness. Between 2015 and 2021, BEmONC functionality declined while CEmONC capacity improved slightly, mainly in cesarean delivery, anticonvulsant use, and blood transfusion. COVID-19 pandemic-related disruptions likely contributed to these declines [19, 20]. In 2021, only 2.2% of BEmONC and 27.9% of CEmONC facilities in Nepal performed all required signal functions—levels comparable to Ghana but lower than many LMICs [21, 22]. Assisted vaginal delivery and anticonvulsant use were consistently weak, paralleling global trends of skill attrition and overreliance on cesarean delivery, which in Nepal nearly doubled from 9.9% in 2016 to 18.2% in 2022. Women's growing preference for hospital-based births—over 90% of normal deliveries in 2021 in Nepal—reflects perceived safety but also suggests bypassing of lower-level facilities due to limited readiness and trust across LMICs [23, 24]. Strengthening BEmONC functionality through regular training, improved supervision, and reliable supply chains is therefore essential to ensure equitable access to quality care.

Compliance with standards of normal delivery care varied widely, with routine practices like uterotonic administration and newborn care consistently performed, while structural indicators such as guideline availability, feedback systems, and infection control remained weak. Respectful and supportive care were major strengths—81.8% of women reported being treated respectfully and 85.1% supported emotionally, higher than in India and Ethiopia [25]. Women's satisfaction was most influenced by interpersonal aspects—caring provider behavior and privacy during labor—consistent with findings from Iraq and other LMICs [26, 27]. In contrast, poorly implemented facility amenities such as maternity waiting rooms and low-quality information materials reduced satisfaction. The Maternity Incentive Scheme, designed to address financial barriers and improve access, was paradoxically associated with lower satisfaction due to delayed payments and weak communication, echoing similar challenges in conditional cash transfer programs in Bangladesh and Kenya [28, 29]. Overall, improving interpersonal care, reinforcing provider accountability, and ensuring consistent functionality of lower-level facilities are essential for achieving equitable, respectful, and high-quality maternal care in Nepal.

Implications for Policy, Practice, and Research

Nepal's policy environment for improving quality of care (QoC) during normal deliveries is evolving but constrained by systemic gaps. The accreditation system for quality assurance remains incomplete, local governments face shortages of skilled human resources and weak accountability, and monitoring systems for basic healthcare services are yet to be implemented. Despite uniform service standards, readiness and capacity vary widely across facility types—private facilities often possess better infrastructure but lack trained staff and standard delivery protocols. Strengthening collaboration between public and private sectors, particularly through programs such as the Aama, could help align quality and access. Federalization has improved local ownership but introduced overlaps and delays in decision-making. To sustain maternal and newborn health gains, local governments must prioritize human resource planning, budgeting, and supervision, while the federal government should retain a strategic, regulatory, and coordinating role to ensure coherence across all tiers of government.

Although monitoring systems such as the Nepal Health Facility Survey (NHFS) conducted every five years and the semi-annual Minimum Service Standard (MSS) assessments have enhanced evidence-based planning, existing routine platforms like the Health Management Information System and Logistics Management Information System still lack comprehensive QoC indicators. Developing an integrated data system that routinely captures service readiness, process of care, and client experience—including in private facilities—is essential. Functional BEmONC/CEmONC facilities should be prioritized, ensuring 24/7 availability of skilled birth attendants, essential supplies, and respectful care. Expansion of birthing centers must consider local demand, service continuity, and referral linkages. Because women in many LMICs, including Nepal, often report high satisfaction despite poor service quality, QoC assessments should incorporate provider competence, adherence to standards, and facility readiness alongside satisfaction data. Local mentoring systems to enhance provider skills and accountability could further strengthen quality improvement. Improving the Maternity Incentive Scheme through timely disbursement, adequate supplies, and better communication can increase trust and utilization of peripheral facilities. Rationalizing the distribution of birthing centers, reducing hospital overcrowding, and enhancing community awareness of free maternal services are also critical. Finally, the discontinuation of United States Agency for International Development (USAID) supported health facility surveys has created a data gap in tracking service readiness and QoC—an issue mirrored in other LMICs following USAID closure. Sustaining routine national assessments through domestic financing and alternative donor support is vital to preserve evidence-based policy and continuous quality improvement.

Strengths and Limitations

This study analyzed data from two nationally representative NHFS 2015 and 2021 conducted under the Demographic and Health Program to assess the quality of normal deliveries in Nepal's health facilities. A conceptual framework led approach was used to comprehensively assess quality of delivery care service for readiness, EmONC functionality, adherence to standards, and women's satisfaction with delivery services across public and private facilities. All analysis used WHO recommended indicators making the analysis comparable with other LMICs. Data were collected using standardized, validated tools through

interviews and direct observations by trained medical professionals, ensuring methodological rigor and comparability with other LMICs. However, several limitations exist. The NHFS was not specifically designed for this analysis, resulting in missing variables and limited observation periods that may have overrepresented larger hospitals. Private facilities were underrepresented, and all analyses were not disaggregated by managing authority. Stock data was influenced by the 2015 earthquake and COVID-19 pandemic. Additionally, information on general amenities, comprehensive newborn care, and population coverage of BEmONC/CEmONC facilities was unavailable. Despite these limitations, the study provides robust, nationally representative evidence on the quality of delivery care in health facilities in Nepal.

Conclusion

Nepal is making steady progress toward achieving SDG 3.1 on reducing maternal mortality, marked by a substantial rise in facility-based deliveries—reaching 79.4% in 2022—and a decline in the maternal mortality ratio to 151 per 100,000 live births in 2021. Yet, the increasing proportion of maternal deaths occurring during delivery and the postpartum period highlights persistent gaps in the quality of obstetric care. To meet the SDG 3.1 target, Nepal must sustain an annual 6% reduction in maternal mortality through 2030—an ambitious but attainable goal if quality of care becomes the central focus of maternal health strategies. Strengthening both structural and process dimensions of care is essential, including ensuring uninterrupted availability of essential medicines and equipment, equitable distribution and retention of skilled health workers, and institutionalized accountability for adherence to clinical standards. Nepal's federal governance system offers a critical opportunity for municipalities to lead localized quality improvement initiatives, supported by coordinated technical and financial backing from provincial and federal levels. Achieving equitable, respectful, and high-quality delivery care will be pivotal not only for sustaining maternal mortality reduction but also for reinforcing public trust and resilience within Nepal's evolving health system—offering valuable lessons for other LMICs seeking to transform increased service utilization into improved health outcomes.

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Author Contributions

S.T. conceptualized, designed, and conducted this study, building on her PhD thesis and related publications from the research project.

Disclosure Statement

The author used ChatGPT (OpenAI, San Francisco, CA, USA) solely for grammar checking and language refinement. The content, data interpretation, and conclusions presented in this paper are entirely the author's own.

Ethics and Consent

This study was conducted as part of a PhD research project approved by the Ethical Review Committee of the Nepal Health Research Council (NHRC) in May 2021 and the Ethics Commission of Ludwig Maximilian University of Munich, Germany, in June 2021. Both the NHFS 2015 and NHFS 2021 surveys received ethical clearance from the NHRC Ethical Review Committee. Written consent was obtained from facility authorities, and oral consent was obtained from all participating providers and clients or their next of kin before participation.

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Paper Context

Improving the quality of delivery care is essential for reducing maternal deaths. This study links facility readiness, emergency obstetric and neonatal care functionality, and adherence to standards of quality care with women's satisfaction, providing a comprehensive understanding of quality-of-care determinants in Nepal. Although facility readiness for normal deliveries improved modestly from 2015 to 2021, major gaps persist in delivery care guidelines, basic emergency obstetric and newborn care functionality, and compliance with care standards. The findings underscore the need for targeted investments to strengthen basic emergency obstetric and neonatal care functionality, provider competence, and respectful care to accelerate maternal mortality reduction and guide maternal health policy in Nepal and similar low- and middle-income countries.

Data Availability

Data used in this study were obtained from the Nepal Health Facility Surveys (NHFS) 2015 and 2021, publicly available at https://dhsprogram.com/Data/.

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