

Maternity Care Service Quality, Women's Satisfaction, and Associated Factors in Public Hospitals in Sana'a City, Yemen

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Abstract

Background

Maternal satisfaction is an important indicator of maternity care quality and influences healthcare utilization and maternal and newborn outcomes. Evidence from conflict-affected settings such as Yemen remains limited. The aim of this study is to assess quality of maternity care service, women's satisfaction, and identify factors associated with satisfaction in public hospitals in Sana'a City, Yemen.

Methods

A facility-based cross-sectional study was conducted among 232 postnatal women in three public hospitals. A stratified proportional allocation approach followed by consecutive sampling was used to recruit participants. Data were collected through face-to-face interviews using a structured questionnaire incorporating modified/adapted service quality (SERVQUAL) scale. Data were analyzed using IBM SPSS. Univariable and multivariable logistic regression analyses were performed to identify factors associated with women's satisfaction. Crude odds ratios (CORs) and adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated, and statistical significance was considered at $p < 0.05$.

Results

Overall perceived maternity care quality was moderate, with empathy receiving the highest rating among the SERVQUAL dimensions. Caesarean delivery (AOR = 4.00, 95% CI: 2.01–7.93) and attendance at antenatal care (ANC) education (AOR = 3.39, 95% CI: 1.64–7.03) were independently associated with higher satisfaction. In addition, women with a live normal newborn outcome were more likely to report higher satisfaction compared with those experiencing adverse newborn outcomes (AOR = 2.37, 95% CI: 1.03–5.44). Provision of a birth plan was also, independently associated with higher satisfaction (AOR = 2.74, 95% CI: 1.23–6.09).

Conclusion

Caesarean delivery, attendance ANC education, women with a live normal newborn outcome and provision of a birth plan were independently associated with higher satisfaction. Strengthening ANC education, promoting birth preparedness, improving provider responsiveness, and enhancing childbirth care may improve maternal satisfaction and the quality of maternity services in Yemen.

Introduction

Women's health is a key public health priority, with direct implications for maternal and neonatal outcomes, family wellbeing,

and community development. Despite global progress, maternal mortality remains high. According to the World Health Organization (WHO), an estimated 260,000 women died from pregnancy- and childbirth-related causes worldwide in 2023 [1], with about 800 preventable deaths occurring daily [2]. Nearly 99% of these deaths occur in low- and middle-income countries, reflecting persistent inequities in access to quality maternal healthcare [1]. Although maternal mortality declined by 34% between 2000 and 2020, substantial disparities remain, particularly in Sub-Saharan Africa and South Asia, which account for most global maternal deaths [3]. These inequalities highlight the importance of not only improving access to maternal health services but also ensuring high-quality, woman-centered care across antenatal, intrapartum, and postnatal periods.

Women's satisfaction with maternity care is an important indicator of service quality. It reflects women's experiences and perceptions of care and is strongly associated with service utilization, adherence to medical advice, and improved maternal and neonatal outcomes [4]. Satisfaction is influenced by multiple factors, including provider communication, respect and dignity, waiting time, pain management, and continuity of care. Dissatisfaction may discourage future facility-based deliveries and reduce engagement with maternal health services.

The ANC period is critical, offering opportunities for essential maternal health interventions. WHO recommends woman-centered and respectful intranatal care (INC) that addresses women's physical, psychological, emotional, and social needs while maintaining dignity, privacy, confidentiality, informed choice, and effective communication [5]. Additionally, postnatal care (PNC) is equally important because the first six weeks after birth are a critical period for detecting complications, supporting maternal recovery and well-being, promoting breastfeeding, and providing health education and reproductive health services. WHO recommends person-centered PNC that provides women and newborns with timely information, reassurance, support, and appropriate clinical care [6]. In conflict-affected and fragile settings, these challenges are intensified. Yemen remains one of the most vulnerable countries, with an estimated maternal mortality ratio of 365 per 100,000 live births and a neonatal mortality rate of 37 deaths per 1,000 live births annually [7]. Health system constraints, shortages of essential supplies, financial barriers, and ongoing conflict continue to limit access to quality maternal healthcare services [7]. Despite this burden, evidence on women's satisfaction with maternity care services in Yemen, particularly in public hospitals in Sana'a City, remains limited. Understanding women's experiences is essential for improving service quality and responsiveness.

The findings are expected to inform policymakers and healthcare providers in strengthening maternal healthcare quality in resource-limited and conflict-affected settings. Therefore, this study aimed to assess the quality of maternity care service, women's satisfaction, and identify factors associated with satisfaction in public hospitals in Sana'a City, Yemen.

Methods

Study design and setting

A facility-based cross-sectional study was conducted from January to March 2025 in three public hospitals in Sana'a City, Yemen: Al-Thowrah Hospital, Al-Jomhury Hospital, and Al-Kuwait Hospital. One additional public hospital was invited to participate but declined and no participant refusals reported.

Study population and eligibility criteria

The study population comprised postnatal women admitted to the postnatal wards of the participating public hospitals who had delivered during the study period. All mothers who received maternity care services during their hospital stay were included, those who were critically ill and not agree to participate in the study were excluded.

Sample size and sampling procedure

The sample size was calculated using Epi Info version 7.2 StatCalc. The source population consisted of 3,697 deliveries recorded across the three participating hospitals between October and December 2024. Assuming an expected maternal satisfaction level of 80% based on a previous study [4], a 95% CI, and a 5% margin of error, the minimum required sample size was estimated to be 232 women.

A stratified proportional allocation approach followed by consecutive recruitment was used. The study population was stratified according to the participating hospitals, and the required sample size was proportionally allocated based on the number of deliveries in each hospital. Specifically, the study population was divided into strata according to the hospital of delivery, and the sample size for each hospital was determined in proportion to its delivery volume.

The total number of deliveries recorded across the three selected hospitals between October and December 2024 was 3,697. The sample size for each hospital was calculated using proportional allocation according to the following formula: $\text{Sample for each hospital} = (\text{Number of deliveries in the hospital} / \text{Total number of deliveries}) \times \text{Total sample size}$. This approach ensured proportional representation of women from each participating hospital. Following institutional approval, eligible postnatal women were recruited consecutively from each hospital until the allocated sample size was achieved. Consecutive sampling was selected because a complete sampling frame was unavailable during the study period.

Study variables

Dependent variable: Maternal satisfaction with maternity care service.

Independent variables:

- Socio-demographic variables: age, residence, occupation, educational level, and monthly household income.

- Obstetric variables: parity, number of living children, pregnancy intention, mode of delivery, duration of labour, newborn outcomes, waiting time to receive care from HCPs, ANC attendance, participation in ANC education sessions, and provision of a birth plan.

Operational definitions

- Postnatal woman: refers to a woman within six weeks after childbirth.
- Satisfaction: Those who reported being satisfied with greater or equal to 75% of items were categorized as satisfied, while those who were satisfied in less than 75% of the items were categorized as unsatisfied
- Maternity care services: refers to the healthcare services provided to women during pregnancy, childbirth, and the postnatal period.
- Quality of care: refers to the scope of health care services delivered with evidence-based practices for patients and people. The care provided must be characterized by safety, effectiveness, well-timed, well-organized, reasonable, and people-centered approach.
- Healthcare providers (HCPs): refer to physicians, midwives, and nurses who are professionally qualified to provide maternity care and manage or refer obstetric complications.
- SERVQUAL dimensions of maternity care service:
 - Tangibility: (Materiality) the appearance of physical facilities, equipment, cleanliness, availability of materials, and availability of adequate facilities.
 - Reliability: ability to provide promised services accurately and consistently.
 - Responsiveness: willingness of HCPs to provide prompt and appropriate care.
 - Assurance: competence, safety, trust, respect, and confidence in providers.
 - Empathy: (care, accessibility of services) a willingness to individualized attention, communication, support, and understanding of women's needs.

Data collection

Data were collected through face-to-face interviews using a structured questionnaire developed for the present study based on previously published and validated instruments and relevant literature [4, 8–13]. The questionnaire was adapted to the local maternity care context and the objectives of the study. The complete English-language version of the questionnaire is provided as Supplementary File 1.

The questionnaire consisted of three sections. The first section assessed sociodemographic characteristics, including age, place of residence, educational level, occupation, and monthly household income in Yemeni Rials (YRs). The second section assessed obstetric characteristics. Information was obtained through participant interviews and, where applicable, verified using maternal medical records. Variables included parity, number of living children, pregnancy intention, mode of delivery, duration of

labour, newborn outcome, waiting time to receive care from HCPs, ANC attendance, participation in ANC education sessions, and provision of a birth plan.

The third section assessed women's perceived quality of and satisfaction with maternity care services using a modified/adapted maternity SERVQUAL scale [11, 13–15]. The scale was adapted from previously published applications of SERVQUAL and maternity-care service quality instruments to reflect the context of maternity care and the objectives of the present study. The SERVQUAL framework comprises five dimensions of service quality: tangibility, reliability, responsiveness, assurance, and empathy. Tangibility refers to the physical aspects of care, including equipment, cleanliness, availability of supplies, and adequacy of facilities for maternal and newborn care. Reliability reflects the ability of healthcare providers to provide accurate, dependable, and consistent care. Responsiveness refers to the willingness and promptness of healthcare providers in addressing women's needs. Assurance encompasses provider competence, safety, respect, trust, and confidence in the care provided. Empathy refers to individualized attention, effective communication, emotional support, and understanding of women's needs. Responses were measured using a five-point Likert scale ranging from 1 (fully dissatisfied) to 5 (fully satisfied).

Data quality assurance

Several measures were undertaken to ensure the quality and consistency of the data. Field supervisors reviewed completed questionnaires daily for completeness and internal consistency. Any identified errors or missing information were addressed promptly with the respective data collectors.

The questionnaire was initially prepared in English, translated into Arabic, and independently back-translated into English to assess conceptual and semantic equivalence between the two versions. Content validity was assessed by experts in public health and obstetrics and gynecology, who reviewed the questionnaire for relevance, clarity, and appropriateness of the items to the maternity care context.

Before the main data collection, a pilot study was conducted among approximately 10% of the calculated sample size to assess the clarity, comprehensibility, and feasibility of the questionnaire. Participants included in the pilot study were excluded from the final study analysis. The internal consistency of the women's satisfaction scale was assessed using Cronbach's alpha. The scale demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.864.

Data analysis

Data were entered and analyzed using IBM SPSS Statistics version 27. Descriptive statistics were used to summarize participant characteristics. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviation (SD). There were no missing data for any study variables; therefore, all 232 women were included in the analyses.

Women's satisfaction with maternity care services was assessed using a composite satisfaction index derived from the mean scores of all-satisfaction items across the five SERVQUAL dimensions: tangibility, reliability, responsiveness, assurance, and empathy. Each item was rated on a five-point Likert scale ranging from 1 (fully dissatisfied) to 5 (fully satisfied).

The perceived quality of maternity care services was assessed by calculating the mean score for each SERVQUAL dimension using a five-point Likert scale. Mean scores and SD were computed for each SERVQUAL dimension. To facilitate interpretation, the mean scores were classified into three equal intervals based on the scale range using the formula: interval width = (highest score – lowest score)/number of categories = $(5 - 1)/3 = 1.33$ [16]. Accordingly, mean scores were interpreted as low (1.00–2.33), moderate (2.34–3.66), and high (3.67–5.00).

The service quality gap was calculated as the difference between the mean perceived quality score and the maximum possible score on the five-point Likert scale (mean score – 5) [14]. Values closer to zero indicated perceived quality closer to the highest possible rating. The satisfaction percentage for each SERVQUAL dimension was calculated using the following formula: Dimension satisfaction (%) = $(\text{Mean dimension score} \div 5) \times 100$.

The level of women's satisfaction category (Low/high) with maternity care services was calculated by averaging responses across all satisfaction items for each participant. Participants with an overall satisfaction score $\geq 75\%$ of the maximum possible score were classified as having high satisfaction level, whereas those scoring $< 75\%$ were classified as having low satisfaction level [17–19].

The Kruskal–Wallis H test was used to compare women's satisfaction scores with maternity care services across hospitals because the data were not normally distributed.

Univariable logistic regression analysis was initially performed to examine the association between each independent variable and women's satisfaction. CORs with 95% CIs were calculated. Variables with a p -value < 0.20 in the univariable analysis were entered into the multivariable logistic regression model using the enter method to identify factors independently associated with women's satisfaction. AORs with 95% CIs were reported. Before fitting the multivariable model, multicollinearity among the independent variables was assessed using tolerance values and variance inflation factors (VIFs). No evidence of multicollinearity was observed, as all tolerance values were greater than 0.20 (lowest tolerance value = 0.610) and all VIF values were below 5 (highest VIF = 1.639). The goodness-of-fit of the final model was evaluated using the Hosmer–Lemeshow goodness-of-fit test, and the model's explanatory power was assessed using Nagelkerke's R^2 statistic.

The adequacy of the sample size for multivariable logistic regression was assessed using the events-per-variable (EPV) criterion. The final model included nine predictor variables and 113 outcome events (women with high satisfaction), yielding an EPV of 12.6, which exceeded the commonly recommended minimum of 10 events per variable, indicating an acceptable risk of overfitting. Statistical significance was set at $p < 0.05$ for all analyses.

Results

Socio-demographic and obstetric characteristics

A total of 232 postnatal women participated in the study (mean $\pm$ SD age: 27.2 $\pm$ 6.1 years). Nearly half (47.4%) were aged 16–25 years, 66.4% lived in urban areas, 78.5% had formal education, and 94.0% were housewives. Most participants (65.1%) reported a monthly household income of $\leq$ 30,000 YRs. Overall, 75.4% were multiparous, 81.5% had four or fewer living children, and 80.2% reported an unintended pregnancy. Most women waited < 30 minutes to receive care (84.5%), delivered vaginally (54.3%), had a normal live birth (77.6%), had a labour duration of $\leq$ 1.5 hours (52.2%), and attended antenatal care (93.1%). Approximately half (51.7%) attended ANC education sessions, while only 34.5% reported receiving a birth plan during ANC (Table 1).

Table 1
Socio-demographic and obstetric characteristics of postnatal women attending public hospitals in Sana'a City, Yemen.

Characteristics	Category	n (%)
Age (years)	16–25	110 (47.4)
	26–35	98 (42.2)
	36–44	24 (10.3)
Place of residence	Urban	154 (66.4)
	Rural	78 (33.6)
Educational level	Uneducated	50 (21.5)
	Educated	182 (78.5)
Occupation	Employed	14 (6.0)
	Housewife	218 (94.0)
Monthly household income (YRs)	≤ 30,000	151 (65.1)
	> 30,000	81 (34.9)
Parity	Primipara	57 (24.6)
	Multipara	175 (75.4)
Number of living children	≤ 4	189 (81.5)
	> 4	43 (18.5)
Pregnancy intention	Wanted	46 (19.8)
	Unwanted	186 (80.2)
Waiting time to receive care from HCPs	< 30 minutes	196 (84.5)
	≥ 30 minutes	36 (15.5)
Mode of delivery	Vaginal	126 (54.3)
	Caesarean	106 (45.7)
Duration of labour	≤ 1.5 hours	121 (52.2)
	> 1.5 hours	111 (47.8)
Newborn outcome	Normal live birth	180 (77.6)
	Complication or death	52 (22.4)
ANC follow-up	Yes	216 (93.1)

Characteristics	Category	n (%)
	No	16 (6.9)
Attendance at ANC education sessions	Yes	120 (51.7)
	No	112 (48.3)
Provision of a birth plan	Yes	80 (34.5)
	No	152 (65.5)

ANC, antenatal care; HCPs, healthcare providers; YRs, Yemeni Rials.

SERVQUAL dimensions, women's perceived quality and satisfaction

Table 2 summarizes women's perceived quality and satisfaction with maternity care services across the adapted SERVQUAL dimensions. The overall mean perceived quality score was 2.97 ± 0.69 (59.4%), indicating a moderate level of perceived service quality. Among the five SERVQUAL dimensions, empathy had the highest mean score (3.56 ± 0.64), followed by responsiveness (3.39 ± 0.74), reliability (3.19 ± 0.78), and assurance (2.79 ± 0.58), all of which were classified as moderate quality. Tangibility had the lowest mean score (1.93 ± 0.71) and was classified as low quality.

Compared with the maximum possible score of 5.0, all SERVQUAL dimensions had negative gaps, indicating that perceived quality fell below the highest attainable rating. The largest gap was observed for tangibility (-3.07), whereas the smallest gap was observed for empathy (-1.44), suggesting that empathy was perceived as the dimension closest to the maximum possible level of service quality.

Table 2

Women's perceived quality and satisfaction of maternity care services across adapted SERVQUAL dimensions.

Dimensions	Perceived quality (Mean $\pm$ SD)	Quality category [¶]	Dimensions Satisfaction ^{¶¶} (%)	Difference from maximum score ^{***}
Tangibility	1.93 ± 0.71	Low	38.6	-3.07
Reliability	3.19 ± 0.78	Moderate	63.4	-1.81
Responsiveness	3.39 ± 0.74	Moderate	67.8	-1.61
Assurance	2.79 ± 0.58	Moderate	55.9	-2.21
Empathy	3.56 ± 0.64	Moderate	71.2	-1.44
Overall	2.97 ± 0.69	Moderate	59.4	-2.03

** Perceived quality was categorized based on the mean score as low (1.00–2.33), moderate (2.34–3.66), and high (3.67–5.00). ^{***}Dimension satisfaction (%) = (Mean dimension score ÷ 5) × 100. ^{***}Difference from maximum possible score = Mean perceived quality score – 5 (maximum value on the five-point Likert scale). Values closer to zero indicate perceived quality closer to the highest attainable rating.*

Women’s satisfaction scores with maternity care services across hospitals

A Kruskal–Wallis H test showed a statistically significant difference in women’s satisfaction scores with maternity care services among the three public hospitals (H = 8.807, p = 0.012) (Table 3). Pairwise post hoc comparisons with a multiple-comparison adjustment showed a statistically significant difference between Al-Thowrah and Al-Jomhury hospitals (p = 0.003), whereas the remaining pairwise comparisons were not statistically significant.

Table 3
Comparison women’s satisfaction scores with maternity care services across hospitals

Hospital	n	Mean Rank	H*	p-value
Al-Thowrah	76	99.43	8.807	0.012
Al-Jomhury	132	127.56		
Al-Kuwait	24	109.69		

Values were compared using the Kruskal-Wallis H test*

Univariable logistic regression analysis

Univariable regression analysis identified several variables associated with level of women’s satisfaction with maternity care services (Table 4). Women who delivered by caesarean had significantly higher odds of reporting high satisfaction than those who had a vaginal delivery (COR = 6.09). Higher satisfaction was also associated with formal education (COR = 2.72), a normal live birth (COR = 2.63), having four or fewer children (COR = 2.28), a wanted pregnancy (COR = 2.07), attendance at ANC education sessions (COR = 6.68), and provision of a birth plan (COR = 5.17).

Table 4

Univariable logistic regression analysis of factors associated with women satisfaction with maternity care services among postnatal women attending public hospitals, Sana'a City, Yemen.

Variable	Low satisfaction n (%)	High satisfaction n (%)	COR (95% CI)	p-value
Age (years)				
16–25	52 (43.7)	58 (51.3)	2.23 (0.88–5.64)	0.090
26–35	51 (42.9)	47 (41.6)	1.84 (0.72–4.70)	0.201
36–44	16 (13.4)	8 (7.1)	Ref.	---
Place of residence				
Urban	73 (61.3)	81 (71.7)	Ref.	---
Rural	46 (38.7)	32 (28.3)	1.59 (0.92–2.77)	0.097
Educational level				
Educated	84 (70.6)	98 (86.7)	2.72 (1.39–5.33)	0.003
Uneducated	35 (29.4)	15 (13.3)	Ref.	---
Occupation				
Employee	6 (5.0)	8 (7.1)	1.44 (0.48–4.27)	0.517
Housewife	113 (95.0)	105 (92.9)	Ref.	---
Monthly household income				
≤ 30,000 YRs	80 (67.2)	71 (62.8)	Ref.	---
> 30,000 YRs	39 (32.8)	42 (37.2)	1.21 (0.71–2.08)	0.483
Parity				
Primipara	27 (22.7)	30 (26.5)	1.43 (0.68–2.24)	0.495
Multipara	92 (77.3)	83 (73.5)	Ref.	---
Mode of delivery				
Vaginal	89 (74.8)	37 (32.7)	Ref.	---
Caesarean	30 (25.2)	76 (67.3)	6.09 (3.44–10.78)	< 0.001
Duration of labour				
≤ 1.5 hours	61 (51.3)	60 (53.1)	1.08 (0.64–1.80)	0.780
> 1.5 hours	58 (48.7)	53 (46.9)	Ref.	---

Variable	Low satisfaction n (%)	High satisfaction n (%)	COR (95% CI)	p-value
Age (years)				
Newborn outcome				
Normal live birth	83 (69.7)	97 (85.8)	2.63 (1.36–5.08)	0.004
Complication or death	36 (30.3)	16 (14.2)	Ref.	---
Number of living children				
≤ 4	90 (75.6)	99 (87.6)	2.28 (1.13–4.58)	0.021
> 4	29 (24.4)	14 (12.4)	Ref.	---
Pregnancy intention				
Wanted	17 (14.3)	29 (25.7)	2.07 (1.07–4.03)	0.023
Unwanted	102 (85.7)	84 (74.3)	Ref.	---
Waiting time to receive care from HCPs				
< 30 minutes	96 (80.7)	100 (88.5)	1.84 (0.88–3.85)	0.103
≥ 30 minutes	23 (19.3)	13 (11.5)	Ref.	---
ANC follow-up				
Yes	113 (95.0)	103 (91.2)	1.83 (0.64–5.21)	0.258
No	6 (5.0)	10 (8.8)	Ref.	---
Attendance at ANC education sessions				
Yes	36 (30.3)	84 (74.3)	6.68 (3.76–11.87)	< 0.001
No	83 (69.7)	29 (25.7)	Ref.	---
Provision of a birth plan				
Yes	16 (13.4)	64 (56.6)	8.41 (4.41–16.02)	< 0.001
No	103 (86.6)	49 (43.4)	Ref.	---

COR, crude odds ratio; CI, confidence interval; Ref., reference category; Women's Satisfaction score ≥ 75% was classified as high satisfaction, and < 75% low satisfaction; $p < 0.05$.

Multivariable logistic regression analysis

The overall multivariable logistic regression model was statistically significant (Omnibus test: $\chi^2 = 91.926$, $p < 0.001$). The model explained 43.6% of the variance in women's satisfaction (Nagelkerke $R^2 =$

0.436) and demonstrated good model fit (Hosmer–Lemeshow test: $\chi^2 = 7.451$, $p = 0.489$). Overall, the model correctly classified 75.9% of participants. The final multivariable logistic regression model demonstrated good discriminative ability, with an area under the receiver operating characteristic curve (AUC) of 0.838 (95% CI: 0.787–0.889), indicating excellent ability of the model to distinguish between women with high and low satisfaction with maternity care services.

After adjustment for potential confounders, mode of delivery, newborn outcomes, attendance at ANC education sessions, and provision of a birth plan remained independently associated with women's satisfaction with maternity care services. Women who underwent caesarean delivery had approximately four times higher odds of reporting satisfaction than those who had vaginal delivery (AOR = 4.00). Women who attended ANC education sessions were more than three times as likely to report satisfaction compared with those who did not attend (AOR = 3.39). Likewise, women who had a normal live birth had higher odds of satisfaction than those whose newborn experienced complications or died (AOR = 2.37). Provision of a birth plan was also independently associated with greater satisfaction (AOR = 2.74). No statistically significant associations were observed for residence, education, number of living children, pregnancy intention, or waiting time to receive care after adjustment (all $p > 0.05$) (Table 5).

Table 5

Multivariable logistic regression analysis of factors associated with women satisfaction with maternity care services among postnatal women attending public hospitals, Sana'a City, Yemen

Variable	Category	AOR (95% CI)	p-value
Place of residence	Urban	Ref.	—
	Rural	1.13 (0.55–2.33)	0.748
Educational level	Uneducated	Ref.	—
	Educated	1.46 (0.56–3.75)	0.438
Mode of delivery	Vaginal	Ref.	—
	Caesarean	4.00 (2.01–7.93)	< 0.001
Newborn outcome	Complication/death	Ref.	—
	Normal live birth	2.37 (1.03–5.44)	0.042
Number of living children	> 4	Ref.	—
	≤ 4	1.55 (0.61–3.95)	0.359
Pregnancy intention	Unwanted	Ref.	—
	Wanted	1.88 (0.83–4.24)	0.130
Waiting time to receive care	≥ 30 minutes	Ref.	—
	< 30 minutes	1.14 (0.46–2.84)	0.774
Attendance at ANC education	No	Ref.	—
	Yes	3.39 (1.64–7.03)	0.001
Provision of a birth plan	No	Ref.	—
	Yes	2.74 (1.23–6.09)	0.014

AOR, adjusted odds ratio; CI, confidence interval; Ref, reference category; $p < 0.05$.

Discussion

This study assessed women's satisfaction with maternity care services and associated factors among postnatal women attending public hospitals in Sana'a City, Yemen. The findings demonstrated that women's satisfaction was associated with several factors related to maternal characteristics. Overall, maternity care services were perceived as moderate quality, with empathy, responsiveness, and reliability receiving relatively higher ratings, whereas tangibility and assurance were areas requiring further improvement.

In univariable analysis, the present study found that women's satisfaction was associated with several socio-demographic and obstetric factors. Although educational level, number of living children, and pregnancy intention were significantly associated with women's satisfaction in the univariable analysis, these associations were no longer significant after adjustment for other covariates. This suggests that their effects may be explained by confounding or interactions with other maternal and healthcare-related factors. In contrast, caesarean delivery, attendance at antenatal care education, live newborn outcome, and receipt of a birth plan remained independent predictors of women's satisfaction. Educational level was significantly associated with women's satisfaction. Education may have a complex association with maternal satisfaction. Women with formal education attainment may have better health literacy and communication abilities, but they may also have greater expectations regarding respectful care, communication, and service standards. Previous studies have reported inconsistent findings, with some studies demonstrating higher satisfaction among women with lower education levels, possibly due to lower expectations or limited awareness of available healthcare standards [20, 21]. These variations indicate that the relationship between education and satisfaction may depend on the healthcare context and women's expectations.

Several obstetric characteristics were significantly associated with maternal satisfaction, including number of living children, pregnancy intention, mode of delivery, newborn outcomes, ANC education, and provision of a birth plan. These findings indicate that women's evaluations of maternity care are influenced by both clinical outcomes and the processes involved in receiving care.

Number of living children were significantly associated with satisfaction. Women with fewer children reported higher satisfaction compared with women who has more children. Previous childbirth experience may increase familiarity with maternity services and reduce anxiety related to labour and delivery. Conversely, first-time mothers may have greater informational and emotional needs, and unmet expectations may negatively affect satisfaction. Similar findings were reported by Panth and Kafle [22], who found that multiparous women were more likely to report satisfaction with institutional delivery services compared with primiparous women. Pregnancy intention was also associated with satisfaction. In this study, women with unwanted pregnancies reported higher satisfaction levels compared with women with wanted pregnancies. Although this finding differs from some previous studies, it may reflect the influence of individual expectations and perceptions after receiving safe institutional care. Women with planned pregnancies may have had higher expectations regarding preparation, communication, and support, which may have affected their evaluation of services [22].

In the multivariable analysis, mode of delivery, newborn outcome, participation in antenatal education, and provision of a birth plan remained significant predictors of satisfaction after adjusted to another variables. Women who underwent caesarean delivery were more likely to report higher satisfaction compared with those who had vaginal delivery. This finding contrasts with some studies reporting higher satisfaction following vaginal birth due to shorter recovery and greater alignment with women's expectations [23, 24]. However, other studies have demonstrated that satisfaction after caesarean delivery may be related to perceived safety, reduced fear of prolonged labour, and effective provider

communication [25, 4]. The influence of delivery mode on satisfaction may therefore depend less on the procedure itself and more on women's experiences of communication, pain management, involvement in decisions, and the quality of support received during childbirth.

Newborn outcome was also independently associated with women's satisfaction. Women with a live and normal newborn were more likely to report higher satisfaction than those who experienced complications or adverse outcomes. The health status of the newborn is a major concern for mothers and may strongly influence their overall perception of maternity care. Similar findings have been reported in Ethiopia, where favorable maternal and neonatal outcomes were associated with increased satisfaction with delivery services [4, 26]. These findings highlight the importance of strengthening both maternal and newborn care processes to improve women's overall childbirth experiences.

Participation in antenatal education sessions was one of the strongest predictors of satisfaction. Women who attended ANC education sessions had higher satisfaction compared with those who did not. Antenatal education provides opportunities for women to receive information about pregnancy, labour, newborn care, and available services, which may improve confidence, reduce anxiety, and establish realistic expectations regarding childbirth. Previous studies have identified communication, counselling, and ANC-related factors as important determinants of maternal satisfaction [16, 27]. Despite high ANC attendance in the current study, birth preparedness activities remained limited, with only one-third of women reporting receipt of a birth plan. Women provision of a birth plan was independently associated with higher satisfaction. Strengthening ANC counselling and childbirth preparation may therefore represent an important strategy for improving maternity care experiences. This is consistent with WHO recommendations emphasizing ANC as a platform for positive pregnancy experiences through effective communication, education, and respectful care [28].

Using the adapted SERVQUAL framework, this study demonstrated that women perceived the overall quality of maternity care as moderate. Among the five SERVQUAL dimensions, empathy received the highest mean score, followed by responsiveness, reliability, and assurance, whereas tangibility received the lowest score. Although all dimensions, except tangibility, were classified as moderate, the comparatively higher rating for empathy suggests that women placed greater value on interpersonal aspects of care, including emotional support, respectful communication, and compassionate interactions with healthcare providers. These findings are consistent with previous studies showing that respectful maternity care, effective communication, and emotional support are important determinants of positive childbirth experiences and women's perceptions of service quality [9, 10].

Despite the relatively higher ratings for empathy and responsiveness, the findings indicate that important gaps remain between the quality of care received and the highest attainable level of service quality. The largest gap was observed for tangibility, suggesting deficiencies in the physical environment, availability of equipment and supplies, and the overall condition of healthcare facilities. Similar findings have been reported in SERVQUAL-based studies, where inadequacies in infrastructure and the healthcare environment were associated with lower perceived service quality and reduced patient satisfaction [13,

14]. These findings highlight the need for investments in facility infrastructure and resources, alongside continued efforts to strengthen provider–patient communication and respectful maternity care.

Improving the availability of essential supplies, maintaining clean environments, and strengthening facility readiness may therefore improve women’s perceptions of maternity care quality. Assurance was another dimension requiring improvement. Women’s confidence in healthcare providers depends on perceived competence, safety, respectful communication, and opportunities to ask questions. Previous research has highlighted that provider competency, communication, and trust are essential determinants of maternal satisfaction [29, 30]. Strategies to improve assurance should include strengthening provider communication skills, promote respectful maternity care, and encourage women’s involvement in decisions related to their care.

The findings also highlight the importance of reducing inequalities in maternity care experiences. Although some socio-demographic factors were associated with satisfaction in the univariable analysis, these associations were attenuated after adjustment. This suggests that satisfaction is influenced more strongly by direct care experiences and service-related factors than by individual characteristics alone. Improving the quality of maternity services should therefore focus on modifiable factors, including provider communication, antenatal education, timely care, and facility conditions.

Overall, this study confirms that maternal satisfaction is a multidimensional outcome influenced by clinical outcomes, healthcare processes, and interpersonal experiences. Improving maternity care in public hospitals in Sana’a requires an integrated approach that combines clinical quality improvement with patient-centered strategies. Strengthening ANC education, improving birth preparedness, enhancing respectful communication, ensuring timely responses during labour, and improving healthcare infrastructure may contribute to better childbirth experiences and greater trust in institutional maternity services.

Strengths and limitations

This study provides important evidence on women's satisfaction with maternity care services and factors associated with satisfaction in public hospitals in Sana’a City, Yemen. A key strength is the use of a modified/adapted SERVQUAL framework, which enabled assessment of multiple dimensions of maternity care service quality, including tangibility, reliability, responsiveness, assurance, and empathy. The study also incorporated both socio-demographic and obstetric characteristics, providing a broader assessment of factors associated with women's satisfaction.

Several limitations should be considered when interpreting the findings. First, the cross-sectional design limits the ability to establish temporal or causal relationships between the identified factors and women's satisfaction. Second, the study was conducted in three public hospitals in Sana’a City; therefore, the findings may not be generalizable to private health facilities or to other regions of Yemen with different healthcare resources and service-delivery contexts. Third, women's satisfaction is inherently subjective and may be influenced by cultural expectations, previous healthcare experiences,

and individual perceptions, potentially introducing measurement and response bias. Although some dimensions of care, particularly empathy and responsiveness, received relatively positive ratings, lower ratings for aspects of the physical care environment and other service-quality components indicate areas where women's expectations and experiences may not have been fully met. Finally, interviews were conducted before hospital discharge, when women were still receiving care from the facility and its healthcare providers. This timing may have increased social desirability bias and resulted in an overestimation of reported satisfaction. Nevertheless, the use of a structured questionnaire, standardized interviews, and procedures for assessing validity and reliability strengthened the quality and consistency of the data.

Conclusion

Women's satisfaction with maternity care services in public hospitals in Sana'a City was associated with mode of delivery, newborn outcomes, attendance antenatal education, and prevision of a birth plan. The overall perceived service quality was moderate. Empathy had the highest mean score, followed by responsiveness. Gaps remained in facility conditions, assurance, and other aspects of service delivery. Improving maternity care requires comprehensive interventions that strengthen respectful care, communication, antenatal education, birth preparedness, and healthcare infrastructure. Such improvements may enhance women's childbirth experiences and contribute to greater utilization and trust in institutional maternity services. Future studies incorporating qualitative approaches may provide deeper understanding of women's perceptions and expectations regarding maternity care. Multi-health facility study include publics and privates is recommended to further investigate determinants of maternal satisfaction and quality of care services.

Abbreviations

COR

Crude Odd Ratio

AOR

Adjusted Odd Ratio

CIs

Confidence Intervals

WHO

World Health Organization

ANC

Antenatal Care

PNC

Postnatal care

INC

Intranatal care

SERVQUAL

Service Quality Scale
HCPs
Healthcare Providers
VIF
Variance Inflation Factor
SD
Standard Division
AUC
Area Under Curve
EPV
Events-per-Variable
YRs
Yemeni Rials.

Declarations

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Author contributions

N.A. (First author) conceived and designed the study, collected data, performed statistical analysis and drafted the main manuscript text. FM. supervised the research process, participated in statistical analysis, provided critical guidance, and contributed to manuscript revision. A.A., and G.I were responsible for data entry and participated in data collection. All authors reviewed and approved the final manuscript.

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Data availability and materials

The datasets generated and/or analyzed during the current study are not publicly available due to institutional restrictions but are available from the corresponding author on reasonable request.

Clinical trial number

Not applicable.

Ethics approval and consent to participate

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The study protocol was approved by the Research Ethics Committee of the Faculty of Medicine and Health Sciences, Sana'a University, Sana'a, Yemen [Approval No: (27) 3-8]. Also, ethical approval was obtained from the administrations of the participating hospitals. The objective of the study was clearly explained to all participants. Verbal informed consent was obtained from all participants prior to inclusion in the study. participants had a right to refuse or withdraw participation at any time, and confidentiality of participants' information was strictly maintained and used solely for research and community benefit. All procedures were carried out in accordance with relevant guidelines and regulations.

Consent for publication

Not applicable. This study does not contain any individual person's data in any form (including individual details, images, or videos).

Competing interests

The authors have declared that no competing interests exist.

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