

Research Article

Socioeconomic, Cultural, and Healthcare Determinants of Home versus Facility-Based Deliveries among Women of Reproductive Age

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Abstract

Background: Maternal health outcomes remain suboptimal in rural areas of Pakistan, particularly in Khyber Pakhtunkhwa (KPK), due to persistent disparities in access to skilled birth attendance and institutional delivery services.

Objective: To determine the prevalence and socioeconomic, maternal, institutional, economic, and cultural determinants influencing the choice of home versus facility-based deliveries among women of reproductive age (18–49 years) in rural areas of Khyber Pakhtunkhwa, Pakistan.

Methodology: This comparative cross-sectional study was conducted from January 2024 to December 2024 among 350 women who had delivered within the last six months. Data were collected through structured interviews using a validated questionnaire. Descriptive statistics, Chi-square test, and binary logistic regression analyses were performed using SPSS version 26 to identify factors associated with the place of delivery.

Results: Among 350 participants, 183 (52.29%) had home deliveries, while 167 (47.71%) delivered in healthcare facilities. Most respondents were aged 26–35 years (48.86%), married (97.71%), and belonged to poor households (56.29%). Maternal illiteracy was observed in 63.71% of women, while 47.14% of husbands were also illiterate. Antenatal care (ANC) attendance was reported by 67.43% of women, whereas 32.57% did not receive ANC services. More than half of respondents were knowledgeable about delivery complications (57.71%), and 65.14% had previous experience with facility-based delivery. Significant predictors of home delivery included low maternal education (AOR = 2.58), poor wealth status (AOR = 2.76), lack of ANC attendance (AOR = 3.41), poor transport access (AOR = 3.62), poor knowledge of delivery complications (AOR = 2.49), long distance to health facilities (AOR = 2.21), husband-dominated decision-making (AOR = 1.95), and perception of home delivery as non-threatening (AOR = 2.27) ($p < 0.05$ for all).

Conclusion: Home delivery remains slightly more prevalent than institutional delivery in rural Khyber Pakhtunkhwa, Pakistan, mainly due to socioeconomic deprivation,

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limited healthcare accessibility, and strong cultural influences. Strengthening maternal education, improving transportation and healthcare access, and promoting antenatal care utilization may enhance institutional delivery practices and improve maternal health outcomes.

Keywords: Home Childbirth, Institutional Delivery, Maternal Health, Antenatal Care, Reproductive Age Women, Rural Health, Birth

Introduction

Maternal health is a significant public health problem in developing nations, especially among the unserved and rural communities, where delivery care is lacking [1]. Place of delivery is among the most crucial determinants of the outcomes of the mothers and their babies at birth [2]. Performing deliveries in health facilities with the supervision of a skilled birth attendant (SBA) lowers risks of maternal deaths, postpartum complications, neonatal infections, birth asphyxia and other preventable adverse outcomes [3]. Home delivery, particularly by untrained birth attendants, however, is linked to greater risks for mothers and babies [4].

In the world, the rate of institutional delivery has improved significantly, however, many low resource settings have high prevalence of home delivery of babies even after decades of effort due to social, economic, cultural and healthcare related constraints [5]. Maternal mortality rates (MMRs) and neonatal mortality rates (NMRs) are relatively high in Pakistan, especially in remote and marginalized regions [6]. Poor health-seeking practices among mothers are associated with low literacy rates, poor health facilities and services, long distances to health facilities, poor transportation systems, and entrenched cultural practices [7].

Various interacting factors such as maternal education, household income, parity, previous birth experiences, family influence, accessibility of health care facilities, quality of health care services and cultural beliefs about child birth can influence women's decisions on the place of delivery [2,8,9]. Many of the rural communities have a traditional birth attendant who is still deeply engaged in the delivery process, and myths about what happens in

the hospital and the financial pressures of hiring specialist obstetricians seriously detract from women's decision making for skilled birth attendance [10]. In addition, women may also be less able to access maternal health services due to gender inequalities and limited decision-making power over their health care [11,12].

Knowledge of the determinants of home delivery versus hospital delivery is crucial in designing targeted interventions to promote maternal health and access to safe delivery services for the underserved. Informative results of this identification of factors affecting women's choice can give a clue to healthcare planners/policies makers to create a cultural appropriate strategy for enhancing the institutional delivery rate and minimizing the preventable maternal and neonatal complications in the vulnerable communities.

Research Objective

To determine the prevalence and socio-demographic, maternal, and institutional determinants influencing the choice of home versus hospital deliveries among women of reproductive age (18–49 years), including the effects of accessibility, affordability, and cultural practices.

Methodology

Study Design and Setting

The comparative cross sectional study carried out in KPK Pakistan. The public healthcare facilities in the area were Ayub Teaching Hospital Abbottabad, DHQ Hospital Abbottabad, Lady Reading Hospital MTI Peshawar, PIMS Hospital Peshawar, Rural Health Centres (RHCs), Basic Health Units (BHUs) and government dispensaries. The lady health worker (LHW) programme is available in

community-based maternal healthcare services at the District Health Office (DHO). Eligible participants were identified using delivery record information kept in LHW house registers. Each Union Council had its own Lady Health Workers (LHWs), which was officially provided by District Health Office (DHO) and the researcher coordinated with the LHWs of each Union Council in the process of participant identification and data collection.

Study Duration

This study was carried out for a period of one year from January 2024 to December 2024.

Study Population

The study population consisted of women of reproductive age (18-49 years) who delivered in the last six months.

Sample Size and Sampling Technique

The sample size was determined using the RaoSoft sample size calculator, which was applicable for a population of 3,901, a 95% confidence level, a 5% margin of error and a response distribution of 50%. The number of participants required was at least 350. The number of respondents was 350. Purposive (non-probability) sampling was used.

Inclusion and Exclusion Criteria

Women aged 18–49 years who had delivered within the last six months and were permanent residents of the selected rural areas of Khyber Pakhtunkhwa, Pakistan were included in the study. Participants were eligible if they had a complete obstetric history of the most recent delivery and were willing to provide informed consent. Women with severe mental illness, those with incomplete or unreliable information regarding their delivery history, and those who were seriously ill at the time of data collection were excluded from the study. Women who had not delivered within the defined recall period or who refused participation were also excluded.

Data Collection

The data were gathered using a structured questionnaire on the factors influencing the choice of delivery place among the rural mothers in Eritrea through face-to-face interviews. The questionnaire

was adapted with the consent of the corresponding author. Some minor adjustments were made for appropriateness to the local context. The reliability of the tool was acceptable with a Cronbach's alpha value of 0.78.

Data Collection Procedure

Eligible women were identified using records from the Lady Health Workers (LHWs) and permission from the District Health Office (DHO) after receiving approval from the Ethical Review Committee (ERC). The respective LHWs made contact with eligible participants and the researcher made a visit to the households with the concerned LHW. Study purpose explained in culturally appropriate way and written/thumbprint informed consent obtained before data collection. Interviews were carried out in local language (Urdu and Pashto) to ensure accurate understanding and responses. The researcher visited households in the presence of the concerned lady health worker (LHW) for face to face interview with the eligible respondents.

Data Collection Tool

The data were collected using a structured, interviewer-administered questionnaire designed specifically for this study (Table 1). The questionnaire comprised multiple sections covering socio-demographic characteristics, reproductive and maternal history, economic status, physical accessibility to health facilities, institutional delivery factors, utilization of antenatal care (ANC) services, knowledge regarding delivery-related complications, and perceptions toward home and facility-based delivery.

Section A included socio-demographic and household characteristics such as age, marital status, education, occupation, ethnicity, and wealth status. Section B assessed reproductive and obstetric history, including parity, birth order, birth interval, and previous obstetric complications. Section C focused on maternal health service utilization, particularly ANC attendance, quality of ANC services, and previous facility-based delivery experience. Section D evaluated knowledge of pregnancy and delivery complications as well as perceived risks associated with home delivery. Section E captured institutional and accessibility

factors, including distance to health facility, availability of transport, and road conditions. Section F assessed cultural influences, household decision-making patterns, and husband's

preference regarding place of delivery. The outcome variable was the place of delivery of the most recent birth (home or health facility).

Table 1: Structured Questionnaire for Determinants of Home vs Hospital Delivery among Women

Section	Variable	Question	Response Options (Code)
A: Socio-demographic Characteristics	Age	What is your age?	___ years (18–25 / 26–35 / 36–49)
	Marital status	What is your marital status?	Married / Single / Divorced / Widowed
	Religion	What is your religion?	Muslim / Hindu / Other
	Ethnic group	What is your ethnic background?	Pashtun / Hindko-speaking / Kohistani / Gojri speakers / Others (including migrants / mixed ethnic groups)
	Mother education	What is your education level?	Illiterate / Primary / Secondary / Higher
	Husband education	Husband's education level?	Illiterate / Primary / Secondary / Higher
	Occupation (mother)	What is your occupation?	Housewife / Laborer / Farmer / Government / Other
	Occupation (husband)	Husband's occupation?	Farmer / Laborer / Merchant / Govt job / Other
	Wealth status	Household economic status?	Poor / Middle / Rich
B: Reproductive History	Parity	How many children have you given birth to?	1–2 / 3–4 / 5–6 / ≥7
	Birth order	Birth order of last child?	1st / 2nd / 3rd / 4th / ≥5
	Birth interval	Time between last two births?	<1 year / 1–2 years / ≥3 years
	Pregnancy wanted	Was last pregnancy planned?	Yes / No
	Past obstetric complications	Any previous complications?	Yes / No
C: Maternal Health Services	ANC attendance	Did you attend ANC visits?	Yes / No
	ANC quality	How do you rate ANC services?	Satisfactory / Not satisfactory
	Previous facility delivery	Previous delivery in hospital?	Yes / No
D: Knowledge & Perception	Knowledge of complications	Are you aware of delivery complications?	Yes / No
	Perception of delivery outcomes	How do you view institutional delivery?	Positive / Negative / Mixed
	Perception of home delivery	Is home delivery safe?	Threatening / Not threatening
E: Institutional & Accessibility Factors	Distance to facility	Distance to nearest health facility?	<10 km / 10–20 km / 20–30 km / >40 km
	Transport	Mode of transport	On foot / Public / Private / Ambulance /

	availability	used?	Other
	Road condition	Condition of road to facility?	Suitable / Not suitable
F: Media Exposure	Newspaper reading	Do you read newspapers?	Daily / Sometimes / Never
	Radio listening	Do you listen to radio?	Daily / Sometimes / Never
	TV viewing	Do you watch TV?	Daily / Sometimes / Never
G: Decision-Making & Cultural Factors	Decision authority	Who decides place of delivery?	Mother / Husband / Both / LHW / TBA
	Husband preference	Husband prefers delivery at?	Home / Hospital
	Cultural influence	Do cultural practices influence delivery choice?	Yes / No
H: Outcome Variable	Place of delivery	Where did you deliver last baby?	Home / Health facility

Statistical Analysis

The data collected were entered and analyzed by the statistical package for social sciences (SPSS) version 26. Descriptive statistics of frequencies, percentages, means and standard deviations were used to summarize the study variables. A Chi-square test was used to assess the associations between independent variables and place of delivery. Binary Logistic regression was used to determine the independent factors influencing home delivery. Where applicable, associations were evaluated with respect to their strength using effect size estimation. A P value of < 0.05 was deemed to be statistically significant.

Ethical Considerations

Ethical approval and permission for conducting the study and data collection were obtained from the head of the included institutions prior to commencement of the research. Participants were not required to participate and confidentiality and anonymity were strictly ensured throughout the study. All participants provided written informed consent or, where necessary, a thumbprint prior to data collection.

Results

The **Table 2** presents the socio-demographic, maternal, and institutional characteristics of the respondents (n = 350). The majority of women were aged 26–35 years (171, 48.86%), followed by 19–25

years (90, 25.71%) and 35–49 years (81, 23.14%). Most participants were married (342, 97.71%), with a small proportion being separated/divorced (5, 1.43%) or widowed (3, 0.86%). More than half belonged to the Peshawar (200, 57.14%) and were Pashtun. Maternal illiteracy was high (223, 63.71%), and 165 (47.14%) husbands were also illiterate. Regarding socioeconomic status, 197 (56.29%) women belonged to poor households. In terms of reproductive history, 119 (34.00%) had 3–4 children and 56 (16.00%) had ≥7 children. Most women reported husband-dominated decision-making (23, 6.57%) and lived 20–40 km from a health facility (108, 30.86%). Private transport was commonly used (223, 63.71%), while nearly half reported unsuitable road conditions (170, 48.57%). Overall, 236 (67.43%) women had ANC attendance and 228 (65.14%) had previous facility delivery experience. Home delivery remained slightly higher (183, 52.29%) compared to institutional delivery (168, 48.00%).

Table 2: Socio-demographic, maternal, and institutional characteristics of respondents (n = 350)

Variable	Category	n	%
Age (years)	18 years	8	2.29
	19–25 years	90	25.71
	26–35 years	171	48.86
	35–49 years	81	23.14
Marital status	Married	342	97.2
	Separated/Divorced	5	1.4
	Widow	3	0.9
Religion	Muslim	262	74.86

Ethnic group	Hindu	88	25.14
	Pashtun	200	57.14
	Hindko-speaking	87	24.86
	Kohistani / Gojri speakers	44	12.57
	Others (including migrants / mixed ethnic groups)	19	5.43
Mother education	Illiterate	223	63.71
	Primary/Middle	99	28.29
	Secondary/Higher	22	6.29
	Diploma & above	6	1.71
Husband education	Illiterate	165	47.14
	Primary/Middle	121	34.57
	Secondary/Higher	51	14.57
	Diploma & above	13	3.71
Parity	1-2	100	28.57
	3-4	119	34.00
	5-6	75	21.43
	7+	56	16.00
Decision-making authority	Mother only	42	12.00
	Husband only	23	6.57
	Both jointly	44	12.57
	Dai (TBA)	107	30.57
	Lady Health Worker	134	38.29
Husband's preferred delivery	Health facility	181	51.71
	Home delivery	169	48.29
Occupation of mother	Housewife	261	74.57
	Government worker	13	3.71
	Merchant	1	0.29
	Farmer	21	6.00
	Daily laborer	54	15.43
Occupation of husband	Government worker	28	8.00
	Merchant	14	4.00
	Farmer	121	34.57
	Daily laborer	168	48.00
	Student/Other	19	5.43
Wealth status	Poor	197	56.29
	Medium	113	32.29
	Rich	40	11.43
Distance to facility	<10 km	96	27.43
	10-20 km	98	28.00
	20-30 km	108	30.86
	>40 km	48	13.71

Means of transport	On foot	17	4.86
	Traditional transport	7	2.00
	Public/Ambulance	55	15.71
	Personal vehicle	48	13.71
	Private vehicle	223	63.71
Road condition	Suitable	180	51.43
	Not suitable	170	48.57
Newspaper reading	Daily	7	2.00
	Sometimes	63	18.00
	Never	280	80.00
Radio listening	Daily	8	2.29
	Sometimes	59	16.86
	Never	283	80.86
TV viewing	Daily	15	4.29
	Sometimes	61	17.43
	Never	274	78.29
Knowledge of complications	Knowledgeable	202	57.71
	Not knowledgeable	148	42.29
Pregnancy wanted	Yes	259	74.00
	No	91	26.00
ANC attendance	Yes	236	67.43
	No	114	32.57
Quality of ANC	Satisfactory	266	76.00
	Not satisfactory	84	24.00
Previous facility delivery	Yes	228	65.14
	No	122	34.86
Birth order	1st	51	14.57
	2nd	51	14.57
	3rd	61	17.43
	4th	55	15.71
	5th	42	12.00
	≥6	90	25.71
Birth interval	<1 year	106	30.29
	1-2 years	187	53.43
	≥3 years	57	16.29
Past obstetric complications	Yes	115	33.00
	No	234	67.00
Perception of delivery outcomes	Positive	165	47.14
	Negative	100	28.57
	Mixed	85	24.29
Perception of home delivery	Threatening	201	57.43
	Not threatening	149	42.57
Choice of delivery	Health facility	167	47.7
	Home delivery	183	52.3

place (last childbirth)			
Place of delivery	Health facility	167	47.7
	Home delivery	183	52.3

All the examined variables had a statistically significant association with place of delivery ($p < 0.05$). Maternal education ($\chi^2 = 24.18, p < 0.001$), husband education ($\chi^2 = 18.92, p < 0.001$), parity ($\chi^2 = 12.44, p = 0.006$), and wealth status ($\chi^2 = 21.56, p < 0.001$) were significantly associated with delivery place. Institutional factors such as distance to facility ($\chi^2 = 19.87, p < 0.001$), transport availability

($\chi^2 = 28.41, p < 0.001$), and road condition ($\chi^2 = 9.72, p = 0.002$) were also significant. Maternal health factors including ANC attendance ($\chi^2 = 26.33, p < 0.001$), knowledge of complications ($\chi^2 = 23.10, p < 0.001$), previous facility delivery ($\chi^2 = 15.88, p < 0.001$), and pregnancy wanted status ($\chi^2 = 11.09, p < 0.001$) showed strong associations. Cultural/household decision-making ($\chi^2 = 31.45, p < 0.001$), birth order ($\chi^2 = 14.22, p = 0.015$), and birth interval ($\chi^2 = 10.36, p = 0.006$) were also significantly associated with home versus hospital delivery (Table 3).

Table 3: Association between socio-demographic, maternal, institutional, and cultural factors and place of delivery among respondents (n = 350)

Variable	χ^2	p-value	COR (95% CI)	AOR (95% CI)
Age of respondent	8.42	0.038	1.42 (1.02–1.98)	1.63 (1.04–2.57)
Marital status	4.11	0.129	1.12 (0.78–1.62)	1.08 (0.71–1.64)
Religion	6.87	0.009	1.55 (1.10–2.19)	1.74 (1.09–2.79)
Ethnic group	7.94	0.047	1.41 (1.01–1.97)	1.58 (1.01–2.49)
Maternal education	24.18	<0.001	2.31 (1.65–3.24)	2.58 (1.71–3.92)
Husband education	18.92	<0.001	1.76 (1.28–2.42)	1.92 (1.28–2.87)
Parity	12.44	0.006	1.54 (1.12–2.12)	1.81 (1.16–2.84)
Decision-making authority	31.45	<0.001	2.62 (1.88–3.65)	1.95 (1.22–3.12)
Husband's preferred delivery place	33.18	<0.001	3.11 (2.22–4.36)	2.83 (1.84–4.36)
Occupation of mother	9.27	0.026	1.48 (1.05–2.09)	1.69 (1.03–2.78)
Occupation of husband	10.84	0.028	1.51 (1.06–2.14)	1.77 (1.12–2.81)
Wealth status	21.56	<0.001	2.89 (2.01–4.17)	2.76 (1.84–4.12)
Distance to facility	19.87	<0.001	2.21 (1.58–3.08)	2.21 (1.43–3.41)
Transport availability	28.41	<0.001	3.95 (2.78–5.61)	3.62 (2.31–5.67)
Road condition	9.72	0.002	1.63 (1.19–2.23)	1.78 (1.12–2.83)
Newspaper reading	6.12	0.047	1.31 (0.89–1.94)	1.42 (0.88–2.29)
Radio listening	5.96	0.051	1.28 (0.83–1.97)	1.31 (0.81–2.11)
Television viewing	7.26	0.027	1.44 (1.04–2.01)	1.59 (1.01–2.52)
Knowledge of complications	23.10	<0.001	2.58 (1.83–3.64)	2.49 (1.67–3.71)
Pregnancy wanted	11.09	<0.001	1.62 (1.17–2.24)	1.69 (1.08–2.65)
ANC attendance	26.33	<0.001	3.76 (2.63–5.37)	3.41 (2.18–5.32)
Quality of ANC	14.82	<0.001	2.14 (1.52–3.01)	2.08 (1.36–3.17)
Previous facility delivery	15.88	<0.001	2.33 (1.64–3.31)	2.14 (1.38–3.31)
Birth order	14.22	0.015	1.69 (1.10–2.60)	1.74 (1.09–2.77)
Birth interval	10.36	0.006	1.58 (1.08–2.31)	1.68 (1.05–2.69)
Past obstetric complications	8.94	0.003	1.49 (1.06–2.10)	1.57 (1.01–2.45)
Perception of delivery outcomes	9.56	0.008	1.72 (1.20–2.46)	1.89 (1.20–2.97)
Perception of home delivery as threatening	17.61	<0.001	2.41 (1.70–3.42)	2.27 (1.45–3.56)

Women with low maternal education had higher odds of home delivery (AOR = 2.58, 95% CI: 1.71–

3.92, $p < 0.001$). Low husband education also increased the risk (AOR = 1.92, 95% CI: 1.28–2.87, p

= 0.002). Poor wealth status was a strong predictor (AOR = 2.76, 95% CI: 1.84–4.12, $p < 0.001$). Lack of ANC attendance significantly increased home delivery (AOR = 3.41, 95% CI: 2.18–5.32, $p < 0.001$). Poor knowledge of complications was associated with higher risk (AOR = 2.49, 95% CI: 1.67–3.71, $p < 0.001$). Women living more than 20 km from a facility had higher odds (AOR = 2.21, $p = 0.001$).

Poor transport access (AOR = 3.62, $p < 0.001$) and unsuitable road conditions (AOR = 1.78, $p = 0.014$) were significant institutional barriers. Husband-dominated decision-making increased home delivery (AOR = 1.95, $p = 0.004$), and no previous facility delivery also remained a significant predictor (AOR = 2.14, $p = 0.001$, **Table 4**).

Table 4: Multivariable Logistic Regression Analysis of Factors Associated with Home Delivery

Questionnaire Variable	Category/Comparison	AOR	95% CI	p-value
Educational level of mother	Illiterate vs educated	2.58	1.71–3.92	<0.001
Educational level of husband	Illiterate vs educated	1.92	1.28–2.87	0.002
Parity (number of children)	≥5 children vs lower parity	1.81	1.16–2.84	0.009
Final decision on place of delivery	Husband only vs others	1.95	1.22–3.12	0.004
Age of respondent	≥35 years vs <35 years	1.63	1.04–2.57	0.032
Religion	Hindu vs Muslim	1.74	1.09–2.79	0.021
Ethnic group	Pashtun vs Other	1.58	1.01–2.49	0.044
Husband’s preferred delivery place	Home delivery preference vs facility	2.83	1.84–4.36	<0.001
Occupation of mother	Unemployed/housewife vs employed	1.69	1.03–2.78	0.038
Occupation of husband	Daily laborer/farmer vs salaried worker	1.77	1.12–2.81	0.015
Household wealth status	Poor vs medium/rich	2.76	1.84–4.12	<0.001
Distance to nearest health facility	>20 km vs ≤20 km	2.21	1.43–3.41	0.001
Means of transport to facility	Poor/inadequate vs adequate transport	3.62	2.31–5.67	<0.001
Road condition to reach facility	Not suitable vs suitable	1.78	1.12–2.83	0.014
Newspaper reading	Never vs daily/sometimes	1.42	0.88–2.29	0.148
Radio listening	Never vs daily/sometimes	1.31	0.81–2.11	0.267
Television viewing	Never vs daily/sometimes	1.59	1.01–2.52	0.046
Knowledge of complications	Not knowledgeable vs knowledgeable	2.49	1.67–3.71	<0.001
Pregnancy wanted	No vs yes	1.69	1.08–2.65	0.021
ANC attendance	No vs yes	3.41	2.18–5.32	<0.001
Quality of ANC/delivery care	Not satisfactory vs satisfactory	2.08	1.36–3.17	0.001
Previous facility delivery	No vs yes	2.14	1.38–3.31	0.001
Birth order	≥6 births vs lower birth order	1.74	1.09–2.77	0.019
Birth interval	<1 year vs ≥1 year	1.68	1.05–2.69	0.031
Past pregnancy complications	No complications vs complications present	1.57	1.01–2.45	0.043
Perception of delivery outcomes	Negative/mixed vs positive	1.89	1.20–2.97	0.005
Home delivery perceived as threatening	Not threatening vs threatening	2.27	1.45–3.56	<0.001

Discussion

In the present study, 48.00% of the women delivered their babies at health facilities while 52.00% delivered at home. This shows there is low utilization of maternal health services, where slightly more than half of mothers gave birth at

home. There is a similar pattern in rural areas as home delivery is still prevalent, as the people are poor and lack social support and adequate health facilities. Only 31% of them deliver their babies in institutions. The results indicated that although the overall situation in the country is improving, there are still rural and arid areas where utilization of

maternal health services remains poor [12-14]. In Pakistan, significant urban-rural disparities exist in delivery practices, with higher rates of home births in rural areas and lower institutional deliveries, largely influenced by limited access to healthcare services and prevailing patriarchal norms that restrict women's autonomy in household and healthcare decision-making.

In the present study, maternal education was significantly related to delivery choice with 63.71% of mothers being illiterate, and being at higher risk of home delivery (AOR = 2.58, $p < 0.001$). Likewise, the illiteracy of husbands (47.14%) was also high and linked to the likelihood of home delivery (AOR = 1.92, $p = 0.002$). Similar results were observed in rural areas of KPK where most of the deliveries took place in illiterate women suggesting that there is a strong correlation between educational status and institutional delivery [13]. In Pakistan, other studies also showed that more educated women are more likely to use institutional delivery services as they have better awareness, autonomy and health-seeking behavior [12,13,14,15,16]. The results confirm that education is an important factor influencing women's utilization of maternal health services.

In the present study, it was found that 56.29% of the women were living in poor households, and women from poor households were found to be strongly associated with home delivery (AOR = 2.76, $p < 0.001$). This is consistent with national and regional studies, which showed that women in the poorest wealth quintile were the least likely to receive institutional delivery services [13,17]. Another study from Pakistan has shown that financial difficulties are among the most significant obstacles to safe delivery practices, especially in remote and unprivileged areas [18]. The findings support the conclusion that economic deprivation is a significant structural challenge to access to skilled birth attendance.

Regarding ANC, 67.43% of women attended ANC and lack of ANC was strongly associated with home delivery (AOR = 3.41, $p < 0.001$). This is in line with an earlier studies that found that non-ANC users were significantly more likely to deliver at home and some reports indicated up to 14 times

higher risk among those who were not attending ANC [12-17]. In the same way, national level evidence in Pakistan indicates that counselling for risk identification and birth preparedness leads to increased the use of ANC services for improved institutional delivery [17]. These findings emphasize the importance of ANC as a point of entry for supporting safe delivery practices.

Additionally, institutional accessibility factors were found to be important in this study. Many women were also far from health facilities, and having poor transport access was a significant factor in home delivery (AOR = 3.62, $P < 0.001$). In rural Pakistan there has also been a reported association of geographical distance, lack of transport and poor road infrastructure with the uptake of institutional delivery [19]. In remote areas, geographical isolation continues to be a major barrier to maternal healthcare access.

Cultural and household decision-making also was an important factor. The findings of this study showed that a higher proportion of the women who use the health facility for home delivery reported that their husbands make all the decisions about delivery (AOR = 1.95, $p = 0.004$) with 6.57% of women reporting husband-only decision-making regarding home delivery. Other research conducted in Pakistan has also revealed that restricted autonomy among women decreases the chance of institutional delivery, since women lack autonomy in their healthcare decisions [20]. Furthermore, the previous delivery at the facility was associated with the current delivery choice as 65.14% of the women had experienced a previous facility delivery, resulting in a lower likelihood of home delivery (AOR = 2.14, $p = 0.001$). The results are consistent with previous studies that found that having an institutional delivery experience could lead to more use of health services in the future, due to greater familiarity and confidence with services.

Strength and Limitations

This study has a number of strengths including the relatively large sample size of 350 women, community-based data collection through the Lady Health Workers network and the comprehensive nature of the multiple determinants of place of

delivery captured, covering socio-demographic, maternal, institutional, economic and cultural factors. Data reliability was enhanced by using a structured questionnaire which was previously validated and has good internal consistency (Cronbach's alpha = 0.78). Moreover, multivariate logistic regression analysis improved the internal validity and the independent predictors for home delivery were identified.

The study has a number of limitations, however. However, it is difficult to draw causal inferences about the relationship between the predictor(s) and place of delivery due to its cross-sectional design. Non-probability purposive sampling could lead to selection bias and has a restricted application of results. Answers to the questions may have been subject to recall bias and/or social desirability bias. Last but not least, the lack of qualitative information limits the ability/ty to explore cultural, social and behavioral factors that might affect delivery decisions in greater depth.

Conclusion

The results of the study indicate that the rate of home delivery is slightly higher than institutional delivery with 52.00% of the women delivering at home. This pattern is influenced by various interconnected factors such as low levels of maternal and husband's education, low utilization

of antenatal care services, poor knowledge about obstetric complication, distance to health facilities, lack of transport, poor road conditions, and husband's dominance over decision making.

The study confirms that education, economic, cultural, and accessibility-related factors all play an important role in influencing maternal health care choices in this rural community. The findings highlight the importance of taking a multi-sectoral approach to tackling female education, community awareness, access to antenatal services, access to delivery services, transport services, and outreach for health systems to enhance institutional deliveries and avert preventable maternal risks in hard-to-reach rural communities.

Conflict of interest

The authors declared no conflict of interest.

Authors Contribution

MS, SA, MH, US, and RS contributed substantially to the conception and design of the study, data acquisition, analysis, and interpretation of results. All authors participated in drafting and critically revising the manuscript for important intellectual content, approved the final version for publication, and agree to be accountable for all aspects of the work.

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