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# Prevalence and factors associated with institutional delivery in rural Afghanistan: secondary analysis of the 2022–2023 multiple indicator cluster survey

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## Abstract

**Background** Institutional delivery rates among rural women appear to still be suboptimal, mainly in low and middle-income countries (LMICs). Despite that, there has been a lack of research addressing this issue among women in rural Afghanistan. Hence, this study aimed to assess the prevalence and factors associated with institutional delivery among women in rural Afghanistan.

**Methods** In this cross-sectional study, we used the 2022–2023 Afghanistan Multiple Indicator Cluster Survey (MICS) for analysis. A total of 10,644 ever-married women, aged 15–49 years, who gave birth to a live baby in the past 2 years and lived in rural areas of Afghanistan were included in this analysis. The outcome was institutional delivery and was defined as a live birth delivered by an ever-married woman at a public or private health facility in the past 2 years prior to the MICS. We applied a binary logistic regression model and provided adjusted odds ratios (AORs) and 95% confidence intervals (CIs) on the factors associated with institutional delivery.

**Results** Out of 10,644 women, 59.4% delivered at a health facility in their last pregnancy. We found that women in the age groups 30–39 years [AOR = 1.16, 95% CI (1.05–1.28)] and 40–49 years [1.28 (1.08–1.51)], women with formal education [1.56 (1.35–1.79)], women living in households with educated heads [1.19 (1.07–1.33)], women who had 1–3 antenatal care (ANC) visits [3.12 (2.81–3.47)] and ≥ 4 ANC visits [5.42 (4.78–6.15)], women who had access to mobile phones [1.26 (1.15–1.39)], women in the third [1.73 (1.51–1.98)], fourth [2.30 (1.98–2.66)], and highest [3.66 (3.05–4.39)] wealth households, and those with media access [1.24 (1.09–1.41)] were more likely to use institutional delivery. However, the likelihood was lower in multipara women [0.65 (0.57–0.74)].

**Conclusion** Just more than half of Afghan women opt for institutional deliveries in rural settings. There is a pressing need for concerted efforts aimed at enhancing access to maternal healthcare services, taking into account the associated factors identified in this context.

**Keywords** Health facility delivery, Institutional delivery, Associated factors, Rural areas, Afghanistan

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## Introduction

Maternal mortality remains one of the most pressing global health concerns [1]. In 2020, about 287,000 women lost their lives from preventable pregnancy-related complications, with 95% of all these deaths occurring in low and lower-middle-income countries (LMICs) [2]. Over 75% of global maternal fatalities worldwide are caused by direct obstetric complications, such as bleeding, infection, complications from unsafe abortion, pregnancy-induced hypertension, and obstructed labor [1, 2]. These not only underscore the immediate need for improved access to maternal healthcare services but also emphasize the importance of addressing the underlying determinants influencing women's choices regarding institutional deliveries, especially in regions like Afghanistan.

Afghanistan is one of the countries with alarmingly low institutional delivery rates, standing at just 48%, and a skilled birth attendance rate of 56% [3]. Despite global efforts to reduce maternal and neonatal mortality, Afghanistan continues to suffer from high maternal mortality (638 per 100,000) and neonatal mortality (45 per 1,000) [1, 2, 4]. Access to emergency obstetric care remains a significant challenge, with caesarean sections performed in only 3% of live births [5]. Postpartum hemorrhage is the primary cause of maternal death in the country [2, 4, 6, 7], underscoring the critical need for timely and skilled medical intervention during childbirth. Ensuring universal access to institutional delivery and skilled birth attendance has always been the main strategic objective for reducing preventable maternal mortality in Afghanistan [8]. Institutional delivery is essential due to its significant impact on maternal and newborn health outcomes, as it increases access to emergency obstetric care, including management of complications, surgical interventions, and blood transfusions, which are vital in managing life-threatening conditions such as postpartum hemorrhage and obstructed labor [9, 10].

However, disparities in access to institutional deliveries and skilled birth attendants are a major concern, with urban and wealthier segments of the population having far better access to these critical services than the rural population or the poorest [10, 11]. Several studies have reported a lower proportion of institutional deliveries among women residing in rural areas in many LMICs [9, 12–14]. In Afghanistan, previous studies have mainly focused on the prevalence of institutional deliveries at the national level or within urban areas [3, 15]. Despite 73% of the population living in rural areas [16], nationally representative reports on institutional delivery rates for rural women have not been published.

In Afghanistan, geographical barriers, women's decision-making autonomy, wealth, and education have consistently affected the utilization of healthcare services [3, 5, 15, 17–19]. Women in rural areas face higher

challenges due to inadequate healthcare infrastructure, a shortage of female healthcare workers, lower levels of education, cultural norms, and travel barriers [20–22]. The collapse of the internationally assisted Afghan government in 2021 exacerbated these challenges, as international funding was severely restricted, plunging the country into a deeper humanitarian crisis [5, 23]. The financial situation of the population has dramatically worsened, with health services that were heavily reliant on donor funding suffering immensely [24]. Recent climate change hazards have further compounded these issues by damaging many health facilities [25]. Restrictions on women's mobility and access to work and education have not only impacted women as healthcare providers but also as recipients of essential health services [5, 24, 26]. This is particularly concerning in rural areas, where 88.2% of the population faces about a two-hour distance to health facilities [27].

Despite some studies exploring factors associated with the utilization of institutional delivery [3, 15], there remains a significant data gap, particularly in rural Afghanistan. Utilizing the 2022–2023 Afghanistan Multiple Indicator Cluster Survey (MICS), this study aimed to determine the prevalence of institutional delivery and its associated factors among women in rural Afghanistan. By providing comprehensive insights into the prevalence and predictors of institutional delivery, this research aimed to address the critical research gap and provide evidence-based recommendations for targeted interventions to improve maternal health outcomes in rural Afghanistan.

## Methods

### Data source, sample size, and sampling

Data from the MICS 2022–23, which used a nationally representative sample in Afghanistan, were analyzed. The data collection process and sampling approach of MICS 2022–23 are described elsewhere [28]. In brief, the survey employed a nationally representative two-stage stratified sampling design covering all 34 provinces of Afghanistan, with urban and rural areas in each province serving as primary strata. In the first stage, enumeration areas (EAs) from the 2019 Satellite-Imagery-based national sampling frame were selected systematically with probability proportional to size. In the second stage, after listing all households in each selected EA, a systematic sample of 24 households was drawn. This resulted in a total sample of 23,568 households across 982 EAs, of which 23,213 were successfully interviewed (99.8% response rate). The design ensures representativeness for national, urban/rural, and provincial estimates, and yielded substantial completed interviews with women (44,341), children under five (32,989), and children ages 5–17 (20,068). For this study, the eligible study population was defined as

ever-married women, aged 15–49 years, who gave birth to a live baby in the past 2 years and lived in rural areas of Afghanistan. In the MICS 2022–23 database, data on 44,874 women were available; however, 533 of them had missing values on demographic characteristics and on use of services. We excluded the 533 women, which accounted for less than 2% of the data, and we assumed those women excluded were non-responders. From the remaining 44,341 women, aged 15–49 years, we excluded 33,697 women who did not meet the eligibility criteria for the study, and we used data from 10,644 ever-married women who had complete data on variables used in this study (Fig. 1).

### Study variables

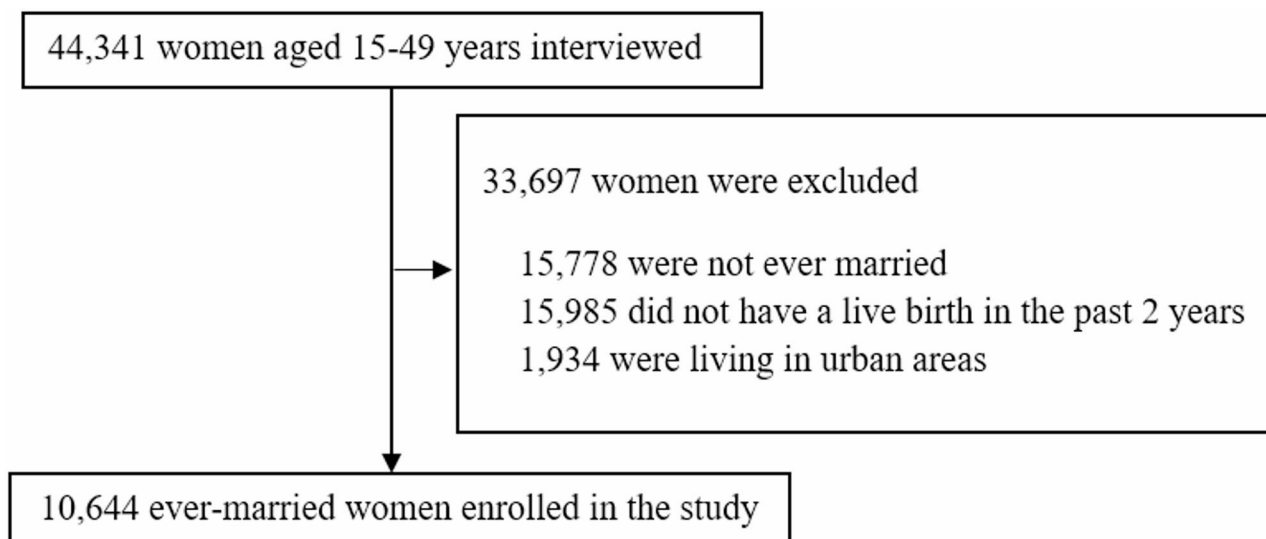
The outcome variable was institutional delivery, defined as a live birth delivered by an ever-married woman at a public or private health facility in the past 2 years prior to the MICS 2022–23. For creating the outcome variable, women who delivered at a public or private health facility or hospital (institutional delivery) were coded “yes” and women who delivered a live birth at home (non-institutional delivery) were coded “no”.

The explanatory variables included women’s age (15–29, 30–39, 40–49 years), women’s education (no formal education vs. attended formal education), household head’s education (no formal education vs. attended formal education), wealth status [lowest quintile (poorest) up to highest quintile (richest)], women’s parity (primipara vs. multipara), antenatal care (ANC) visits (no visit, 1–3 visits,  $\geq 4$  visits), access to mobile phone (coded “yes” if women used a mobile phone at least once a week in the last 3 months, and “no” otherwise), and access to media. Access to media was coded as “yes” if the woman

watched TV at least once a week, or the woman listened to the radio at least once a week, or the woman read a newspaper less than once a week; and coded as “no” if none of the above criteria was met.

### Statistical analysis

We first described the baseline characteristics of women and compared distributions across institutional and non-institutional deliveries using the chi-square test. For regression analysis, we specified a binary logistic regression model and performed both bivariate and multivariable analyses. Variables with a bivariate  $p$ -value  $< 0.25$  were retained in the multivariable model following established recommendations [29]. Based on prior literature [15, 30–33], we identified explanatory variables that could potentially influence institutional deliveries. Prior to regression analysis, we assessed multicollinearity by calculating variance inflation factors (VIFs) for all independent variables; no variable exceeded a VIF of 5, indicating acceptable collinearity. A random cluster effect was added to the model to take the clustering effects of data at the household level into account, and to provide adjusted standard errors for the odds ratios (ORs) and adjusted odds ratios (AORs) with 95% confidence intervals (CIs). All data analyses were performed by STATA version 17 [34], and a  $p$ -value  $< 0.05$  was considered significant. Because the analysis was hypothesis-driven rather than exploratory, we did not apply formal multiple-comparison adjustments, which is consistent with common practice in epidemiological regression modeling [35].



**Fig. 1** Final sample size and schematic presentation of the sample selection

**Table 1** Baseline characteristics of ever-married women, by status of deliveries in rural areas of Afghanistan

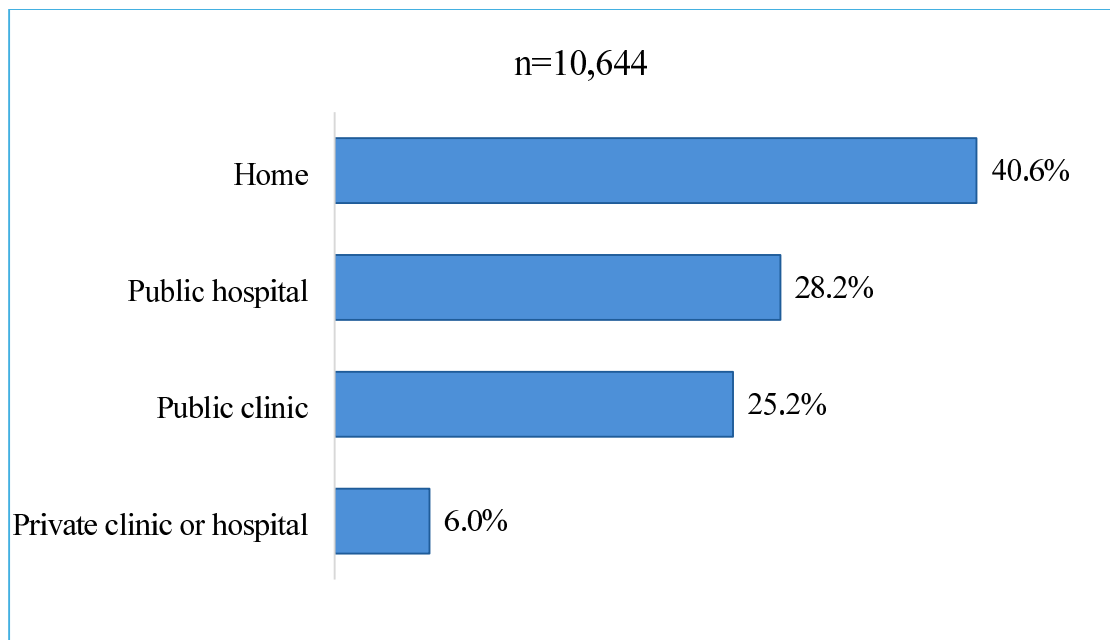
Characteristics	Total n (%) 10,644 (100)	Deliveries		P-Value
		Non-institutional n (%) 4,324 (40.6)	Institutional n (%) 6,320 (59.4)	
Women's age (years)				
15–29	6,310 (59.3)	2,504 (57.9)	3,806 (60.2)	0.037
30–39	3,470 (32.6)	1,445 (33.4)	2,025 (32.0)	
40–49	864 (8.1)	375 (8.7)	489 (7.8)	
Women's education				
No formal education	8,910 (83.7)	3,936 (91.0)	4,974 (78.7)	< 0.001
Primary	813 (7.6)	225 (5.2)	588 (9.3)	
Secondary/higher	921 (8.7)	163 (3.8)	758 (12.0)	
Household head education				
No formal education	7,204 (67.7)	3,284 (76.0)	3,920 (62.0)	< 0.001
Primary	1,135 (10.7)	361 (8.4)	774 (12.3)	
Secondary/higher	2,305 (21.7)	679 (15.7)	1,626 (25.7)	
Women's parity				
Primipara	1,685 (15.8)	530 (12.3)	1,155 (18.3)	< 0.001
Multipara	8,959 (84.2)	3,794 (87.7)	5,165 (81.7)	
Antenatal care (ANC) utilization				
No visit	3,033 (28.5)	2,069 (47.8)	964 (15.3)	< 0.001
1–3 visits	4,659 (43.8)	1,633 (37.8)	3,026 (47.9)	
≥ 4 visits	2,952 (27.7)	622 (14.4)	2,330 (36.9)	
Access to mobile phones				
No	4,723 (44.4)	2,457 (56.8)	2,266 (35.8)	< 0.001
Yes	5,921 (55.6)	1,867 (43.2)	4,054 (64.2)	
Access to a newspaper				
No	10,393 (97.6)	4,290 (99.2)	6,103 (96.6)	< 0.001
Yes	251 (2.4)	34 (0.8)	217 (3.4)	
Access to TV				
No	9,457 (88.9)	4,122 (95.3)	5,335 (84.4)	< 0.001
Yes	1,187 (11.2)	202 (4.7)	985 (15.6)	
Access to the radio				
No	9,570 (89.9)	4,019 (93.0)	5,551 (87.8)	< 0.001
Yes	1,074 (10.1)	305 (7.0)	769 (12.2)	
Wealth status				
Lowest quintile (poorest)	2,025 (19.0)	1,242 (28.7)	783 (12.4)	< 0.001
Second	2,185 (20.5)	1,171 (27.1)	1,014 (16.0)	
Third	2,228 (20.9)	888 (20.5)	1,340 (21.2)	
Fourth	2,237 (21.0)	668 (15.5)	1,569 (24.8)	
Highest quintile (richest)	1,969 (18.5)	355 (8.2)	1,614 (25.5)	

p-values were obtained by chi-square test

## Results

Table 1 presents baseline characteristics of ever-married women in rural areas. Women aged 15–29 comprised 59.3% of the overall sample, with 57.9% and 60.2% in the non-institutional and institutional delivery groups, respectively. There were significant differences between women who had non-institutional deliveries and women who had institutional deliveries. These differences were in terms of women's education level, the education level of the head of household, wealth status, women's parity, ANC visits, access to mobile phones, and access to media

(newspaper, TV, radio). For example, 91.0% women in non-institutional vs. 78.7% women in institutional delivery groups, respectively, did not have formal education, and 47.9% women in non-institutional vs. 15.3% women in institutional delivery groups, respectively, did not have any ANC visits. A similar pattern was observed for access to mobile phones and access to media. For instance, 43.2% of women in non-institutional vs. 64.2% of women in institutional delivery groups, respectively, had mobile phones, and 4.7% of women in non-institutional vs. 15.6%



**Fig. 2** Institutional and non-institutional deliveries in rural areas of Afghanistan (n = 10,644)

of women in institutional delivery groups, watched TV, respectively (Table 1).

Figure 2 shows the proportions of institutional and non-institutional deliveries in rural areas. Of 10,644 women, 40.6% of them gave birth at home (non-institutional deliveries), and only 6.0% of women gave birth in private clinics or hospitals. Deliveries conducted at public hospitals and clinics accounted for 28.2% and 25.2%, respectively, of childbirths among women in rural areas.

Table 2 provides the likelihood of institutional deliveries in rural areas. The results from multivariable analysis show that older women were more likely to have institutional deliveries, compared to women 15–29 years of age [AOR (95% CI) of 1.16 (1.05–1.28) for women 30–39, and 1.28 (1.08–1.51) for women 40–49 years of age, respectively]. Education of women and education of household head were significant predictors of institutional deliveries [1.56 (1.35–1.79) for women who were educated, and 1.19 (1.07–1.33) for women whose household head was educated]. Women from households with higher wealth were more likely to have institutional deliveries. In comparison to women from the lowest wealth status, women from the 3rd, 4th, and 5th quintiles of wealth status had a greater likelihood of institutional deliveries [1.73 (1.51–1.98), 2.30 (1.98–2.66), and 3.66 (3.05–4.39), respectively]. Women with more childbirths in the past were less likely to have institutional deliveries, compared to those with one delivery in the past [0.65 (0.57–0.74)]. Women who used ANC services had a greater likelihood of having institutional deliveries [3.12 (2.81–3.47) in women with 1–3 ANC visits and 5.42 (4.78–6.15) in

women with  $\geq 4$  ANC visits] compared to women with no ANC visit. The odds of institutional deliveries were greater in women who had mobile phones, and in women who had access to media (newspaper, TV, radio) [1.26 (1.15–1.39), and 1.24 (1.09–1.41), respectively] compared to those who did not have mobile phones, and those who did not have access to media, respectively.

## Discussion

This study reports the prevalence of institutional delivery and its associated factors among women in rural Afghanistan using data from the most recent MICS 2022–2023. Our findings indicate that 6,320 women, representing 59.4%, delivered at a health facility or hospital in their last pregnancy. The analysis revealed that several factors increase the likelihood of institutional delivery, including higher maternal age and education, higher household wealth, higher household head education, lower parity, using ANC, having mobile phones, and access to media.

In the present study, 59.4% of rural women reported institutional delivery, comparable to the national average (56%) reported previously in Afghanistan [3]. However, the current institutional delivery rate among rural women in Afghanistan is lower than the national (66.3%) and urban (88.6%) figures reported in MICS 2022–2023 [28]. Previous studies reported institutional delivery rates among rural women between 22% and 78.1% in other LMICs [9, 36–38]. Childbirth carries inherent risks, and skilled medical attention during delivery is critical for both the mother and baby. Low facility birth rates expose a higher percentage of women to complications

**Table 2** Factors associated with institutional delivery in rural areas of Afghanistan

Characteristics	Crude odds ratio (95%CI)	P-Value	Adjusted odds ratio (95%CI)	P-Value
Women's age (years)				
15–29	Reference		Reference	
30–39	0.92 (0.85–1.00)	0.061	<b>1.16</b> ( <b>1.05–1.28</b> )	<b>0.004</b>
40–49	<b>0.86</b> ( <b>0.74–0.99</b> )	<b>0.037</b>	<b>1.28</b> ( <b>1.08–1.51</b> )	<b>0.004</b>
Women's education				
No formal education	Reference		Reference	
Attended formal education	<b>2.75</b> ( <b>2.43–3.10</b> )	<b>&lt; 0.001</b>	<b>1.56</b> ( <b>1.35–1.79</b> )	<b>&lt; 0.001</b>
Household head education				
No formal education	Reference		Reference	
Attended formal education	<b>1.93</b> ( <b>1.76–2.12</b> )	<b>&lt; 0.001</b>	<b>1.19</b> ( <b>1.07–1.33</b> )	<b>0.001</b>
Women's parity				
Primipara	Reference		Reference	
Multipara	<b>0.62</b> ( <b>0.56–0.70</b> )	<b>&lt; 0.001</b>	<b>0.65</b> ( <b>0.57–0.74</b> )	<b>&lt; 0.001</b>
Antenatal care (ANC) utilization				
No visit	Reference		Reference	
1–3 visits	<b>3.98</b> ( <b>3.60–4.40</b> )	<b>&lt; 0.001</b>	<b>3.12</b> ( <b>2.81–3.47</b> )	<b>&lt; 0.001</b>
≥ 4 visits	<b>8.04</b> ( <b>7.14–9.06</b> )	<b>&lt; 0.001</b>	<b>5.42</b> ( <b>4.78–6.15</b> )	<b>&lt; 0.001</b>
Access to mobile phones				
No	Reference		Reference	
Yes	<b>2.35</b> ( <b>2.17–2.56</b> )	<b>&lt; 0.001</b>	<b>1.26</b> ( <b>1.15–1.39</b> )	<b>&lt; 0.001</b>
Access to media				
No	Reference		Reference	
Yes	<b>2.68</b> ( <b>2.40–3.00</b> )	<b>&lt; 0.001</b>	<b>1.24</b> ( <b>1.09–1.41</b> )	<b>0.001</b>
Wealth status				
Lowest quintile (poorest)	Reference		Reference	
Second	<b>1.37</b> ( <b>1.21–1.56</b> )	<b>&lt; 0.001</b>	1.13 (0.99–1.29)	0.08
Third	<b>2.39</b> ( <b>2.11–2.72</b> )	<b>&lt; 0.001</b>	<b>1.73</b> ( <b>1.51–1.98</b> )	<b>&lt; 0.001</b>
Fourth	<b>3.73</b> ( <b>3.26–4.26</b> )	<b>&lt; 0.001</b>	<b>2.30</b> ( <b>1.98–2.66</b> )	<b>&lt; 0.001</b>
Highest quintile (richest)	<b>7.21</b> ( <b>6.14–8.47</b> )	<b>&lt; 0.001</b>	<b>3.66</b> ( <b>3.05–4.39</b> )	<b>&lt; 0.001</b>

Crude and adjusted odds ratios were obtained by bivariate and multivariable logistic regression analyses, respectively. Significant values are in bold

like hemorrhage, infections, and obstructed labor, which can be fatal without timely intervention [39]. Our findings suggest that the institutional delivery rate is still suboptimal in the rural communities of Afghanistan and raise causes for urgent action. A mixed-method study

identified such factors as financial difficulties, transportation problems, and familial or cultural constraints as barriers to institutional delivery among rural women in Afghanistan [40]. Poor health services in the health facility is another barrier reported in a cross-sectional study conducted in Kandahar, Afghanistan [15]. Moreover, geographical isolation and limited healthcare infrastructure in rural Afghanistan may have contributed to the notable disparities in institutional delivery rates when compared to urban environments [41]. Given these findings together, there is a need for designing and implementing interventions aimed towards increasing institutional delivery among women in rural Afghanistan.

In our study, we observed that the prevalence of institutional delivery was higher among women in the 30–39 years and 40–49 years age groups. Previous studies have also found that the probability of institutional delivery was higher in older women [12, 14, 42]. This could be attributed to better knowledge, awareness about maternal healthcare, and greater autonomy in healthcare decision-making among older women compared to younger women [18]. The suggestive action calls for greater attention from policymakers to come up with specific interventions to increase institutional deliveries among young rural women. An example could be implementing community-based education programs specifically tailored for younger women, focusing on the benefits of institutional delivery and addressing misconceptions or cultural barriers.

Educational attainment promotes better enlightenment on maternal healthcare utilization [43, 44]. Similarly, we found that women with formal education were 1.5 times more likely to deliver in a health facility compared to those with no formal education. Women's education effects on the choice of birthplace are consistently reported across studies in LMICs [3, 9, 12, 42]. Educated women are more likely to understand the importance of giving birth in a health facility than women with no formal education, which may be the cause [12]. Unfortunately, the majority (83.7%) of women surveyed in this national study had no formal education, and recent bans imposed on female education are likely to worsen women's literacy rates and widen health inequities in the country [26]. There is, therefore, an urgent need to advocate for women's education. Additionally, awareness and educational programs should be given a more prominent place in health programs focused on increasing institutional deliveries in rural Afghanistan, especially for less-educated women.

Rates of institutional delivery were substantially higher among women living in households with educated heads. This aligns with earlier studies from Bangladesh [45] and rural Uganda [46]. The possible reason might be that educated household heads have better access to healthcare

information, including the advantage of deciding the use of institutional delivery services for their female household members. Other studies have also provided evidence for the crucial role of decision-makers' education in the optimal utilization of maternal healthcare services [13, 33, 47]. This finding deserves more attention in the current sociopolitical context of Afghanistan, where women encounter several challenges in accessing healthcare services [48]. This means that involving household heads in interventions aiming to promote institutional deliveries should be a key policy consideration.

We also found that women in the high wealth quintiles are more likely to deliver in a health facility than those in the low-wealth quintiles. This finding is in agreement with studies conducted in other rural areas of LMICs, such as Bangladesh [9], Sub-Saharan Africa [49], Ghana [50], and Ethiopia [38]. Poverty has long been considered a determinant of poor access to health services in developing countries [51]. In spite of free institutional delivery services, our finding is likely due to direct and indirect costs (i.e., distance, travel expenses, and other informal costs) linked to accessing institutional delivery services in rural Afghanistan [40]. Previous studies have also highlighted wealth-related disparities in the use of institutional delivery services in rural Afghanistan [15, 40]. Therefore, it is crucial to make sure that everyone in the community, especially those women who have historically received insufficient care, can access and benefit from institutional delivery services. Effective interventions to increase institutional deliveries among rural women include providing transportation vouchers [30] and offering essential supplies, medications, and meals at birthing facilities to minimize costs and financial hardships [40].

Consistent with earlier studies [9, 12, 14, 52], ANC utilization had a significant relationship with institutional delivery. The likelihood of women delivering in a health facility was 3.1 and 5.4 times greater among women who had 1–3 and 4 or more ANC visits, as compared to those who had no ANC visits. Similar findings were reported in rural Bangladesh [9] and in the 12th district of Kandahar, Afghanistan, where a significant association was found between ANC utilization and institutional delivery [15]. ANC utilization provides an opportunity to promote the benefits of institutional delivery services [12, 53]. The significant impact of ANC utilization on institutional delivery highlights the importance of enhancing ANC quality, including more frequent visits and targeted counselling on optimal utilization of maternal healthcare services. Providing counseling and support during ANC visits to encourage and empower younger women to opt for institutional delivery is essential.

The odds of institutional delivery were lower among multipara women as compared to primipara women

[0.65 (0.57–0.74)]. The association between the use of health facilities for delivery and parity has been widely reported across studies in LMICs [9, 31, 37]. Literature shows that women who have many children are less likely to give birth in a health facility [9, 49]. This is often because high-parity women feel more confident and experienced in handling their pregnancy, leading them to opt for home births rather than hospitals [49]. Multiparous women may also view childbirth as a routine event, especially if prior deliveries were uneventful [54]. They might prioritize convenience or cultural practices associated with home births, overlooking potential risks associated with unattended births [55]. Given this finding, health programs for increasing institutional deliveries should pay more attention to multipara women in rural Afghanistan.

In our study, we observed higher rates of institutional deliveries among women who had access to mobile phones. This observation aligns with studies conducted in Tanzania [56] and India [57]. Findings from a previous study in rural Tanzania indicated that smartphone-assisted interventions had brought a considerable enhancement in institutional delivery rates [56]. There is also evidence that mobile phone-based interventions, such as voice messages, text messages, and call reminders, have been used in improving the delivery of maternal healthcare services in rural regions of many LMICs [56, 58, 59]. Moreover, in our previous analyses, we also observed the association between mobile phone ownership and appropriate maternal and child healthcare utilization among women in Afghanistan [7, 60]. The current study supports this relationship, suggesting that mobile phone-based interventions could positively influence the uptake of institutional delivery services among rural women in Afghanistan.

Lastly, women who had access to media were 1.2 times more likely to deliver in a health facility compared to those with no access. This finding aligns with existing literature [12, 38, 49]. Women with media access have a better chance of receiving crucial health information, which positively impacts their health-seeking behaviors [12, 49, 61]. This association is also supported by previous studies in Afghanistan, where exposure to mass media had a positive influence on utilization of maternal healthcare services [3, 17, 44, 62]. Additionally, media can counteract harmful myths and misinformation surrounding childbirth, particularly in rural areas with limited access to healthcare professionals [63]. These associations might be important for understanding the importance of media broadcasts in boosting institutional delivery rates in rural Afghanistan, and deserve considerable attention in future policy efforts and health interventions.

## Limitations

This study has some limitations. First, the study assessed selected socio-economic and demographic variables, while health system factors, accessibility, and cultural and religious beliefs and practices could also affect the outcome. This may limit the overall understanding of factors influencing delivery place preference in rural Afghanistan. Further research in Afghanistan is needed to address comprehensive variables. Second, the data collected for MICS 2022–2023 were self-reported and, therefore, could suffer from information and recall biases. Finally, the study is limited by its cross-sectional nature, which could not establish causality.

Despite the mentioned limitations, this is the first nationally representative study to determine the prevalence and correlates of institutional delivery in rural Afghanistan, thus providing crucial information for policymakers for targeted maternal health interventions.

## Conclusion

This study reveals that the prevalence of institutional deliveries is unacceptably low in rural Afghanistan. Our findings highlight several key factors associated with institutional delivery, including maternal age, education, household wealth, the education level of the household head, parity, ANC visits, mobile phone use, and media access. To improve institutional delivery rates, it is crucial to address these determinants through targeted interventions. Enhancing access to maternal healthcare services, increasing the quality and frequency of ANC visits, and utilizing mobile phone-based interventions could significantly impact maternal health outcomes in rural Afghanistan. These strategies, tailored to the unique socio-economic and cultural context of rural communities, are essential for reducing maternal mortality and improving overall maternal health.

## Abbreviations

ANC	Antenatal care
AOR	Adjusted odds ratio
CI	Confidence interval
COR	Crude odds ratio
LMICs	Low and middle-income countries
MICS	Multiple Indicator Cluster Survey
VIF	Variance inflation factors

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## Authors' contributions

Conceptualization and design: MHS and ET. Analysis: ET and MHS. Writing-original draft: MHS, ET, MJ, PG, and HS. Writing-review & editing: MHS, KF, AWW, and OD. All authors have read and approved the final manuscript.

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## Data availability

The MICS 2022–23 dataset is publicly available on UNICEF's official website through the following link: <https://mics.unicef.org/surveys?display=card&key=s=Afghanistan>

## Declarations

### Ethics approval and consent to participate

Ethical approval for this study was waived by the Research Committee of the Department of Public Health, Faculty of Medicine, Kandahar University, as the analysis was based on secondary data obtained from the Afghanistan MICS 2022–2023. The MICS survey was approved by the Afghanistan Ministry of Public Health and UNICEF. All study participants provided informed consent before data collection, and for children, consent was obtained from a parent or legal guardian in accordance with survey protocols. Moreover, the study adheres to the Declaration of Helsinki.

### Consent for publication

Not applicable.

### Competing interests

The authors declare no competing interests.

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