

## Factors affecting maternal healthcare utilization in Afghanistan: secondary analysis of Afghanistan health survey 2012

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### ABSTRACT

This study, a secondary analysis of data from Afghanistan Health Survey 2012, aimed to identify factors affecting maternal healthcare utilization in Afghanistan. Subjects were 5,662 women aged 15–49 years who had had one delivery in the two years preceding the survey. Odds ratio (OR) and 95% confidence interval (CI) were estimated by logistic regression analysis. The study found that 54.0% of mothers used antenatal care (ANC) at least one time, and 47.4% of births were assisted by skilled birth attendants (SBA). Adjusted OR of ANC use was 2.74 (95% CI, 2.08–3.60) for urban residency, 1.69 (95% CI, 1.26–2.27) for primary education relative to no education, 3.94 (95% CI, 3.51–4.42) for knowledge on danger signs of pregnancy, and 1.78 (95% CI, 1.47–2.15) for television and radio relative to no exposure. Adjusted OR of SBA utilization was 3.71 (95% CI, 2.65–5.18) for urban residency, 0.67 (95% CI, 0.48–0.91) for age <20 years relative to age 34–49 years, 1.43 (95% CI, 1.03–1.97) for secondary and higher education relative to no education, 1.83 (95% CI, 1.47–2.27) for para 1 relative to para ≥5, 6.66 (95% CI, 5.43–8.15) for ≥4 ANC visits relative to no visit, 1.37 (95% CI, 1.21–1.57) for knowledge of danger signs of pregnancy, 1.62 (95% CI, 1.38–1.90) for radio relative to no exposure, and 2.71 (95% CI, 2.25–3.27) for rich households relative to poor ones. Since women's education and knowledge about danger signs of pregnancy were significant factors of both ANC and SBA, educating women may be an effective step in promoting safe maternal health.

Key Words: maternal healthcare, maternal mortality, skilled birth attendant, antenatal care, Afghanistan

### INTRODUCTION

Almost 289,000 women (800 women per day) worldwide died in 2013 due to pregnancy related complications or childbirth. These deaths could have been prevented through skilled care services and/or access to emergency obstetric care.<sup>1-4)</sup> Although there has been a 45% decrease in global maternal mortality rate (MMR) from 380/100,000 live births in 1990 to 210/100,000 live births in 2013, developing countries still carry a greater share of the burden.<sup>2,4)</sup> In consideration for the vital importance of maternal health, the United Nations has come to value maternal and child healthcare as a developmental and human rights issue. This was reflected in the Millen-

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Development Goals (MDG) to promote safe motherhood and childcare across the globe; emphasizing specifically maternal health with the fifth MDG, which aims to reduce maternal mortality rate to 75% from 1990 to 2015.<sup>4)</sup> Maternal healthcare services have remained a major challenge to the global public health system, especially in developing countries<sup>5,6)</sup> with huge disparities in access and utilization of the services across and within the countries, and between urban and rural areas. In 2012, of 40 million births delivered without skilled health personnel in developing countries, over 32 million deliveries took place in rural areas; the proportion of skilled birth attendance (SBA) utilization and four or more antenatal care (ANC) visits were 68% and 52%, respectively.<sup>4)</sup>

Developing countries suffer substantially high maternal death, accounting for 99% of the world's total maternal deaths,<sup>6-8)</sup> with a MMR 14 times higher (230/100,000 live births) than those of the developed countries (16/100,000 live births).<sup>2,4)</sup> Evidence suggests maternal mortality causes surviving children to face high risk for poverty, neglect, and mortality. It also affects the survival of children in a greater way than a non-maternal death.<sup>9)</sup> In low income countries, MMR is 450/100,000 live births and life time risk of maternal death is 1 in 52, while this risk in high income countries is 1 in 3,400.<sup>2)</sup> In 2013, Sub Saharan Africa had the highest death rate of 510/100,000 live births, followed by Southern Asia, Oceania and the Caribbean, each accounting for 190/100,000 live births, followed by Southeastern Asia, which had lower incidence.<sup>4)</sup> MMR varies strikingly among countries; for instance, Sierra Leone has the highest maternal rate with 1,100/100,000 live births while Belarus has a rate of 1/100,000 live births. Nearly one-third of all deaths are concentrated in two of the most highly populated countries: 17% in India and 14% in Nigeria.<sup>2)</sup>

Afghanistan has one of the worst records of child and maternal health, with 1 in 11 women dying from pregnancy or childbirth because of poor access to healthcare, and 1 in 5 children dying before reaching age five.<sup>10)</sup> Afghanistan has met MDG 5, which is the reduction of MMR to 50% between 2002 and 2015; however further reduction of 25% from the 2002 baseline is targeted by the year 2020.<sup>11)</sup> WHO estimated that though MMR in Afghanistan has declined from 1,100/100,000 live births in the year 2000 to 400/100,000 live births in 2013, it is still the highest in the region. According to estimates in a 2013 report by WHO, UNICEF, UNFPA and World Bank, not only Afghanistan's MMR but also its life time risk of maternal death (1 in 49) was estimated as the highest in the region. The report stated that maternal mortality per 100,000 live births was 32 in China, 23 in Iran, 170 in Pakistan, 44 in Tajikistan, 36 in Uzbekistan, 61 in Turkmenistan, and 190 in India. The lifetime risk of maternal death in all of the above countries is lower than that of Afghanistan.<sup>2)</sup> The Afghanistan mortality survey suggested that one woman dies every 2 hours in the country from pregnancy related causes; 41% of these deaths occur during pregnancy, 40% occur during delivery and 19% occur in post-partum stage. The main cause of deaths (56%) was hemorrhage, followed by obstructed or prolonged labor, preeclampsia/eclampsia, and sepsis/infection.<sup>12)</sup>

In developing countries, more than two-thirds of births are delivered by SBA, which has grown more slowly in rural areas than urban areas. It was estimated that lack of SBA contributes to the loss of 2 million lives each year worldwide.<sup>4)</sup> In Afghanistan, utilization of SBA at childbirth is an emphasized element of maternal and child healthcare, prioritized in the Basic Package of Health Services.<sup>13)</sup> Designed by Ministry of Public Health (MoPH) and delivered to all Afghan population, Basic Package of Health Services is an essential set of health services comprising maternal and child health, immunization, nutrition, communicable disease, disability, mental health, and supply of essential drugs.<sup>14)</sup> Increasing the proportion of SBA and ANC utilization is a central strategy for improving maternal and child healthcare in Afghanistan, where 10,000 maternal deaths and 40,000 neo-natal deaths could have been prevented in 2000 if 80% of deliveries were

assisted by SBA.<sup>12)</sup> The Afghanistan National Risk and Vulnerability Assessment reported that universal coverage of SBA utilization, coverage of at least one ANC visit and at least 4 ANC visits have remained low; being 39.9%, 51.2%, and 9.9%, respectively.<sup>15)</sup> Therefore, identification of factors influencing the use of maternal healthcare services will promote safe motherhood and increase national utilization coverage. Increasing access to and utilizing skilled health personnel at antenatal, natal and postnatal services are key interventions proved to be effective in reducing maternal mortality and morbidity. However, many women in developing countries do not obtain the recommended services.<sup>16)</sup> This is why WHO reports that the majority of pregnancy related deaths and complications are preventable, and thus recommends all healthy women to obtain at least four antenatal visits during pregnancy and to utilize SBA during childbirth.

Few studies have been conducted on factors that affect maternal healthcare utilization in Afghanistan. To present a countrywide and updated reproductive health status of mothers, this study is meant to explore the influencing factors and to bridge the knowledge gap by using secondary data from Afghanistan Health Survey (AHS) 2012 and applying multi-correlate assessment of maternal healthcare utilization among 15–49 years old childbearing Afghan women who had one delivery in the two years preceding the survey. The study is believed to help different health sector related institutions to design or modify their strategies and develop evidence based policies and thus may serve as effective tool for all health-project implementing bodies to promote safe motherhood.

## MATERIALS AND METHODS

This is a secondary analysis of AHS 2012 data obtained by a joint team composed of Johns Hopkins University (JHU), Indian Institute of Health Management Research (IIHMR) and MoPH of Afghanistan. AHS is a nationally representative household survey covering all 34 provinces of the country, designed and implemented to provide the government of Afghanistan, donors and key stakeholders with information on core indicators for maternal and child healthcare (MCH), health seeking behavior, healthcare utilization, and health related expenditures. The dataset is open to any researchers to find useful information through secondary analysis.

Afghanistan is administratively composed of 34 provinces each of which divides into districts. Districts are divided into villages and sub villages in rural areas and into urban blocks in urban areas, hereinafter referred as enumeration areas. The sampling was based on a pre-census household listing, which was obtained from Central Statistics Organization (CSO) in 2012. It included 45,000 enumeration units in rural and urban areas, while abandoned and destroyed villages were excluded from the sampling frame before sampling.

The data used for the present study were composed of two projects; Monitoring & Evaluation Technical Assistance for Strengthening of Health Activities of the Rural Poor (METASHARP) and Results Based Financing (RBF). Twenty five provinces were under the coverage of METASHARP project and 9 others were covered by RBF project.

In METASHARP provinces, stratified multi-stage cluster sampling method was applied. In the first stage, a list of clusters within each province was developed. In the second stage, clusters were sampled using systematic random sampling in each province. In the third stage, each cluster was sub-divided into segments such that each had a fixed size of 20 households. Finally, one segment was randomly selected and all households within the segment were sampled.

In RBF provinces, a multi-stage probability sampling scheme was applied. In the first stage, health facilities were sampled by using stratified random technique. In the second stage, two villages or clusters were randomly selected from the list of all villages in the catchment area

of the sampled health facilities. In the third stage, 24 households were sampled in each of the selected villages using simple random sampling.

Based on the sampling approach described above, 563 clusters were sampled but 552 clusters were completed which covered 12,227 households; however, as many as 12,209 households were found to be actual residential homes. Out of 12,209 households, 72 households were non responsive, for 99.4% household response rate. In 12,209 households, 14,780 eligible women were found with 14,551 women participating in the survey and being interviewed, for response rate of 98.5%.

From the study population, only those with a delivery in the last two years preceding the survey were included in the analysis. Two aspects of maternal healthcare utilization were selected as outcomes; use of ANC from skilled health personnel and use of SBA at childbirth. Delivery by SBA was defined as a delivery assisted by at least one of the three medical professionals (doctor, nurse, or midwife), which included both home and facility deliveries. ANC is a pregnancy related healthcare service including physical/lab examination, tetanus toxoid vaccination, and administration of pharmaceutical items like folic acid, as well as explanation of danger signs of pregnancy, birth plan, and referral system to a health facility. Explanatory variables available for analysis were place of residence, age, education, parity, number of ANC visits, knowledge of danger signs of pregnancy, media exposure, and wealth. Some of the explanatory variables were categorized as follows; less than 20 years, 20–34 years, and 35–49 years for age; 1 birth, 2–4 births, and 5 or more births for parity, no ANC visit, 1–3 visits, and 4 and more visits for ANC, no education, primary education, secondary, and higher education for level of education.

Odds ratios (ORs) and 95% confidence interval (CI) were estimated by logistic regression analysis. Statistical Package for Social Science (SPSS) version 22.0 (SPSS Inc. Chicago, IL, USA) was used for the calculation.

## RESULTS

The study subjects were 5,662 women who had at least one delivery in the last two years preceding the survey from 14,551 eligible women in the data set. Tables 1 and 2 show characteristics of the subjects according to ANC and SBA utilization. There were 4 missing values for ANC and 15 missing values for SBA utilization, resulting in 5,658 women and 5,647 women for analysis, respectively.

Women utilizing ANC services for their latest pregnancy were 54.0%; 77.4% in urban areas and 52.1% in rural areas. No large differences in the percentage were observed among different age groups and among different number of parity. The percentage was more than 70% among women educated primary or higher, while it was 52.3% among women with no education. Women with knowledge of the danger signs of pregnancy were more likely (69.3%) to attend ANC service than those without (36.2%). Women without media exposure were the majority, but they had the lowest percentage of ANC utilization (48.4%). Rich women tended to have frequent ANC utilization, as shown in Table 1.

Among all subjects, 47.4% had childbirth with SBA. There were similar tendencies in the SBA utilization, as shown in Table 2. However, the difference in the SBA utilization between urban (87.2%) and rural (44.1%) was more marked, while the difference between those with and without knowledge of the danger signs of pregnancy was less marked. The SBA utilization among women with primary education (64.1%) was higher than that among those with no education (45.3%) and lower than those with secondary or higher (71.7%). ANC visits and wealth had a strong influence on SBA utilization.

**Table 1** Antenatal care (ANC) utilization according to selected characteristics in Afghanistan, 2012 (n=5,658)

Characteristics	ANC utilization		
	Yes	No	Total
	Number (%)	Number (%)	Number (%)
<b>Residence</b>			
Urban	326 (77.4)	95 (22.6)	421 (100)
Rural	2,730 (52.1)	2,507 (47.9)	5,237 (100)
<b>Age</b>			
< 20	235 (59.9)	157 (40.1)	392 (100)
20–34	2,230 (54.2)	1,884 (45.8)	4,114 (100)
35–49	591 (51.3)	561 (48.7)	1,152 (100)
<b>Education</b>			
No education	2,665 (52.3)	2,429 (47.7)	5,094 (100)
Primary	188 (71.5)	75 (28.5)	263 (100)
Secondary+	190 (71.4)	76 (28.6)	266 (100)
<b>Parity</b>			
1	519 (58.1)	374 (41.9)	893 (100)
2–4	1,287 (53.1)	1,136 (46.9)	2,423 (100)
≥ 5	1,250 (53.4)	1,092 (46.6)	2,342 (100)
<b>Knowledge of danger signs of pregnancy</b>			
No	943 (36.2)	1,663 (63.8)	2,606 (100)
Yes	2,108 (69.3)	933 (30.7)	3,041 (100)
<b>Media exposure</b>			
No exposure	1,483 (48.4)	1,579 (51.6)	3,062 (100)
Radio	562 (50.2)	557 (49.8)	1,119 (100)
TV	373 (64.5)	205 (35.5)	578 (100)
TV and radio	628 (71.1)	255 (28.9)	883 (100)
<b>Wealth</b>			
Poor	1,734 (49.5)	1,770 (50.5)	3,504 (100)
Middle	544 (55.7)	433 (44.3)	977 (100)
Rich	778 (66.1)	399 (33.9)	1,177 (100)
All subjects	3,056 (54.0)	2,602 (46.0)	5,658 (100)

Missing data were 35 for education, 11 for knowledge of danger signs of pregnancy and 16 for media exposure.

**Table 2** Utilization of skilled birth attendant (SBA) at childbirth according to selected characteristics in Afghanistan, 2012 (n=5,647)

Characteristics	SBA-assisted delivery		
	Yes	No	Total
	Number (%)	Number (%)	Number (%)
<b>Residence</b>			
Urban	367 (87.2)	54 (12.8)	421 (100)
Rural	2,307 (44.1)	2,919 (55.9)	5,226 (100)
<b>Age</b>			
< 20	204 (52.3)	186 (47.7)	390 (100)
20–34	1,946 (47.4)	2,161 (52.6)	4,107 (100)
35–49	524 (45.6)	626 (54.4)	1,150 (100)
<b>Education</b>			
No education	2,304 (45.3)	2,781 (54.7)	5,085 (100)
Primary	168 (64.1)	94 (35.9)	262 (100)
Secondary+	190 (71.7)	75 (28.3)	265 (100)
<b>Parity</b>			
1	495 (55.7)	394 (44.3)	889 (100)
2–4	1,157 (47.8)	1,265 (52.2)	2,422 (100)
≥ 5	1,022 (43.8)	1,314 (56.2)	2,336 (100)
<b>Knowledge of danger signs of pregnancy</b>			
No	954 (36.7)	1,647 (63.3)	2,601 (100)
Yes	1,715 (56.5)	1,322 (43.5)	3,037 (100)
<b>Number of ANC visits</b>			
No Visit	671 (25.9)	1,923 (74.1)	2,594 (100)
1–3 Visits	1,384 (62.8)	819 (37.2)	2,203 (100)
≥4 Visits	558 (74.8)	188 (25.2)	746 (100)
Don't know	61 (58.6)	43 (41.4)	104 (100)
<b>Media exposure</b>			
No exposure	1,132 (37.0)	1,925 (63.0)	3,057 (100)
Radio	595 (53.3)	522 (46.7)	1,117 (100)
TV	341 (59.3)	234 (40.7)	575 (100)
TV and radio	598 (67.8)	284 (32.2)	882 (100)
<b>Wealth</b>			
Poor	1,287 (36.8)	2,210 (63.2)	3,497 (100)
Middle	527 (54.1)	448 (45.9)	975 (100)
Rich	860 (73.2)	315 (26.8)	1,175 (100)
All subjects	2,677 (47.4)	2,970 (52.6)	5,647 (100)

Missing data were 35 for education, 9 for knowledge of danger signs of pregnancy and 16 for media exposure.

To assess associations in terms of OR, logistic regression analysis was applied. In multivariate analysis, ORs of ANC use were adjusted for age, residence, education, parity, danger signs of pregnancy, media exposure, and wealth. SBA utilization was adjusted for the same, as well as for number of ANC visits.

As shown in Table 3, a significant adjusted OR of at least one ANC utilization was observed for urban residency (OR=2.74), education (OR=1.69 for primary education and OR=1.54 for secondary or higher compared to no education), knowledge of danger signs of pregnancy

**Table 3** Odds ratio (OR) and 95% confidence interval (CI) of antenatal care utilization in Afghanistan 2012 (n=5,658)

Variables	Unadjusted		Adjusted <sup>a</sup>	
	OR (95% CI)	P value	OR (95% CI)	P value
<b>Residence</b>				
Rural	1 (Reference)		1 (Reference)	
Urban	3.15 (2.49–3.99)	<0.001	2.74 (2.08–3.60)	<0.001
<b>Age</b>				
< 20 years	1.42 (1.13–1.79)	0.003	1.18 (0.88–1.60)	0.268
20–34 years	1.12 (0.99–1.28)	0.081	1.13 (0.96–1.33)	0.148
35–49 years	1 (Reference)		1 (Reference)	
<b>Education</b>				
No education	1 (Reference)		1 (Reference)	
Primary	2.29 (1.74–3.00)	<0.001	1.69 (1.26–2.27)	<0.001
Secondary+	2.28 (1.74–2.99)	<0.001	1.54 (1.14–2.08)	0.005
<b>Parity</b>				
1	1.21 (1.04–1.42)	0.015	1.11 (0.91–1.36)	0.306
2–4	0.99 (0.88–1.11)	0.859	0.93 (0.80–1.07)	0.292
5 or more	1 (Reference)		1 (Reference)	
<b>Knowledge of danger signs of pregnancy</b>				
No	1 (Reference)		1 (Reference)	
Yes	3.99 (3.57–4.46)	<0.001	3.94 (3.51–4.42)	<0.001
<b>Media exposure</b>				
No exposure	1 (Reference)		1 (Reference)	
Radio	1.07 (0.94–1.23)	0.305	0.89 (0.76–1.03)	0.111
TV	1.94 (1.61–2.33)	<0.001	1.34 (1.08–1.66)	0.007
TV and radio	2.62 (2.23–3.08)	<0.001	1.78 (1.47–2.15)	<0.001
<b>Wealth</b>				
Poor	1 (Reference)		1 (Reference)	
Middle	1.28 (1.11–1.48)	0.001	1.13 (0.96–1.32)	0.152
Rich	1.99 (1.73–2.28)	<0.001	1.08 (0.91–1.29)	0.384

a Adjusted for age, residence, education, parity, knowledge of danger signs of pregnancy, media exposure and wealth.

(OR=3.94), and having access to TV (OR=1.34), and having access to both TV and Radio (OR=1.78). Wealth showed a significant unadjusted OR, but did not show a significant adjusted OR. The adjusted association of residency was stronger for SBA utilization (OR=3.71) than for ANC (OR=2.74). Age, parity, knowledge on danger signs of pregnancy, media exposure, and wealth, were significantly associated with SBA utilization after the adjustment (Table 4). Education was also significant for SBA, as similar for ANC. Number of ANC visit was the strongest factor among those examined in this study.

## DISCUSSION

This paper identified factors that affected use of maternal healthcare services in Afghanistan among women aged 15–49 years, describing the estimated proportion of women using ANC during pregnancy and SBA at childbirth. The study revealed that 54.0% had at least one ANC visit with a skilled health provider during their latest pregnancy, and 47.4% of women giving birth in two years preceding the survey utilized SBA at childbirth.

Place of residency, education, danger signs of pregnancy, media exposure, and wealth were found to be significant factors associated with utilization of both ANC services and SBA assisted deliveries. The OR of attending an ANC visit was 2.7 and that of SBA utilization was 3.7 for women in urban areas compared to those of women residing in rural areas even after the adjustment. Our study was consistent with the results of studies conducted in developing countries like Namibia<sup>8)</sup> and Ethiopia.<sup>17-19)</sup> The difference in service coverage between urban and rural areas might be due to factors other than those adjusted in this study, such as better transportation system and higher employment opportunities in the urban areas, which enable the residents to access healthcare services to a greater extent than the rural ones. Labor force participation rate has been low for women in Afghanistan; the World Bank estimation was 16% for Afghan women aged 15 years and above in 2013.<sup>20)</sup> A possible explanation for this low rate could be cultural barriers, as well as due to high burdens related to household chores and child care.

The level of women's education influenced utilization of maternal healthcare services. Mothers who had primary education were 1.7 times more likely and mothers with secondary and higher education were 1.5 times more likely to utilize ANC compared to their peers with no education. A literature review on determinants of delivery use conducted by Gabrysch *et al.* reported a similar finding,<sup>21)</sup> and so did other studies in other developing countries.<sup>8,18,22)</sup> The OR of utilizing SBA for educated mothers was 1.4 over those with no education, which was consistent with the other studies.<sup>15,23-25)</sup> The higher maternal healthcare coverage among educated women may be due to their good level of awareness about types and availability of health services, their ability to read written information, and their use of these abilities to access health services.<sup>24)</sup> A study conducted in Southwest Ethiopia highlighted that educated mothers are well familiar with the benefits of preventive health; they have greater decision making power. These mothers have stronger confidence in dealing with healthcare providers and travel more outside of their homes.<sup>26)</sup>

Knowledge of the danger signs of pregnancy demonstrated significant association with utilization of maternal healthcare services. In this survey, the danger signs were explained as fever, bleeding, swelling of body/hands/face, and headache. Mothers with knowledge of the danger signs were nearly 4 times (OR=3.94) more likely to attend ANC visits and 1.4 times more likely (OR=1.37) to utilize SBA at child birth compared to those without the knowledge. This finding is supported by studies conducted in Nepal and Nigeria.<sup>22,27)</sup> Knowledge of the danger signs may make mothers more cautious about their health, as well as motivate and prepare them for timely and appropriate decision making. Similarly, other studies conducted in Ethiopia



**Table 4** Odds ratio (OR) and 95% confidence interval (CI) of delivery by skilled birth attendants in Afghanistan, 2012 (n=5,647)

Variables	Unadjusted		Adjusted <sup>a</sup>	
	OR (95% CI)	P value	OR (95% CI)	P value
Residence				
Rural	1 (Reference)		1 (Reference)	
Urban	8.60 (6.43–11.5)	<0.001	3.71 (2.65–5.18)	<0.001
Age				
< 20 years	1.31 (1.04–1.65)	0.021	0.67 (0.48–0.91)	0.012
20–34 years	1.08 (0.94–1.23)	0.275	0.79 (0.66–0.95)	0.009
35–49 years	1 (Reference)		1 (Reference)	
Education Level				
No education	1 (Reference)		1 (Reference)	
Primary	2.16 (1.67–2.79)	<0.001	1.38 (1.03–1.86)	0.032
Secondary+	3.06 (2.33–4.02)	<0.001	1.43 (1.03–1.97)	0.031
Parity				
1	1.62 (1.38–1.89)	<0.001	1.83 (1.47–2.27)	<0.001
2–4	1.18 (1.05–1.32)	0.005	1.29 (1.11–1.50)	0.001
5 or more	1 (Reference)		1 (Reference)	
Number of ANC <sup>b</sup> visits				
No visit	1 (Reference)		1 (Reference)	
1–3 visits	4.84 (4.28–5.48)	<0.001	4.26 (3.71–4.88)	<0.001
4 or more visits	8.51 (7.05–10.3)	<0.001	6.66 (5.43–8.15)	<0.001
Knowledge of danger signs of pregnancy				
No	1 (Reference)		1 (Reference)	
Yes	2.24 (2.01–2.49)	<0.001	1.37 (1.21–1.57)	<0.001
Media exposure				
No exposure	1 (Reference)		1 (Reference)	
Radio	1.94 (1.69–2.23)	<0.001	1.62 (1.38–1.90)	<0.001
TV	2.48 (2.07–2.97)	<0.001	1.08 (0.86–1.36)	0.494
TV and radio	3.58 (3.05–4.20)	<0.001	1.41 (1.16–1.72)	0.001
Wealth				
Poor	1 (Reference)		1 (Reference)	
Middle	2.02 (1.75–2.33)	<0.001	1.73 (1.46–2.04)	<0.001
Rich	4.69 (4.05–5.43)	<0.001	2.71 (2.25–3.27)	<0.001

a Adjusted for age, residence, education, parity, number of ANC visits, knowledge of danger signs of pregnancy, media exposure and wealth.

b Antenatal care

suggested that mothers who knew the signs and considered pregnancy as a risky period had higher likelihood of ANC utilization than those who perceived pregnancy as a risk free period.<sup>7,26)</sup> A study conducted in Uganda concluded that knowledge of the danger signs of pregnancy was significantly associated with knowledge of birth preparedness, making mothers four times more likely to be knowledgeable about birth preparedness and complication readiness than their peers who did not have the knowledge.<sup>28)</sup>

The MoPH of Afghanistan, as part of its health promotion activities, provides health education through public/private mass media on different health aspects, such as maternal and child care, and particularly on the importance of seeking institutionalized care from health facilities at prenatal, natal and postnatal phases like birth spacing. This has contributed to raising public health awareness and added to the services utilization coverage. Exposure to media significantly influenced utilization of maternal healthcare services. Women who had access to only TV and those with access to both TV and radio attended more ANC visits (OR=1.34 and OR=1.78, respectively) than those who were not exposed. Access to radio did not show significant effect to increase the likelihood of attending ANC visits before and after adjustment of variables. This might be due to a lower frequency of health education broadcasted via radio about the importance of ANC attendance. A study by Shivam *et al.* in Tanzania reported same effect of radio on ANC utilization.<sup>29)</sup> However, we expected a significant association of radio listening with ANC use. Women having access only to radio and those with access to both TV and radio were 1.6 times and 1.4 times more likely to utilize SBA, respectively, than those who were unexposed. Exposure to TV was a significant factor in unadjusted analysis ( $P<0.001$ , OR=2.48), however its effect was absent after controlling with other variables. A small proportion of women watching TV (575 respondents, 10.2%) might have been the reason that TV did not show significant effect. A study in Ethiopia found a similar result suggesting no association between watching TV and use of delivery, although it was significant with use of ANC.<sup>17)</sup>

Wealth was a strong and significant factor with a positive association on utilization of SBA. The method developed by Filmer and Pritchett was used for asset based measure of wealth status of the households in this survey.<sup>30)</sup> The assets were refrigerator, stoves/gas cooker, sewing machine, iron, radio, TV, DVD player/VCR, satellite phone, cell phone, bicycle, motorcycle, car, tractor and thresher. The wealthier the households were the higher chance SBA was utilized at childbirth. Women from the rich households were 2.7 times more likely to use SBA than those who were in poor ones. This result was consistent with studies conducted elsewhere.<sup>17,31)</sup> Though maternal healthcare is one of the elements of Basic Package of Health Services and being delivered free of charge in governmental health facilities, patients are required to pay for other expenses like transportation. In case of seeking health services in private facilities and home services, they are required to cover the expenditure out-of-pocket, which not all the clients can afford and thus they tend to choose unsafe deliveries which are not attended by SBA. Wealth was a significant determinant of ANC utilization in unadjusted analysis (OR=1.99), but not in adjusted analysis.

Age and parity did not affect the use of ANC significantly. The result for age contradicts those of some studies conducted in India, Nigeria and Ethiopia,<sup>7,24,29)</sup> but conforms with the findings of other studies conducted in Ethiopia<sup>17)</sup> and Republic of Congo.<sup>32)</sup> A study in Ethiopia reported a consistent finding,<sup>7)</sup> while other studies did not.<sup>15,17)</sup> For SBA utilization, age, parity, and number of ANC visits were statistically significant. Mothers with five or more children were less likely to utilize SBA compared to their counterparts with one child. This finding was consistent with those of other studies conducted elsewhere.<sup>17,26,33)</sup>

Frequency of ANC visits was found to be the strongest and significant predictor positively associated with utilization of SBA at childbirth. The study found that more ANC visits resulted

in more utilization of SBA. Further, those who completed four or more visits were 6.7 more likely to utilize SBA than those who did not attend any visits. This effect of ANC visits may be due to the fact that the visits are effective opportunities for health education, birth preparedness measures and for referral to a health facility. During the visits, expecting mothers are motivated and encouraged to seek health from skilled health provider at childbirth. A study conducted in Ethiopia reported a similar result, suggesting that ANC is an important entry point for subsequent use of delivery and prenatal care (PNC).<sup>17)</sup> Similarly, another study conducted in India reported that ANC is an important step in bringing women into contact with health system, facilitating women's access to medical care for future health needs including post-natal care.<sup>34)</sup>

Using a nationally representative survey as the source of data was the strength of this study which covered 12,209 households across the country. In addition, factors which influenced utilization of maternal health care services were identified using logistic regression analysis. However, there were some limitations that could not be avoided. All data collected for the study were based on self-reported information and were not verified by triangulating with other sources. Respondents were asked about events that occurred in the two years preceding the survey, which might have led to recall bias. This study was a cross-sectional study and we could only identify associations among outcome and explanatory variables, without drawing conclusion about the causality of the outcomes.

In conclusion, the results of this study indicated that educating mothers and increasing their awareness about the danger signs of pregnancy may lead to higher utilization rates of ANC and SBA, although government efforts are changing the environment surrounding Afghanistan women. Adopting interventions to address health inequity among different groups may be effective strategy in promoting maternal health. Despite the fact that ANC attendance and SBA utilization ensure safe motherhood and contribute to reducing maternal mortality, this study found that 46.0% of respondents did not use ANC and 52.6% of them gave birth without assistance of SBA. Health campaigns through the mass media may help to change women's behavior, attitudes and increase public awareness about health services in communities. Since quality of services, health providers' behavior, and clients' privacy all influence health seeking behavior of women, future studies to investigate the associations of the aforementioned domains with maternal service utilization are also needed.

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## CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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