

## FACTORS INFLUENCING NON-INSTITUTIONAL DELIVERIES IN AFGHANISTAN: SECONDARY ANALYSIS OF THE AFGHANISTAN MORTALITY SURVEY 2010

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### ABSTRACT

Home delivery in unhygienic environments is common among Afghan women; only one third of births are delivered at health facilities. Institutional delivery is central to reducing maternal mortality. The factors associated with place of delivery among women in Afghanistan were examined using the Afghanistan Mortality Survey 2010 (AMS 2010), which was open to researchers. The AMS 2010 data were collected through an interviewer-led questionnaire from 18,250 women. Odds ratio (OR) and 95% confidence interval (CI) of non-institutional delivery were estimated by logistic regression analysis. When age at survey, education, parity, residency, antenatal care frequency, remoteness, wealth and regions were adjusted, the OR of non-institutional delivery was 8.37 (95% CI, 7.47–9.39) for no antenatal care relative to four or more antenatal care visits, 4.07 (95% CI, 3.45–4.80) for poorest household relative to women from richest household, 2.02 (95% CI, 1.43–2.84) for no education relative to higher education, 1.78 (95% CI, 1.52–2.09) for six or more deliveries relative to one delivery, and 1.50 (95% CI, 1.36–1.67) for rural relative to urban residency. Since antenatal care was strongly associated with non-institutional delivery after adjustment of the other factors, antenatal care service may promote institutional deliveries, which can reduce maternal mortality ratio in Afghanistan.

Key Words: Maternal mortality, delivery, antenatal care, Afghanistan

### INTRODUCTION

Globally, 287,000 women were estimated to have died during pregnancy and childbirth in 2010. Although maternal mortality has shown a 47% decline since 1990, the levels are far from the 2015 Millennium Development Goal 5 (MDG5) target.<sup>1)</sup> The targets for improving maternal health are to reduce maternal mortality ratio (MMR) by three-fourths and to achieve universal access to reproductive health.<sup>1)</sup> The government of Afghanistan is committed to achieving MDG5, which

Received: September 10, 2014; accepted: October 30, 2014

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targets reduction in MMR by 50% between 2002 and 2015, and further reduction to 25% of the 2002 level by 2020.<sup>2)</sup> In Afghanistan, studies have found that the leading causes of maternal mortality were hemorrhage, obstructed or prolonged labor, and sepsis.<sup>3,4)</sup> The pregnancy-related mortality ratio was high in rural areas comparing to urban areas, and higher with remoteness as well.<sup>4)</sup> The recent Afghanistan Mortality Survey 2010 (AMS 2010) showed a dramatic reduction in the pregnancy-related mortality ratio to 327 per 100,000 live births compared with the findings of a previous study conducted in 2001, although there was a difference in design between the two studies.<sup>3,4)</sup> Reductions of maternal and neonatal mortality are high priorities in Afghanistan because there are still growing concerns regarding complications from pregnancy and child health. Complications from pregnancy account for about two in five deaths in women aged 15–49 years. According to the AMS 2010, one Afghan woman dies every two hours from pregnancy-related causes.<sup>3)</sup> There is expert consensus that deliveries by skilled birth attendants at a health facility substantially reduce the risk of maternal death. In addition, by increasing of antenatal care (ANC), postnatal care and family planning, the maternal mortality can be further reduced.<sup>5)</sup>

The Ministry of Public Health (MoPH) of Afghanistan is promoting safe motherhood through various activities, including institutional deliveries or deliveries by skilled birth attendants. The MoPH of Afghanistan has focused its attention on the delivery of a Basic Package of Health Services (BPHS) and Essential Package of Hospital Services (EPHS).<sup>6,7)</sup> Institutional delivery and ANC are important pillars of safe motherhood initiative.<sup>8)</sup> They are included as central parts of the BPHS, which should be provided to all Afghans to reduce maternal as well as neonatal morbidity and mortality.<sup>6)</sup> Despite many efforts by the MoPH to provide equal access to better quality of health services to all Afghans, with a focus on women and children in rural areas of the country, there are still concerns about those who are unable to access the health services particularly in the rural areas.<sup>9)</sup> Increasing the proportion of births assisted by skilled birth attendants (doctors, midwives and nurses) trained in safe delivery care during the delivery is a central strategy for improving maternal and child health in Afghanistan.<sup>10)</sup> If skilled birth attendants assisted 80% of pregnant Afghan women, an estimated 10,000 maternal and 40,000 neonatal deaths would have been prevented in 2002.<sup>4,10-12)</sup> Proper medical attention and hygienic conditions during delivery can reduce the risk of complications and infections that may cause the death or serious illness of the mother, the baby, or both.<sup>10)</sup> A key strategy to reducing maternal and neonatal deaths is the 'health-center intrapartum care strategy,' where qualified skilled workers manage labor, effectively manage complications and are supported with effective referral systems for specialized care when needed, and an effective postnatal care package.<sup>13-15)</sup> Hence, an important component in the effort to reduce the health risks of mothers and children is to increase the proportion of babies delivered in a safe, clean environment under the supervision of health professionals.<sup>16)</sup>

Institutional delivery, however, is affected largely by the social and economic situation of the target population. Factors such as age, education, urban/rural setting, sociocultural practices, and access and utilization of ANC significantly influence institutional delivery. Therefore, there is a need to understand the social, economic, demographic and familial dynamics controlling for all factors that influence the choice of place of delivery among women in Afghanistan. The study aims to explore the influencing factors associated with non-institutional deliveries among women in Afghanistan adjusted for other potential factors using the AMS 2010. In addition, this study describes the reasons of women for not delivering at health facility and identifies the possible barriers to access of health services from the view point of the Penchansky and Thomas model.<sup>19)</sup>

## MATERIALS AND METHODS

### *Data Source*

The data were taken from the AMS 2010, which was conducted by Afghan Public Health Institute of the MoPH, the Central Statistical Organization (CSO) of Afghanistan from April to December 2010. The technical assistance for the AMS 2010 was provided by ICF Macro (an international company), Indian Institute of Health Management Research (IIHMR) and the World Health Organization Regional Office for the Eastern Mediterranean (WHO/EMRO). The survey was financially supported by United States Aids for International Development (USAID), and United Nations Children's Fund (UNICEF). The AMS 2010 is part of the worldwide MEASURE DHS project that assists countries in the collection of data to monitor and evaluate population, health, and nutrition programs. The AMS 2010 was a national wide survey that covered 24,032 sampled households with urban-rural breakdowns of all 34 provinces of Afghanistan. In this survey, data of married women aged 12–49 years (n=48,190) were sampled from the 24,032 households. The AMS 2010 covered 87% of population (98% of urban areas and 84% of the rural areas). Ethical approval for the AMS 2010 was obtained from the institutional review boards at the MoPH, ICF Macro, IIHMR, and WHO. The obtained data for this study were based on anonymous public use data with no identifiable information on survey respondents. Therefore, no further ethical approval was necessary. The data collection methods have been described in details in the AMS 2010 report.<sup>3)</sup>

### *Data Analysis*

To examine the associations between place of delivery (in particular home deliveries) and social and economic factors, the following ten independent variables were selected from the AMS 2010 dataset for this study: age at survey, education, parity, ANC frequency, ANC provider, wealth quintiles, remoteness quintiles, rural/urban residence, region and ethnicity. These were selected based on the previous studies. These variables are potentially confounding on the place of delivery. In order to make the analysis more simple and meaningful, we regrouped some of the variables from their origin group in the dataset. The following variables were regrouped: age was regrouped into less than 20, 20–24, 25–29 and 30 and above, parity was regrouped into 1 child, 2–3 children, 4–5 children, 6 and more children, education was regrouped into higher education, secondary education, primary education and no education and finally the ANC frequency was regrouped into 4 or more visits, 2–3 visits, 1 visit, and no visit. Although the AMS 2010 report applied weighted frequency,<sup>3)</sup> we used the raw data because multivariate analysis can be applied to raw data, but not for weighted frequency. In the multivariate analysis, logistic regression was applied to calculate adjusted odds ratio (OR) and 95% confidence interval (CI). All statistical associations were considered to be significant at a  $p < 0.05$ . The STATA 12 program was used for data analysis.

## RESULTS

In total, 48,190 women participated in the AMS 2010. Among them 18,255 had at least one child birth, including still birth, within five years before the survey. Sixty two percent of women had a non-institutional delivery. Table 1 shows the distribution of 10 selected factors. The mean age of the study population was 29.2 years. Nearly 5% of mothers were under 20 years of age. About 24% of mothers were between 20–24 years old, and 27% were between 25–29 years old and almost 50% of mothers above 30 years old. About 14% of mothers had one child, 29%

two to three children, 24% four to five children and almost 34% of mothers had more than six children. The number of children born ranged from 1–16. Eighty six percent of mothers had no education, 8% had primary education, nearly 6% had secondary education, and only more than 1% of mother had higher education. Although 347 subjects were in the Central Highland region, more than 1,000 women were sampled from the other seven regions. More than 70% of women lived in a rural area and 30% lived in an urban area.

We explored associations between delivery place and the 10 respondent factors listed in Table 2. In unadjusted analysis, all levels of all factors were significant, except “Baloch” and “Other” for ethnicity. Since ethnicity and ANC provider were linked with the other factors, both were excluded in the multivariate analysis. The number of ANC visits and the wealth status of household were strongly associated with non-institutional delivery. Women with no antenatal visit or women from the poorest quintile were 12 times more likely to have non-institutional delivery compared to those with four or more antenatal visits (OR=12.11) or women from the richest quintiles (OR=12.19). However, after adjusting for the other variables, the odds ratio for ANC visits was 8.37, and for wealth quintile 4.07, indicating that ANC visits is a significant predictor of institutional delivery. Education was also a prominent factor. The OR for women with no education was 6.54 relative to women with higher or secondary education, while adjusted OR was 2.02. There was no significant difference between secondary education and higher education. Rural residency and remoteness were significant factors for non-institutional delivery in the unadjusted analysis. After adjustment, the OR reduced to 1.50 and 1.41, respectively. The unadjusted OR for parity was 1.58 (2–3 children), 1.74 (4–5 children), and 1.93 (six or more children) relative to one child. The adjusted OR was similar; 1.66, 1.82, and 1.78, respectively. The adjusted OR for age group was not significant. Region had significant association with the non-institutional delivery. Women living in the Central Highland (Bamyan and Daikundi provinces) had the highest OR of non-institutional delivery (OR=8.12) compared to the capital region, followed by the North Eastern region (OR=5.39), which includes the hard-to-reach province of Badakhshan. Western region had the third highest (OR=4.74), followed by South Eastern region (OR=3.79), Northern region (OR=3.38), Eastern region (OR=2.55), and Southern region (OR=2.14). The adjustment reduced the ORs in any region.

Excluding traditional birth attendant (OR=1.49), the existence of ANC providers was negatively associated with non-institutional delivery; the unadjusted OR was 0.13 for doctor, 0.18 for midwife or nurse, and 0.39 for community health worker. Practice of delivery varied among the different ethnic groups in Afghanistan. Compared to women of Pashton ethnicity, Hazara (OR=1.20), Uzbek (OR=1.71), Turkman (OR=1.61), Nuristani (OR=13.13) and Pashai women (OR=1.44) were more likely to deliver at home, while Tajik women were less likely to have delivery at home comparing with Pashton women (OR=0.83).

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**Table 1** Characteristics of women aged 15–49 years (n=18,255) in Afghanistan

Variables	Number (%)	Variables	Number (%)
Place of delivery		Remoteness quintiles	
Institutional delivery	6,881 (37.69)	Least remote	2,302 (12.61)
Non-institutional delivery	11,374 (62.31)	Second	3,299 (18.07)
		Middle	3,591 (19.67)
Age		Fourth	4,712 (25.18)
Less than 20	877 (4.80)	Most remote	4,351 (23.83)
20–24	4,298 (23.54)		
25–29	4,878 (26.72)	Wealth quintiles	
30+	8,202 (44.93)	Richest	4,878 (26.72)
		Second	3,871 (21.21)
Parity		Middle	3,256 (17.84)
1	2,479 (13.58)	Fourth	3,158 (17.30)
2–3	5,212 (28.55)	Poorest	3,092 (16.94)
4–5	4,406 (24.14)		
6 or over	6,158 (33.73)	Region	
		Capital	3,124 (17.11)
Education		Northern	2,912 (15.95)
Higher	242 (1.33)	Western	1,995 (10.93)
Secondary	854 (5.68)	Central Highland	347 (1.90)
Primary	1,415 (7.75)	North Eastern	3,060 (16.76)
No Education	15,744 (86.24)	Eastern	3,088 (16.92)
		Southern	1,778 (9.74)
ANC <sup>1</sup> frequency		South Eastern	1,951 (10.69)
No visit	6,227 (34.11)		
1 visit	2,512 (13.76)	Ethnicity	
2–3 visits	6,043 (33.10)	Pashton	8,107 (44.41)
≥ 4 ANC visits	3,286 (18.00)	Tajik	6,091 (33.37)
Missing value	187 (1.02)	Hazara	1,365 (7.48)
		Uzbek	1,478 (8.10)
ANC provider		Turkmen	333 (1.82)
None	6,227 (34.11)	Nuristani	199 (1.09)
Doctor	6,932 (37.97)	Baloch	90 (0.49)
Midwife/nurse	4,560 (24.98)	Pashai	259 (1.42)
TBA <sup>2</sup>	390 (2.40)	Others	318 (1.74)
CHW <sup>3</sup>	72 (0.39)		
Data missing	28 (0.15)		
Residence			
Urban	5,429 (29.74)		
Rural	12,826 (70.26)		

<sup>1</sup> Antenatal care, <sup>2</sup> traditional birth attendant, and <sup>3</sup> community health worker

**Table 2** Unadjusted and adjusted odds ratio (OR) of selected factors of non-institutional deliveries among women in Afghanistan (n=18,255)

Variable	Unadjusted OR (95%CI)	P value	Adjusted OR <sup>1</sup> (95%CI)	P value
<b>Age</b>				
Less than 20	1 (Reference)		1 (Reference)	
20–24	1.21 (1.05–1.40)	<0.001	1.06 (0.88–1.26)	0.558
25–29	1.40 (1.20–1.60)	<0.001	1.10 (0.90–1.33)	0.346
30+	1.59 (1.38–1.83)	<0.001	1.13 (0.92–1.40)	0.227
<b>Parity</b>				
1	1 (Reference)		1 (Reference)	
2–3	1.58 (1.43–1.74)	<0.001	1.66 (1.47–1.88)	<0.001
4–5	1.74 (1.58–1.93)	<0.001	1.82 (1.58–2.11)	<0.001
6 or over	1.93 (1.76–2.13)	<0.001	1.78 (1.52–2.09)	<0.001
<b>Education</b>				
Higher	1 (Reference)		1 (Reference)	
Secondary	1.05 (0.75–1.46)	<0.001	0.82 (0.56–1.20)	0.797
Primary	2.31 (1.68–3.16)	<0.001	1.37 (0.96–1.96)	<0.001
No Education	6.54 (4.85–8.81)	<0.001	2.02 (1.43–2.84)	<0.001
<b>ANC<sup>2</sup> frequency</b>				
≥ 4 ANC visits	1 (Reference)		1 (Reference)	
2–3 visits	2.05 (1.87–2.23)	<0.001	1.75 (1.58–1.93)	<0.001
1 visit	3.11 (2.79–3.46)	<0.001	2.51 (2.22–2.83)	<0.001
No visit	12.11 (10.9–13.4)	<0.001	8.37 (7.47–9.39)	<0.001
Don't Know	2.10 (1.56–2.82)	<0.001	1.63 (1.18–2.27)	<0.001
<b>ANC provider</b>				
None	1 (Reference)			
Doctor	0.13 (0.12–0.14)	<0.001		
Midwife/nurse	0.18 (0.16–0.20)	<0.001		
TBA <sup>3</sup>	1.49 (1.06–2.09)	<0.001		
CHW <sup>4</sup>	0.39 (0.23–0.65)	<0.001		
<b>Residence</b>				
Urban	1 (Reference)		1 (Reference)	
Rural	4.75 (4.44–5.08)	<0.001	1.50 (1.36–1.67)	<0.001
<b>Remoteness quintiles</b>				
Least remote	1 (Reference)		1 (Reference)	
Second	1.62 (1.45–1.80)	<0.001	1.10 (0.97–1.25)	0.167
Middle	2.16 (1.95–2.41)	<0.001	1.08 (0.95–1.23)	0.212

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Fourth	3.56 (3.21–3.95)	<0.001	1.48 (1.31–1.69)	<0.001
Most remote	4.32 (3.88–4.81)	<0.001	1.41 (1.23–1.61)	<0.001
Wealth quintiles				
Richest	1 (Reference)		1 (Reference)	
Second	2.61 (2.39–2.85)	<0.001	1.57 (1.41–1.74)	<0.001
Middle	3.66 (3.33–4.02)	<0.001	1.96 (1.74–2.21)	<0.001
Fourth	6.29 (5.68–6.97)	<0.001	2.90 (2.53–3.33)	<0.001
Poorest	12.19 (10.8–13.8)	<0.001	4.07 (3.45–4.80)	<0.001
Region				
Capital	1 (Reference)		1 (Reference)	
Northern	3.38 (3.04–3.76)	<0.001	1.96 (1.72–2.23)	<0.001
Western	4.74 (4.19–5.36)	<0.001	2.31 (1.99–2.68)	<0.001
Central Highland	8.12 (6.09–10.8)	<0.001	1.85 (1.35–2.55)	<0.001
North Eastern	5.39 (4.82–6.02)	<0.001	2.09 (1.83–2.39)	<0.001
Eastern	2.55 (2.31–2.83)	<0.001	1.23 (1.08–1.40)	0.002
Southern	2.14 (1.90–2.41)	<0.001	1.63 (1.42–1.87)	<0.001
South Eastern	3.79 (3.36–4.27)	<0.001	1.67 (1.44–1.94)	<0.001
Ethnicity				
Pashton	1 (Reference)			
Tajik	0.83 (0.78–0.89)	<0.001		
Hazara	1.20 (1.07–1.36)	<0.001		
Uzbek	1.71 (1.51–1.93)	<0.001		
Turkmen	1.61 (1.26–2.05)	<0.001		
Nuristani	13.13 (6.72–25.7)	<0.001		
Baloch	0.81 (0.53–1.24)	0.334		
Pashai	1.44 (1.10–1.89)	<0.001		
Others	1.82 (1.41–2.35)	0.358		

<sup>1</sup> Adjusted for all listed variables, but ethnicity and ANC provider, <sup>2</sup> antenatal care,

<sup>3</sup> traditional birth attendant, and <sup>4</sup> community health worker

## DISCUSSION

A strong association was found between number of ANC visit, household wealth and place of delivery. Women with no antenatal visits or women from the poorest quintile showed twelfold odds of non-institutional delivery compared to those with 4 or more ANC visits or women from the richest quintiles. However, after adjusting for other significant variables, women with no ANC visits were 8 times more likely to have non-institutional delivery compared to those with 4 or more ANC visits, while women in the poorest households were 4 times more likely to have non-institutional delivery compared to those in the richest households, making antenatal visits the most significant predictor of institutional delivery.

After ANC visits and household wealth, education was a prominent predictor. Women with

no education were 6.5 times more likely than women with higher or secondary education to have a non-institutional delivery, while adjusted for other variables as age, parity, frequency of antenatal visits, urban/rural setting, remoteness, region and wealth, they were twice more likely to have non-institutional delivery than those with higher or secondary education. Urban/rural residency and remoteness were also significant predictors of non-institutional delivery. Unadjusted for other variables, women living in rural areas were almost five times more likely to have non-institutional delivery compared to those living in urban areas. Similarly, women in the most remote areas were 4.5 times more likely to have non-institutional delivery compared to those in the least remote areas. Normally, rural settings were the most remote areas, while urban settings were the least. After adjusting for other significant predictors, women in rural areas or women in the most remote areas were 1.5 times more likely have non-institutional delivery compared to those living in urban settings or women living the least remote areas. Parity was a significant and steady predictor of non-institutional delivery without any strong correlation with other predictors. Finally, age group was a statistically significant variable, with every level of increase in the age group the chance of non-institutional delivery slightly increasing when not adjusted for other variables. However, age was not significant predictor of non-institutional delivery when adjusted for other variables.

In the AMS 2010, a list of factors was asked from women participants as their reasons for non-institutional delivery. We assigned the reasons into the Penchansky and Thomas model of access to health.<sup>19-21</sup> In the Penchansky and Thomas model, access to health care is classified into five distinct dimensions: affordability, accommodation, availability, accessibility, and acceptability. Among the reasons for non-institutional delivery in Afghanistan, more than half of the women participants mentioned affordability (lack of money 51.1%) and accessibility dimensions (too far and transportation problems 51.9%) as the most common barriers; however, more than one third of women participants experienced acceptability barriers (not necessary 35.5%, not customary 19.2%, none to accompany 13.6%, not life threatening, no good service available 9.3 %, religious restriction 2.3%, no permission 6.9%, and better service at home 4.9%), 13.1% availability barriers (no female provider available 13.1% and no knowledge where to go 2.1%), and 11.9% accommodation barriers (long waiting time 4.6%, inconvenient service hour 6.8%, afraid of bad people 2.4%, afraid of health facility 1.8%, and security reason 11.9%). The women's perceptions are aligned with our findings that household wealth, an indicator of financial problems, and remoteness and rural settings, both indicators of poor physical infrastructure such as bad roads or no roads, were significant predictors of institutional delivery.

The aforementioned findings are consistent with studies conducted in low-income and lower middle-income settings such as in Kenya,<sup>22</sup> Bangladesh,<sup>23</sup> India,<sup>24</sup> Pakistan,<sup>5</sup> Malawi,<sup>17</sup> and in Nepal.<sup>18</sup> Nevertheless, individual factors cannot explain the complexity of non-institutional delivery; a web of association among the factors makes the impact greater than that of the sum of all of them. For example, we found that the number of ANC visits were the most important factor of institutional delivery. However, the pathway of ANC visits leading to institutional delivery is affected by the level of women's education, women's household wealth and women's parity. A study in Pakistan found that maternal factors, particularly parity and mother's education, had a substantial effect on a woman's making at least three ANC visits during her last pregnancy, and being from poor households made women less likely to make three ANC visits, and thus to deliver at a health facility.<sup>5</sup> In addition, this study supported the focused ANC of WHO recommending a minimum of four visits for ANC including screening and treatment for infections and identification of warning signs during pregnancy.<sup>25</sup> ANC is a unique opportunity to promote safe delivery and healthy behavior such as breastfeeding, early postnatal care, family planning, and increasing the number of ANC visits to at least four, which will, in turn, create a

link between mother and her family with the health system, and increase the chance of a safe delivery that contributes to a healthy life cycle.

In the meantime, women's education is a crucial pathway to institutional delivery. Higher levels of women's education have a direct association with institutional delivery. Similar to this study, a study in Nigeria also found that urban/rural differences had significant associations with the place of delivery.<sup>26)</sup> Perhaps this is due to higher proportion of educated women in urban areas than in rural areas. They get maternal and other health services nearby, and have better access to information than rural mothers. So, higher levels of women's education have a direct association with institutional delivery.

Bartlett and her colleagues found wide-ranged regional disparity in Afghanistan with regard to MMR for the period of 1999–2002.<sup>4)</sup> Despite the recent decline in maternal mortality over time, these disparities were yet visible. For example, the Central Highland region (Bamyan and Daidkondi provinces), the North Eastern region (Badakhshan, Takhar, Kunuz and Baghlan provinces), the Western region (Ghor, Badghis, Farah and Hirat provinces) and the Northern region (Faryab, Saripol, Samangan, Jawzjan and Balkh provinces) had a high OR of non-institutional delivery.

One of the indicators for measuring MDG5 is the proportion of birth delivered with assistance of a skilled personnel. In almost all countries, where health professionals attended more than 80% of deliveries, MMR were below 200 per 100,000 live births.<sup>27)</sup> The number of deliveries taking place in health facilities in Afghanistan, thus attended by skilled personnel, was 32% in the AMS report,<sup>3)</sup> and 24% in the Afghanistan MDG 2010 report.<sup>28)</sup> The number of births attended by skilled personnel in general maybe higher, as there are some trained community midwives who attend deliveries at home. The community midwife program through which midwives attend deliveries at home can be a solution to the cultural challenge of not attending (or not allowing women to attend) a health facility. At health facility or at home, skilled birth attendance is strongly related to reduced MMR, and by increasing health facility delivery, and home delivery by community midwives,<sup>29)</sup> Afghanistan may reach the target set by MDG for 2015 (50%), and/or 2020 (75%).

The main strength of this study was using a national representative survey data sample of 24,032 households covering more than 87% of the whole country. In addition, the multivariate logistic regression analysis identified the factors influencing women in Afghanistan on choosing place of delivery. However, the study had some limitations. There might be recall biases regarding the place of delivery collected from mothers. The data on wealth, distance and residence reflected the situation at the time of the survey and not at the time of delivery, resulting in the misclassification on the categories.

In conclusion, the determinants of non-institutional delivery found in this study have useful implications for both health providers and health policy makers for promoting and strengthening institutional delivery strategies in Afghanistan. The findings, thus, suggest that interventions targeting increased institutional delivery should be comprehensive. Health sector-related interventions may include projects that provide ANC for women with more living children, women with low or no formal education, and women from the poorest households. However, long-term multi-sectorial interventions should be comprised of national programs that focus on encouraging and promoting women's education, preventing early marriage, increasing household income, and promoting family planning and having fewer children in the family. It goes without saying that sustainable health infrastructure that guarantees availability, accessibility, and affordability of health services is a must.

## ACKNOWLEDGEMENTS

We would like to thank the Afghan Public Health Institute (APHI) of Ministry of Public Health of Afghanistan and Measure DHS for providing the study data and advises. Many thanks to all our friends and colleagues as Dr. Ihsnaullah Shahir, Professor Bill William Newbrander, Dr. Hafiz Rasooli, Dr. Hemati, Dr. Masoud Mehrzad, Dr. Aeraj Feroz, Dr. Mohammad Abul Bashar Sarker, Dr. Hiroswawa Tomoya for their good advices during the study design. We are very grateful for the support of Associate Professor Michiyo Higuchi, Dr. Khalid Aryanfer, Dr. Rahela Kaveer, Dr. Tahir Khan, and Dr. Essa Tawfiq who have encouraged and provided us very good comments and feedback during reviewing of the manuscript. In addition, we would like to express our gratitude and appreciation to Ms. Aya Higa for all their supports during my study time, and are thankful to Mr. Joshua A. Reyer, Assistant Professor, Department of Healthcare Administration, Nagoya University Graduate School of Medicine, for English language review of this manuscript. The authors declare that they have no conflict of interest.

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