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UTILIZATION OF SKILLED BIRTH ATTENDANT IN SOUTH ASIAN REGION: A COMPARATIVE STUDY OF INDIA, BANGLADESH AND NEPAL

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ABSTRACT

Background: Skilled birth attendant is an important indicator which plays a significant role to increase safe delivery and reduce maternal and child mortality. This study aimed to analyze the practices and determinants of delivery by Skilled Birth Attendants (SBAs) in the selected South Asian countries. **Methods:** The world development indicators of World Bank, the cross-sectional data of National Family Health Surveys and Demographic Health Surveys were used as data sources. We used descriptive statistics, bi-variate analysis, Pearson's correlation coefficient and binary logistic regression to accomplish our objectives. **Results:** Our findings suggest the negative correlation between MMR, NMR and accessing SBAs services. The utilization of SBAs was relatively lower among women belonged to Bangladesh compared to Nepal and India. In Nepal, the percentage of SBA have increased by 35 percentage points which were higher than India and Bangladesh. Mother's age, birth order, place of residence and religion had influenced SBAs utilization but wealth index and education status were the major determinants of delivery by SBAs. The odds ratio of SBAs among higher educated women were 8.501 (in 2005-06), 6.041 (in 2011) and 4.580 (in 2011) times compared to women with no education in India, Bangladesh, and Nepal respectively. **Conclusions:** A large proportion of women in the South Asian region still continues to deliver babies without the assistance of SBAs. The utilization of SBA need to be improved among women with no education and economically poor households. The question remains concerning achievement of development goals and increasing institutional deliveries.

KEYWORDS: Maternal health, Skilled Birth Attendant, Safe delivery, South Asian region.

INTRODUCTION

Complications during pregnancy and childbirth are leading cause of death among women of reproductive age group in the developing region in comparison to the developed region.[1] Approximately 289,000 maternal deaths occurred worldwide in 2013, and meanwhile, the death of newborn has reached at 3.6 million within the first four weeks of birth.[2]

The skilled birth attendant is an important indicator which plays a significant role to increase safe delivery and reduce maternal and child mortality.[3] The use of skilled birth attendant has been the key strategy to increase safe delivery and prevent the maternal mortality over the last two decades.[4] The members of the United Nations (UN) adopted the Millennium Declaration and set eight-millennium development goals in September 2000, one of which is reducing maternal mortality.[5] Delivery conducted by SBAs was selected as an indicator to monitor the progress towards the MDG-5 target of reducing maternal mortality worldwide.[6] The use of SBAs during the antepartum, intrapartum and postpartum period could prevent many occurrences of maternal morbidity and mortality. Unfortunately, qualified midwives, nurses and doctors are often not available in the rural areas of many developing countries where most women are delivered.[7]

The World Health Organization (WHO) defines a skilled birth attendant (SBA) as "an accredited health professional such as a midwife, doctor or nurse- who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborns".[8]

Worldwide, 65.7 percent of births were attended by a skilled health worker. This means each year, worldwide 45 million births happened at home without the skilled birth attendants. In developed countries more than 99 percent of birth have been assisted by skilled health

personnel, the comparative figure in developing countries is 62 percent. In Africa and Asia, only 46.5 percent and 65.4 percent respectively, of women gave birth with professional assistance.[7]

The skilled birth attendance rate is less than 50 percent in Bangladesh and between 50 percent and 60 percent in India and Nepal.[9] The utilization of skilled birth attendants at delivery among rural women in Bangladesh, Nepal and India are very poor.[10-12] Home delivery conducted without the assistance of skilled birth attendants is still a common practice among them.[10,12] It is, therefore, imperative to analyze the trends and patterns of skilled birth attendants across three South Asian countries (India, Bangladesh and Nepal) and examine the factors associated with the skilled birth attendant in the selected countries.

MATERIALS AND METHODS

Data Source: The development indicators such as Skilled Birth Attendant (SBA), Maternal Mortality Ratio (MMR) and Neonatal Mortality Rate (NMR), published by World Bank were used in this study to examine the correlation between the utilization of SBAs and MMR and NMR in India, Bangladesh and Nepal. The data sources of this study were Demographic Health Surveys (DHS) which are known as National Family Health Survey (NFHS) in India. It was NFHS-I & II for the India, conducted in 998-1999 and 2005-2006 respectively. In the country of Bangladesh, the data were taken from DHS-I, II & III, carried out in 1999-2000, 2007 and 2011 respectively. The data sources for the Nepal were DHS-I (1996), DHS-II (2006) and DHS-III (2011) as well.

Description of Variables: The independent variables were mother's age, birth order, place of residence, religion, mother's education and wealth quintiles. We categorized the mother's age(15-24,25-34 and 35+), birth order (1, 2-3, 4-5, 6+), place of residence (urban, rural), religion (Muslim, Hindu and Other), mother's education (no education, primary, secondary and higher) and wealth index (poorest, poorer, middle, richer and richest). The NFHS-2 (India), DHS-2 (Bangladesh) and DHS-1 (Nepal) did not collect data on household income or consumption. Consequently, we measured household wealth concerning ownership of household assets. Asset information was collected through the NFHS and DHS household questionnaire. The questions for household's ownership of consumer items were the fan, television, bicycle, telephone and car, agricultural land, type of drinking water sources and toilet facilities and other characteristics.

Statistical Analysis: Principal component analysis was used to generate wealth index. Bi-variate analysis, Pearson's correlation coefficient, and binary logistic regression were performed to analyze the factors influencing the skilled birth attendants. The relative change was also calculated to see the changes in the using of skilled birth attendant over the time. The SPSS version 20.0 was used for all the statistical calculations.

RESULTS

The relationship between the utilization of skilled birth attendants (SBA) and maternal mortality ratio (MMR) as well as neonatal mortality rate (NMR) in the three selected countries at the different point of time has been shown in the Fig. 1. It was found that as the percentage of using SBAs was increased the MMR and NMR were decreased in all three countries. Pearson's correlation coefficient was used to examine the relationship of delivery conducted by trained births attendants with maternal mortality ratio and neonatal mortality rate. This statistical technique apparently supported the strong negative linear relationship of receiving SBAs with MMR and NMR in all the countries. In the recent year, the coverage of births attended by skilled birth attendants is recorded as 52 percent, 42 percent and 56 percent in India (2008), Bangladesh (2014) and Nepal (2014) respectively. India's pregnant women had used SBAs at the time of their delivery more than double in percentage compared to the Bangladesh and Nepal in 2006.

We found a steady increase in utilization of SBAs in Nepal over the periods (Table 1). During 1998-1999, India's skilled birth attendant was 42 percent, and it was increased by 4.2 percentage points during the eight-year period. On the other hand, during the 1999-2000 Bangladesh recorded only 22 percent which was half of the India's recorded birth attendant during 1999-2000. The utilization of skilled birth attendant in Bangladesh was stagnant at the low level during last decade. However, use of skilled birth attendant in Nepal was increased rapidly from 10 percent in the year 1996 to the level of 45 percent in the year 2011.

Table 2 illustrated the percentage of skilled birth attendants by some selected background characteristics like mother's age, birth order, place of residence, religion, mother's education, and wealth quintiles in India, Bangladesh, and Nepal in different periods of time. This table also showed the relative changes of skilled birth attended in the selected countries. Women who belonged to younger age group were having the highest percentage for delivery of births by the health professional. Near about half of the younger women had availed the facility of the skilled birth attendant in 2005-06 and 2011 in India and Nepal respectively. But in 1999-00 (23.50 percent) and 2011 (29.6 percent), women with higher age had utilized the SBAs at delivery high in percentage compared to other age groups. The birth order was negatively associated with the use of skilled birth attendant. Mothers belonged to the first order had experienced maximum utilization during the study period. The percentage of birth attended by SBA among first order women was found to be highest in India (65.2 percent) compared to Nepal (64.4 percent) and Bangladesh (40 percent) in the recent years. The urban resident women were having more number of delivery

attended by SBAs than the rural counterparts. The rural-urban gap (36 percent) in the utilization of SBAs was found in highest percentage in India (36 percent) compared to Bangladesh and Nepal in the recent year. The relative change in rural areas was 189.5 percent between1996 to 2006 and 90.9 percent between 2006 to 2011 in Nepal and which were recorded as the highest relative change in rural areas compared to other two countries. Those women who belonged to the Muslim community were having the lowest number of delivery attended by SBAs compared to other religions. The percentage of the safe delivery was marginally declined among Muslims whereas more than 12 percentage points improvements were noticed in the use of skilled birth attendant among Hindus during 2007-2011 in Bangladesh. Result revealed that women belonging to the poorest wealth quintile and the illiterate group were having the lowest percentage for delivery by SBAs in all the selected countries. The highest level of impact of education and wealth index on SBA were found in India. The percentage of utilization of SBAs was 95.7 and 88.8 among high educated and richest women respectively in India in 2005-06.

Mothers from younger age group, urban resident, first birth order, other religious groups were more likely to go for safe delivery than their counterparts (Tale 3). Mother's education and wealth index found to be significantly associated with delivery by SBAs. The women belonged to the highest wealth quintile (AOR: 8.105, $p<0.01$) in 2011 and have higher education (AOR: 9.833, $p<0.01$) in 2006 were more likely to have health professional at delivery than the poorest and illiterate women in Nepal. This influence of wealth and education was the highest in Nepal compared to other two countries.

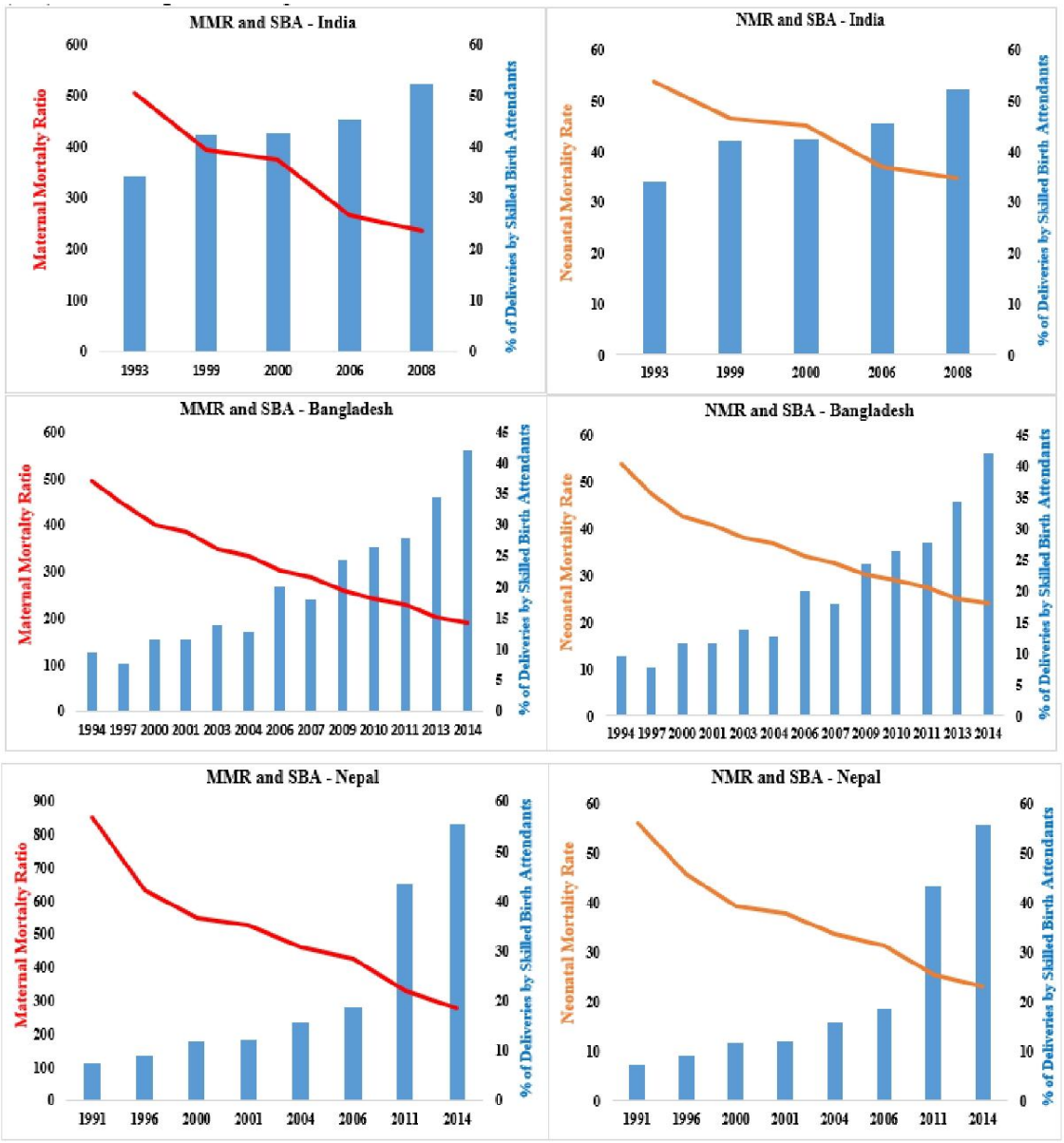

Figure 1: Maternal Mortality Ratios (MMR), Neonatal Mortality Rates NMR) and Percentage of Skilled Attendant at Delivery (SBA) in South Asian Region.

Table 1: Distribution of skilled birth attendant in South Asian region.

Countries	Skilled Birth Attendant (%)	Number (n)
India		
1998-99	42.4	13878
2005-06	46.6	26293
Bangladesh		
1999-2000	21.8	1512
2007	29.2	1766
2011	28.7	2529
Nepal		
1996	10.1	441
2006	25.8	1428
2011	45.2	2435

Table 2: Socioeconomic and demographic differentials and relative changes in the utilizations of skilled birth attendants in South Asian region.

Background Characteristics	India			Bangladesh						Nepal					
							Relative Change						Relative Change		
	1998-99 (1)	2005-06 (2)	**Relative Change [(2-1)/(1)]*100**	1999-00 (1)	2007 (2)	2011 (3)	**(2-1)/(1)*100**	**(3-2)/(2)*100**	**(3-1)/(1)*100**	1996 (1)	2006 (2)	2011 (3)	**(2-1)/(1)*100**	**(3-2)/(2)*100**	**(3-1)/(1)*100**
Mother age at birth															
15-24	44.5	49.3	**10.8**	21.5	30.9	28.8	**43.7**	**-6.8**	**34.0**	13	29.7	50.7	**128.5**	**70.7**	**290**
25-34	41.7	46.9	**12.5**	23.5	28.4	29.6	**20.9**	**4.2**	**26.0**	8.2	25.5	45.5	**211.0**	**78.4**	**454.9**
35+	29.1	31.6	**8.6**	15.8	23.1	23	**46.2**	**-0.4**	**45.6**	6.5	14.2	24.5	**118.5**	**72.5**	**276.9**
Birth order															
1	60.5	65.2	**7.8**	29.2	39.5	40	**35.3**	**1.3**	**37.0**	19.7	42.2	64.4	**114.2**	**52.6**	**226.9**
2-3	42.6	47.7	**12.0**	21.6	28	26.6	**29.6**	**-5.0**	**23.1**	9.3	22.2	41.6	**138.7**	**87.4**	**347.3**
4-5	25.6	27.3	**6.6**	16.4	18.2	13.9	**11.0**	**-23.6**	**-15.2**	6.2	12.5	26.4	**101.6**	**111.2**	**325.8**
6+	18	16.5	**-8.3**	11.5	12.4	6.2	**7.8**	**-50.0**	**-46.1**	3.5	11.7	15.6	**234.3**	**33.3**	**345.7**
Place of Residence															
Urban	73.3	73.5	**0.3**	42.4	48.3	50.8	**13.9**	**4.9**	**19.8**	46.4	53.1	76.1	**14.4**	**43.3**	**64.0**
Rural	33.5	37.5	**11.9**	17.7	24.2	22.3	**36.7**	**-8.5**	**26.0**	7.6	22	42	**189.5**	**90.9**	**452.6**
Religion															
Muslim	39.2	38.8	**-1.0**	20.9	28.7	27.5	**37.3**	**-4.4**	**31.6**	8.6	18.2	39.6	**111.6**	**117.6**	**360.5**
Hindu	41.7	47.5	**13.9**	27.2	36.7	41.9	**34.9**	**12.4**	**54.0**	10.2	26	46.6	**154.9**	**79.2**	**356.9**
Other	63.8	60.8	**-4.7**	51.6	23.7	39.5	**-54.1**	**40.0**	**-23.4**	9.4	27.5	37.2	**192.6**	**35.3**	**295.7**
Mother's Education															
No Education	23.6	26.1	**10.6**	14.2	15.2	11	**7.0**	**-38.2**	**-22.5**	5.4	14.5	27.6	**168.5**	**90.3**	**411.1**
Primary	46.9	46.5	**-0.9**	17.5	20.9	18.1	**19.4**	**-15.5**	**3.4**	15.7	28.2	42.7	**79.6**	**51.4**	**172.0**
Secondary	68.7	71.8	**4.5**	36.4	40.1	36.7	**10.2**	**-9.3**	**0.8**	38.4	51.5	68.8	**34.1**	**33.6**	**79.2**
Higher	89	95.7	**7.5**	75.0	72.2	78.3	**-3.7**	**7.8**	**4.4**	83.1	89.3	88.8	**7.5**	**-0.6**	**6.9**
Wealth Index															
Poorest	16.3	19.4	**19.0**	12.4	13.9	11.0	**12.1**	**-26.4**	**-20.9**	3.8	9.7	18.2	**155.3**	**87.6**	**87.6**
Poorer	22.6	31.8	**40.7**	13.1	19.6	16.2	**49.6**	**-21.0**	**-17.3**	7.2	18.5	34.7	**156.9**	**87.6**	**87.6**
Middle	38.8	49	**26.3**	16.2	20.9	24.3	**29.0**	**14.0**	**16.3**	5.3	20.4	47.6	**284.9**	**133.3**	**133.3**
Richer	55.2	67.2	**21.7**	21.0	37.4	38	**78.1**	**1.6**	**1.6**	8.7	32.5	62.2	**273.6**	**91.4**	**91.4**
Richest	79.5	88.8	**11.7**	47.0	60.9	61.6	**29.6**	**1.1**	**1.1**	25.6	62.4	86.7	**143.8**	**38.9**	**38.9**

Table 3: Adjusted Odds Ratio (AOR) showing factors influencing the utilization of skilled birth attendant in South Asian Region.

Background Characteristics	India		Bangladesh			Nepal		
	1998-99	2005-06	1999-00	2007	2011	1996	2006	2011
Mother age								
15-24(R)	1	1	1	1	1	1	1	1
25-34	1.419***	1.309***	1.325**	1.154*	1.448***	1.408**	1.568***	1.132
35+	1.822***	1.687***	1.315*	1.480***	2.250***	2.779***	1.941***	1.356**
Birth order								
1(R)	1	1	1	1	1	1	1	1
2-3	.463***	.504***	.679***	.648***	.527***	.450***	.353***	.484***
4-5	.306***	.310***	.560***	.466***	.331***	.280***	.235***	.327***
6+	.226***	.201***	.425***	.317***	.162***	.195***	.254***	.228***
Place of Residence								
Urban(R)	1	1	1	1	1	1	1	1
Rural	.398***	.554***	.468***	.586***	.506***	.212***	.693***	.530***
Religion								
Muslim(R)	1	1	1	1	1	1	1	1
Hindu	1.081**	1.220***	1.521***	1.313**	1.798***	.575*	0.941	1.054
Other	1.100*	.765***	3.210***	2.216**	1.068	.396***	1.035	0.737
Mother's Education								
No Education(R)	1	1	1	1	1	1	1	1
Primary	1.737***	1.555***	1.008*	1.192*	1.391***	2.038***	1.430***	1.482***
Secondary	2.800***	2.569***	1.597***	2.039***	2.226***	3.303***	2.793***	2.110***
Higher	5.976***	8.501***	4.411***	4.154***	6.041***	8.680***	9.833***	4.580***
Wealth Index								
Poorest(R)	1	1	1	1	1	1	1	1
Poorer	1.362***	1.433***	0.961	1.006	1.012	1.588	2.178***	1.929***
Middle	1.874***	2.264***	1.235*	1.000	1.360***	1.543**	2.178***	2.771***
Richer	2.705***	3.530***	1.176	1.598***	1.916***	1.188	3.172***	3.830***
Richest	4.659***	6.948***	2.429***	2.848***	3.195***	3.967***	6.383***	8.105***

P values-*** Significant at 1 percent; ** Significant at 5 percent; * Significant at 10 percent.(R)=Reference Category.

DISCUSSION

The success of skilled birth attendant utilization in a society is reflected by the reduction in maternal and neonatal mortality. This reason considers the presence of SBA at birth as the major determinant of maternal and neonatal mortality.

Our present study has tried to demonstrate how the maternal and neonatal mortality are associated with the skilled birth attendant. The Pearson's correlation coefficient apparently revealed a strong negative correlation between utilization of skilled birth attendants and maternal mortality and neonatal mortality in all the selected countries. The other studies from various countries have shown the presence of skilled birth attendant at birth decreases maternal mortality to a great extent.[3,10,13-19] We did not find the utilization of SBA at births in India, Nepal, Bangladesh in line with development goals.[19-22] But pregnant women from India had utilized SBA services in greater proportion at their last delivery compared to the other two selected countries of South Asia. Compared to India and Bangladesh, growth in utilization of SBA services was higher in Nepal.

Though the age of the mother, birth order, place of residence, religion were found as influencing factors in accessing the services of a skilled birth attendant, the educational status of the mother and wealth index were considered as the potential determinants.

Findings showed that mother's education positively associated with the utilization of safe delivery. The mothers who were more educated have higher chances of accessing safe deliveries compared to less educated mothers.[20,21,23,24] However, some studies in Bangladesh had not found any relation between educational status and SBA utilization.[21,25] Educational status not only empowers the women autonomy but also enhances their decision-making power. Educated women have the superior power of decision in seeking health care services and also have the capability to influence other family members.[20,26-28]

Economic disparity has shown a vast difference in SBA utilization pattern. Women with higher economic status were more likely to utilize safe delivery services compared to women with lower economic status.[19-21,29,30,31,32]

The utilization of SBAs was found to be significantly lower among Muslim women than Hindus.[21,33,34] The previous research considers the low socio-economic status of Muslims is the main reason for the lower utilization of SBAs at delivery. Muslim women are usually lower economic status which may be the cause of lower utilization of SBA services,[19-20] whereas some emphasized religious belief may be one of the reasons of lower accessing of SBA services in the Muslim community.[28,32] It was also found in some studies that pregnant women from the Muslim family prefer Muslim female doctors for delivery services because of their religious faith.[35]

Birth order, place of residence and mother's age have been found to have the association with utilization of SBA services in this study. Women with the first birth order, younger age (except Bangladesh), and resident of urban were more likely to have the higher utilization of SBA services. This finding is a conformity of other researchers.[20-22,36-38]

Low utilization of SBA services in South Asia (India, Bangladesh, and Nepal) have been due to low-quality services, unavailability, and inaccessibility of services, minimum support staff, shortage of medicines, equipment as well as insufficient community awareness.[5,17,18,21,39-41]

There are a few limitations of the study. The results of the study are based on cross sectional data from different countries and hence there can be no proper comparisons of SBAs between countries. The years of data also differ among the countries hindering comparisons. In spite of this limitations, the study made an effort to access the predictors for SBAs using the recent data sources of population based information in South Asia.

CONCLUSION

A large proportion of women in the South Asian region still continues to deliver babies without the assistance of SBAs. The economic status of the household and mother's education emerged as potential determinants in accessing the services of a skilled birth attendant in the study. The Government of selected countries should focus on economically poor, illiterate women so that SBA services can be improved and 100 percent safe delivery can be achieved in the society. The question remains concerning achievement of development goals and increasing institutional deliveries.

Ethical clearance: This study is based on secondary data (DHS). The data is available in the public domain and taken from the DHS website (http://dhsprogram.com/). Therefore, this research does not require ethical clearance.

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