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## **CORRELATION BETWEEN ANTENATAL CARE AND INSTITUTIONAL DELIVERY IN ASSAM**

**Sarjima Brahma,**

Research Scholar,

Department of Economics

University of Science and Technology, Meghalaya

### **Abstract**

Antenatal care and institutional delivery are the important determinants of maternal health care that can help reduce with maternal and child mortality. Accordingly different programs have been implemented in regard to avail this health care among the women. Institutional delivery reduces the risk of both mother and infant mortality whereas antenatal care has an important role in promoting institutional delivery. It is recommended as per the World Health Organization (WHO) that use of antenatal care by adequate number of visits can have positive effect on other maternal health care services with institutional delivery. But, India's maternal and child health programs have not promoted institutional delivery aggressively except in the cases of high risk. Moreover, use of antenatal care is not adequately achieved among all the women. So, this study examines the pattern of antenatal care by number of visits and institutional delivery that a woman receives among the districts within the state and also correlation among these two determinants. Karl Pearson's rank correlation coefficient model was applied to measure the independent effect of number of antenatal care visits on the institutional delivery. The analysis is based on data from Assam's fourth National Family Health Survey (NFHS-4), Government of India. The results indicate that use of both the determinants with adequate number of 'four or more antenatal care visits' and institutional delivery were varying largely among the districts in the state. Also positive correlation was observed between uses of these two services when analyzed among the districts. The study is limited by not undertaking the factors that become constraint in utilizing these services among the women and that result in variation among the districts. Further studies on the factors impacting on its use can help identify the reasons of less utilization among the women in the region so that it can enrich all the women by making it more accessible to them by setting different targets and programs.

*Keywords: Maternal health care, institutional delivery, antenatal care, mortality, variation, correlation.*

### **Introduction**

Health is an indicator of Human Development Index (HDI) and it is also classified as a human right that is needed to be achieved equally among all. So, 'Good health and well-being' was set as one of the goal as per the Sustainable Development Goals (SDGs-3) by aiming to reduce 'under-



five child mortality and maternal mortality'. Accordingly, maternal health care as a health care comprising of important determinants of antenatal care, institutional delivery and postnatal care is very essential to be utilized among the women as it can help reduce with maternal mortality and morbidity, (Shrestha and Shrestha, 2011). Reducing maternal mortality rate (MMR) is closely related to quality maternal health care services received among women. Different programs including the Child Survival and Safe Motherhood (CSSM) and the Reproductive and Child Health (RCH) programmes were implemented in order to produce quality health to both mother and child targeting in the rural areas, (Sugathan et al., 2001). All this programs help implement the need in reducing death to women and child. But it indicates that developing country like India is facing a situation of high Maternal Mortality Rate (MMR) compared to developed countries like France, Germany and Italy, (CIA, 2015). Moreover, this large variation can also be noticed within the states in the country with Assam being the highest in MMR with 237 compared to the other states in the period 2014-16, (NITI Aayog, 2018). In order to reduce this variation among the regions by reducing the maternal mortality rate, maternal health care services is necessary to be accessed by all the women around the region. Among the maternal health care services, antenatal care is one of the important determinants which is very necessary to be achieved adequately among the women. It is the care regarding health of a woman during pregnancy period by the health personnel. As per the World Health Organization (WHO) recommendation, antenatal care must be received by at least four or more visits as it can help benefit with other maternal health care services. It is said that adequate antenatal care visit by four or more times among the women can help with more institutional delivery than the women with lesser number of antenatal care visits as it helps one to know the need to be delivered at health facility, (Fekadu et al., 2018). Institutional delivery is the health facility delivery of a child in a safe environment with the presence of all the necessary equipment and trained health personnel. But in spite of availability and importance of the maternal health services it could be noticed that utilization of these services as unsatisfactory in Assam. It could be seen that only 50% of women received antenatal care visits adequately by four or more times as per recommendation by the WHO and about 71% received institutional delivery. When these services received among the women is examined among the districts within Assam then large variation could be noticed in receiving it. Also when the relation between these services was examined among the districts then it indicates positive correlation in utilizing these services. So, it is necessary that antenatal care be received adequately by four or more times as it can help one to give necessary information regarding health of a mother and child and also further to make then ready with the institutional delivery. It is said that many women die during child birth due to no health facility delivery. So to come over this problem antenatal care is very necessary to be received adequately and with quality care so that it can make increase the number of institutional delivery and help reduce the chances of death to a mother.



## **Objectives**

1. To study the pattern of antenatal care visits and institutional delivery in the state.
2. To analyze correlation between antenatal care and institutional delivery among the districts in Assam.

## **Methodology**

The present study is analytical in nature and is completely based on secondary data. The secondary data is taken from the National Family Health Survey (NFHS-4), Assam, Government of India, 2018. Antenatal Care visits and Institutional delivery are the variables taken under consideration for the study. Data regarding these variables are obtained from the National Family Health Survey (NFHS-4), Assam, Government of India, 2018. Further the collected data is processed to analyze the relation between these two variables in Assam by using the Spearman's rank correlation coefficient method. The formula for computing Spearman's rank correlation coefficient is as follows:

$r=1 - 6\sum D^2/n^3-n$ , where, n is the total number of observations, and D is the difference in the rank of the two variables in the  $i^{th}$  observation.

## **Findings**

### **Variation in utilization of antenatal care visits**

It could be examined that the utilization of antenatal care by 'four or more visits' among the women was 46.5% in the state which showed that only half of the women age 15 to 49 years received this service adequately. When examined among the districts in the state large variation could be noticed with Jorhat (75.8%) ranking the highest in antenatal care utilization with four or more visits next to Sivasagar (70.8%), Dibrugarh (67.6%), Golaghat (62.5%), Lakhimpur (59.1%) was being higher than the state average. However, Bongaigaon district was noticed with lowest ranking (24.2%) in utilizing this service among the women which was also lower than the state average (46.5%). Districts including Dhubri (26.0%), Hailakandi (34.5%), Dima Hasao (35.1%) were next to Bongaigaon in ranking lowest in utilizing this service which were noticed with very low in receiving the service when compared to the highest ranking districts.

Table 1: Pattern of antenatal care (ANC) visits and institutional delivery among the women in Assam by districts

Sl No.	Districts	4 or more ANC visits (in %)	Institutional delivery (in %)
1	Jorhat	75.8	95.9
2	Kamrup(M)	56.9	93.3
3	Dibrugarh	67.6	88.5
4	Sonitpur	42.0	88.4
5	Golaghat	62.5	88.4
6	Baksha	49.8	87.8
7	Sivasagar	70.8	87.1
8	Kamrup	40.4	83.8
9	Nalbari	49.2	82.8
10	Lakhimpur	59.1	82.7
11	Tinsukia	56.1	76.6
12	Dhemaji	49.1	76.1
13	Udalguri	37.0	72.2
14	Morigaon	43.1	72.2
15	Cachar	51.3	71.3
16	Goalpara	42.1	71.2
17	Nogaon	46.2	67.4
18	Bongaigaon	24.2	67.0
19	Kokrajhar	39.1	66.7
20	Darang	39.9	66.1
21	Chirang	41.2	59.4
22	Dima Hasao	35.1	57.1
23	Hailakandi	34.5	56.5
24	Barpeta	47.5	51.8
25	Karbi Anglong	38.1	50.2
26	Karimganj	37.1	48.0
27	Dhubri	26.0	43.6
28	Assam	46.5	70.6

Source: National Family Health Survey (NFHS-4), 2015-16, Assam, India



### **Variation in utilization of institutional delivery**

Similarly, when the utilization of institutional delivery is noticed in the state it could be found that the performance of the state in receiving this service was 70.6% among the women which covered around three quarter of the women utilizing this service. When its use was observed among the districts large variation could also be noticed among the districts. Women from Jorhat (95.9%) received the highest proportion of institutional delivery and Dhubri the lowest with 43.6% only. The high ranking districts next to Jorhat include Kamurp (M) with 93.3%, Dibrugarh (88.5%), Sonitpur (88.4%), Golaghat (88.4%), Baksha (87.8%), Sivasagarh (87.1%), Kamrup (83.8%), Lakhimpur (82.7%) which were noticed with even higher than the state average (70.6%). But, the low ranking districts next to Dhubri including Karimganj (48%), Karbi Anglong (50.2%), Barpeta (51.8%), Hailakandi (56.5%), Dima Hasao (57.1%) indicated lower performance in receiving the institutional delivery among the women which was even lesser than the state average. This showed unsatisfactory performance in utilizing this maternal health care service with institutional delivery among the women with large gap among the districts in the state.

### **Correlation between antenatal care and institutional delivery**

When the correlation between maternal health care services with antenatal care by 'four or more visits' and institutional delivery is examined among the districts within the state then it could be seen that there were positive correlation ( $r=0.76$ ) between these services. Among the districts, high percentage of women using antenatal care by four or more visits was noticed with high percentage in receiving institutional delivery. Accordingly, Jorhat district was noticed with high percentage among the women in receiving institutional delivery with 95.9% and also in using antenatal care visits by four or more times among the women with 75.8%. This showed positive correlation between these two services in the district with not only above the state average but also with highest percentage in utilizing both these services among the districts. On the other hand, Dhubri district was noticed with not only lowest in receiving institutional delivery (43.6%) among the districts being lower than the state average (70.6%) but also noticed with low percentage in utilizing antenatal care service by four or more visits (26%) which was also lower than the state average (46.5%). Most of the women among the districts were noticed with higher proportion in receiving institutional delivery who had more percentage of antenatal care visits by four or more times.



Table 2: Correlation between antenatal care (ANC) visits and institutional delivery among the women in Assam

Sl No.	Districts	Institutional delivery	R1	4 or more ANC visits	R2	D=R1-R2	D <sup>2</sup>
1	Jorhat	95.9	1	75.8	1	0	0
2	Kamrup(M)	93.3	2	56.9	6	-4	16
3	Dibrugarh	88.5	3	67.6	3	0	0
4	Sonitpur	88.4	4	42.0	16	-12	144
5	Golaghat	88.4	5	62.5	4	1	1
6	Baksha	87.8	6	49.8	9	-3	9
7	Sivasagar	87.1	7	70.8	2	5	25
8	Kamrup	83.8	8	40.4	18	-10	100
9	Nalbari	82.8	9	49.2	10	-1	1
10	Lakhimpur	82.7	10	59.1	5	5	25
11	Tinsukia	76.6	11	56.1	7	4	16
12	Dhemaji	76.1	12	49.1	11	1	1
13	Udalguri	72.2	13	37.0	23	-10	100
14	Morigaon	72.2	14	43.1	14	0	0
15	Cachar	71.3	15	51.3	8	7	49
16	Goalpara	71.2	16	42.1	15	1	1
17	Nogaon	67.4	17	46.2	13	4	16
18	Bongaigaon	67.0	18	24.2	27	9	81
19	Kokrajhar	66.7	19	39.1	20	-1	1
20	Darang	66.1	20	39.9	19	1	1
21	Chirang	59.4	21	41.2	17	4	16
22	Dima Hasao	57.1	22	35.1	24	-2	4
23	Hailakandi	56.5	23	34.5	25	-2	4
24	Barpeta	51.8	24	47.5	12	12	144
25	Karbi Anglong	50.2	25	38.1	21	4	16
26	Karimganj	48.0	26	37.1	22	4	16
27	Dhubri	43.6	27	26.0	26	1	1
28	Total						$\sum D^2 = 788$
r=0.76							



*Source: Compiled by author*

## **Discussion**

### **Variation among the districts in receiving institutional delivery and antenatal care by four or more visits**

It was noticed that utilization of maternal health care with institutional delivery and antenatal care by four or more visits has substantially increased in Assam. Use of antenatal care by ‘four or more visits’ among the women increased from 39.3% in NFHS-3 (2005-06) to 46.5% in NFHS-4 (2015-16). Also use of institutional delivery was noticed with increment to 70.6% in NFHS-4 (2015-16) from 59.6% in NFHS-3 (2005-06). This showed a satisfactory result in utilizing these services among the women. However, there is widening gap in use of these services among the districts within the state which was unsatisfactory. Large variation in its use was noticed among the districts. Jorhat being first ranking district in utilizing institutional delivery was noticed with 95.9% among the women and only 43.6% utilized this service in Dhubri which was the lowest. This showed that about 50% of women in Dhubri utilized lesser number of this service than the women in Jorhat performing even lesser than the state average. Variation could also be noticed among the other low performing districts when compared to better performing districts in utilizing institutional delivery. It is supported as per the study in Ethiopia that variation in use of institutional delivery is due to cost of delivery in health institution that became financial constraint in utilizing it among the women, (Pearson et al., 2011). Also, numbers of antenatal visits, age, residence, education of women were the other factors resulting in variation in its use, (Melaku et al., 2014).

Moreover, unsatisfactory result was noticed also in utilizing antenatal care by ‘four or more visits’ with large variation among the districts in the state. Jorhat ranked the highest with 75.8% and Bongaigaon the lowest with only 24.2%. This implies that only one-third of women in Bongaigaon district received this service compared to Jorhat district. Also this low ranking Bongaigaon district along with other low performing districts were noticed with lesser than the state average in receiving the service. Variation in use of antenatal care by adequate number of visits in the study is consistent with the study in Ethiopia where it is revealed that its use dependent on different factors including area of residence, administrative region and education of women that resulted in variation in use of antenatal care, (Yesuf and Margalit, 2013). Similarly, study in India has shown that women with the highest economic status household were more likely to have antenatal visits compared to women with lowest economic status households, (Bloom et al., 2001). Further, it is added that the factors associated with inadequate antenatal care in Equador was due to economic difficulties having to care for a small child and lack of transportation, (Paredes et al., 2005).



### **Correlation between institutional delivery and antenatal care by four or more visits**

In Assam it could be found in case of use of institutional delivery and antenatal care by number of visits that women who had the ANC visit with '4 or more times', among them health facility delivery was seen to be more in the district. This shows that use of ANC by number of visits have its positive impact on use of other maternal health care service with institutional delivery. 'Health facility delivery' is noticed with more common among pregnant woman who accessed 'Antenatal care with four or more number of visits' than who accessed 'one to three ANC visits'. Similarly, study in Ethiopia by Fekadu et al., in 2018 found that four or more ANC visits had a more impact on use of health facility delivery compared to fewer ANC visits, (Fekadu et al., 2018). Moreover, study done in Nigeria and Indonesia also reveals the similar result that ANC benefits women by making them more likely to utilize with institutional delivery as accessing more ANC provides pregnant women an opportunity for sending message to the attendees on the benefits of institutional delivery, (Titaly et al., 2009 & Dahiru & Oche, 2015). This supports to indicate the reason behind positive correlation between institutional delivery and antenatal care by four or more visits among the districts in the state.

Antenatal care is the strongest predictor of institutional delivery as it makes possible to promote institutional delivery by promoting antenatal check-ups and also with associated counseling, (Sugathan et al., 2001). The adequate number of antenatal care visits as recommended by World Health Organization (WHO) is important to be received by all the women as it can help pregnant women available with institutional delivery reducing the risk that may develop in them. It is said that more number of antenatal care visits can significantly change the women's attitude towards institutional delivery with receiving higher percentage of it. In the previous study in India, it is found that women with more number of antenatal care visits had higher percentage of chance to deliver in a health institution compared to women who had no visits, (Dixit et al., 2013). It is noticed with 31% higher chances to deliver in health institution who visited health care three or more than three times. Further, it was added that women who had antenatal care visits were almost eight times more likely to deliver in health institutions than those who had no antenatal care visits with reducing pregnancy complications, (Mengistu and Tafere, 2011).

Within the state also performance of districts among the women in utilizing institutional delivery and antenatal care by number of four or more visits showed positive correlation. Districts which had higher number of four or more antenatal care visits received among the women were noticed with higher number in receiving institutional delivery compared to the districts which had lower number of institutional delivery due to lower number of antenatal care service received among the women with four or more visits. In spite of positive correlation between these services, many women in the districts were noticed with lower percentage in receiving those services. This can be due to different factors impacting on its use. In Ethiopia, factors including mother's age,



residence, education and parity were identified as the reason impacting on its use, (Melaku et al., 2014).

### **Conclusion**

The analysis indicates that the proportion of women giving birth in a health institution was higher for the women who received more number of antenatal care by four or more visits. It showed that use of adequate number of antenatal care visits is the strong predictor of institutional delivery among the districts in the state. But, when use of these maternal health care services is examined then it showed that its use was varying largely among the districts. Some of the districts performed even lesser than the state average in utilizing both the institutional delivery and antenatal care visits. The study was limited to not undertaking the factors that become constraint in utilizing these services among the women and that result in variation among the districts. Further studies on the factors impacting on its use can help identify the reasons of less utilization among the women in the region so that it can enrich all the women by making it more accessible to them by setting different targets and programs.

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It can be seen that use of ANC by number of visit can have a positive impact on use of institutional delivery. Number of 'ANC visits by four to more times' shows more impact than the 'ANC visits by one to three times' on use of 'delivery in a health facility'.

Table 4: Percentage of women who had a health facility delivery by number of ANC visits:

ANC visits	Percentage of Women with institutional delivery
None	40.3
1-3	67.7
4 or more	85.7
Assam	70.6
India	78.9

Source: NFHS-4 (2015-16), Assam, Government of India