Public Health Impact of Pre-Natal Care in Reducing Home Delivery in Nigeria: Evidence from Ndhs 2013

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Abstract

Background: *Health facility delivery is an important factor in reducing deaths arising from complications of pregnancy. Despite the importance of prenatal care the extent of its contribution to hospital based delivery has not yet been evaluated in Nigeria. This study aimed to estimate the extent of the contribution of pre-natal care to hospital delivery in Nigeria.*

Methods: *Data from the 2013 Nigeria Demographic and Health Survey (NDHS) were utilized. The 2013 NDHS was conducted in all the states of Nigeria including the Federal Capital Territory (FCT). The study population comprised of 31,828 women of reproductive age (15-49 years) who were asked questions from the delivery module. The primary data for the survey were collected by visiting households and conducting face-to-face interviews and with the use of questionnaires to obtain information. Data was analysed using SPSS version 21.*

Result: *The mean age of mother was 29.4 years ± 7 standard deviation. The prevalence of health facility based delivery in 2013 was 35.8%. Prenatal care was received by 13477(66%). Among Nigeria women 34.6% felt delivering their babies in the hospital was not important. Among those who received pre-natal care 7350(54.6%) delivered in the health facilities compared to 289(4.2%) health facility delivery among those who did not receive pre-natal care. (p<0.001). Those who received pre-natal care were 12 times more likely to deliver in the health facility (95% CI= 10.56-14.42) p<0.001. In those who had prenatal care 53% reduction in home delivery occurred.*

Conclusion: *To increase health facility delivery in Nigeria efforts to encourage the use of antenatal care services are pertinent.*

Keywords: *Antenatal care, Health facility delivery, Prenatal.*

Introduction

Increasing the percentage of births delivered in health facilities is an important factor in reducing deaths arising from complications of pregnancy. If a complication arises during delivery, a skilled health worker is expected to manage the complication or refer the mother to the next level of care.(National Population Commission (NPC) [Nigeria] and ICF International, 2014) The availability of a skilled health worker is almost nil if the delivery was done outside the health facility.

A health care system aiming to reduce pregnancy-related morbidity and mortality must focus on maternal and new born health. Reproductive health care, the care a woman receives before and during pregnancy, at the time of delivery, and soon after delivery, is important for the survival and well-being of the mother and her child. It encompasses the health care dimensions of family planning and prenatal, natal, and postnatal care with the aim of reducing maternal morbidity and mortality. (Franny, 2013)

Nigeria has a reproductive health policy that provides a roadmap for all stakeholders working in this area. Also, the National Reproductive Health Working Group set up by the federal government plans, coordinates, and facilitates the implementation of reproductive health interventions in the country. This body meets annually to review plans and strategies for improving reproductive health in the country. The Federal Ministry of Health is also implementing an integrated maternal, newborn, and child health strategy that emphasizes the

continuum of care. The biannual Maternal, Newborn and Child Health Week is held in May and November of every year to highlight important maternal and child health issues at all levels of the health care system.

To boost the proportion of skilled birth attendants, the government recruited additional midwives and community health extension workers (CHEWs) and supported training of CHEWs on modified lifesaving skills through the Subsidy Reinvestment and Empowerment Programme as well as the Midwives Service Scheme. The government is also looking toward developing a policy on task shifting as a measure to improve personnel deficits in some parts of the country and in underserved areas. (NPC, 2014) (National Population Commission (NPC)[Nigeria] and ICF International, 2014)

Objectives

Despite all the intervention increase in the rate of hospital delivery over the years has been minimal. This secondary data analysis aimed to achieve the following:

1. To determine the prevalence of hospital delivery in Nigeria using the NDHS 2013.
2. Identify the single most important factor that contributed to hospital based delivery and measure its public health impact.
3. To determine the predictors of hospital delivery in Nigeria.
4. To measure the public health impact of prenatal care (most significant contributor to hospital delivery)

Methods

The 2013 Nigeria Demographic and Health Survey (NDHS) is the fifth DHS in Nigeria, following those implemented in 1990, 1999, 2003, and 2008. A nationally representative sample of 40,320 households from 904 primary sampling units (PSUs) was selected. All women age 15-49 who were usual members of the selected households or who spent the night before the survey in the selected households were eligible for individual interviews. As with previous NDHS surveys, the main objective of the 2013 NDHS was to provide reliable information on fertility and fertility preferences, knowledge and use of family planning methods, maternal and child health, childhood and adult mortality levels, knowledge of and attitudes toward HIV/AIDS and other sexually transmitted infections (STIs), women's empowerment and domestic violence, and knowledge about other illnesses. The survey was designed to produce reliable estimates for key indicators at the national level as well as for urban and rural areas, each of the country's six geographical zones, and each of the 36 states and the Federal Capital Territory (FCT).

In addition to the female survey, a male survey was conducted at the same time in every second household selected for the female survey. In these households, all men age 15-49 who were usual members of the selected households or spent the night before the survey in the selected households were eligible for individual interviews. The survey collected information on their basic demographic status and their knowledge of and attitudes toward HIV/AIDS and other STIs.

Study design

Data from the 2013 Nigeria Demographic and Health Survey (NDHS)were utilized for the analysis in this study. The 2013 NDHS is the fifth comprehensive survey conducted in Nigeria as part of the Demographic and Health Surveys (DHS).It is a nationally representative survey intended for the furtherance of the National Population Commission's (NPC)responsibility of collecting, collating, analyzing and disseminating population census and survey data at all levels that contribute to policy formulation and coordination of population activities in the country. The survey utilized a cross sectional population based study design.

Study area

The 2013 NDHS was conducted in all the states of Nigeria including the Federal Capital Territory (FCT), grouped into six geopolitical zones: North-Central, North-East, North-West, South-East, South-South and South-West. There are 774 constitutionally recognized local government areas (LGAs)in the country and about 374 identifiable ethnic groups, with the Igbo, Hausa and Yoruba as the major groups. The 2006 National Population Census put Nigeria's population at 140,431 ,790 with a national growth rate estimated at 3.2 percent per annum and population density of 150 pop/sq.km. This makes Nigeria the most populous country in Africa.

Study population

The study population comprised of married women of reproductive age (15-49 years) who were asked questions from the delivery module. The 2013 NDHS asked questions on delivery of children in the last five years to only one eligible woman randomly selected in each household in order to maintain confidentiality and protect the respondents as recommended by the WHO ethical guidelines

Unit of enquiry

This included currently married women of reproductive age 15-49 years who gave birth within the last five years before data collection in the 2013 NDHS.

Inclusion criteria

Currently married women within the reproductive age 15-49 years were eligible to be used in the study.

Sample size estimation

This study analyses data from the 2013 Nigeria Demographic and Health Survey which contains data on a nationally representative sample of 31 ,828 women aged 15-49. The selection of one woman per sample household was random so that women who were selected and interviewed (i.e. 31 ,464)for the delivery module questionnaire were a subsample of the entire 2013 NDHS sample (excluding 364).

Sampling frame

Administratively, Nigeria is divided into states. In turn, each state is subdivided into local government areas (LGAs) and each LGA into smaller (secondary and tertiary) localities. Nigeria has 36 states and a Federal Capital Territory (FCT). These states are subdivided into 774 LGAs. Furthermore, the states are regrouped by geographical location to form six zones, as shown in Table B.1 . In addition to these administrative units and geographical zones, during the last population census in 2006, each locality was subdivided into convenient areas called census enumeration areas (EAs). The average number of households per EA in the corresponding locality frame was assigned to each EA. Table B.1 provides the basic information summarized from the sampling frame. The EAs in Nigeria are small in size, with an average of 211 inhabitants (equivalent to 48 households). Since these EAs were too small to be DHS clusters, the 2013 NDHS included several EAs per DHS cluster (with a preferred minimum cluster size of 80 households).

Sampling procedure

The sample for the 2013 NDHS was a stratified sample, selected independently in three stages from the sampling frame. Stratification was achieved by separating each state into urban and rural areas. In the first stage, 893 localities were selected with probability proportional to size and with independent selection in each sampling stratum.

In the second stage, one EA was randomly selected from most of the selected localities with an equal probability selection. In a few larger localities, more than one EA was selected. In total, 904 EAs were selected. After the selection of the EAs and before the main survey, a household listing operation was carried out in all of the selected EAs. The household listing

consisted of visiting each of the 904 selected EAs, drawing a location map and a detailed sketch map, and recording on the household listing forms all occupied residential households found in the EA with the address and the name of the head of the household. If a selected EA included less than 80 households, a neighboring EA from the selected locality was added to the cluster and listed completely. The resulting list of households served as the sampling frame for the selection of households in the third stage.

In the third stage of selection, a fixed number of 45 households were selected in every urban and rural cluster through equal probability systematic sampling based on the newly updated household listing.

The sample allocation features an equal size allocation with small adjustments. Lagos and Kano were assigned the largest sample size, with 40 clusters each; the remaining states had either 23 or 24 clusters each. Among the 904 clusters, 372 were in urban areas and 532 were in rural areas. The total number of households sampled was 40,680, 16,740 from urban areas and 23,940 from rural areas.

Data collection procedure

The primary data for the survey were collected by visiting households and conducting faceto- face interviews and with the use of questionnaires to obtain information on demographic characteristics, socioeconomic characteristics etc.

Data processing procedures

The data collected during the 2013 NDHS underwent initial data processing, which consisted of office editing, coding of open-ended questions, data entry and editing computer-identified errors. Data was analysed using SPSS version 21 . Frequency tables were used to show the distribution of respondents by the variables of interest. Values were expressed as absolute numbers and percentages while appropriate graphs and diagrams were also generated. Inferential statistics was done using chi-square test to determine associations between experience of symptoms of STI and independent variables at 5% level of significance. Thereafter, independent variables were included in multivariate logistic regression model to identify the predictor of health facility based delivery with highest effect.

Variables

Dependent variable was the place of delivery of the child had in the past five years
Independent variables
1. Age of mothers
2. Region
3. Place of residence
4. Education
5. Wealth index
6. Birth order
7. Antenatal visit for pregnancy

Limitation

Some questions might not have been asked which may enrich this work however the available data could still be assumed to provide necessary information for meeting the objectives of the study.
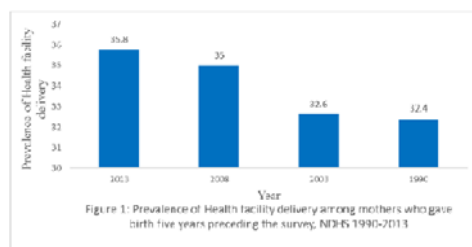
Ethical consideration

Approval to use the 2013 NDHS data set was requested for from Measure DHS and this was granted.

Result

This study analyses data from the 2013 Nigeria Demographic and Health Survey which contains data on a nationally representative sample of 31 ,828 women aged 15-49. The

selection of one woman per sample household was random so that women who were selected and interviewed (i.e. 31 ,464)for the delivery module questionnaire were a subsample of the entire 2013 NDHS sample (excluding 364).


Figure 1: Prevalence of Health facility delivery among mothers who gave birth five years preceding the survey, NDHS 1990-2013

The mean age of mother was 29.4 years ± 7 standard deviation. The prevalence of health facility based delivery among mothers who gave birth five years preceding each survey is as shown in figure 1 . The prevalence of health facility based delivery in 2013 was 35.8% . Increase of 0.8% occurred in 2013 over 2008. Chi square for trend for all deliveries from 1990 -2013 gave 0.3071 , with p-value of 0.9587. (Degree of freedom =3)

Table 1: Sociodemographic Characteristics of Mothers who delivered in Nigeria 2008-2012, NDHS 2013

Variable	Frequency	Percent
Age group in years		
<30	16726	52.6
30+	151	02
Region		
North	21693	68.2
South	101	36
Place of residence		
Urban	11126	35.0
Rural	20702	65.0
Level of Education		
<Secondary	21784	68.4
Secondary and above	10044	31.6
Wealth Index		
Lower	15915	50.0
Upper	1591	3
Birth Order		
1 -4	20648	64.9
>4	3329	10.5
Prenatal Care n=20408		
Yes	13477	66.0
No	6930	34.0

Table 1 shows the sociodemographic characteristics of mothers who delivered in Nigeria 2008-2012. Almost half 16726(52.6%) were <30 years. The women in the northern part of the country had 21693(68.2%) delivery. About two- third of all deliveries 20702(65%) took place in the rural area. Prenatal care was received by 13477(66%).

Figure 2: Delivery places of mothers in Nigeria, 2008-2012, NDHS 2013
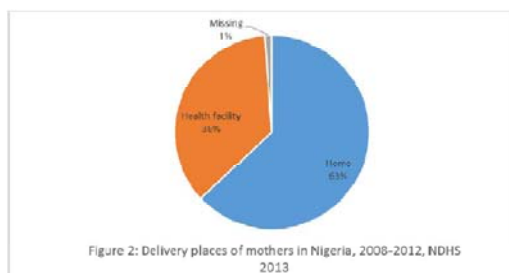
In the 2013 NDHS health facility based delivery took place in 11458(36%) as shown in figure 2

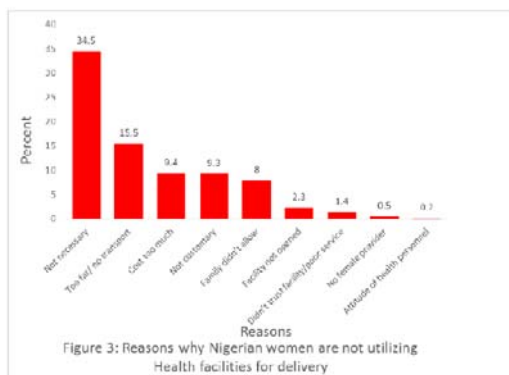Figure 3: Reasons why Nigerian women are not utilizing Health facilities for delivery

Figure 3 shows that 34.6% of Nigeria women felt delivering their babies in the hospital is not important hence they did not utilize the hospital.

Table 2: Factors associated with Health facility based delivery in Nigeria 2008-2012, NDHS 2013

Variable	Place of delivery		Chi Square	p-value
	Health facility	Home		
Age group in years				
<30	5641(34.1)	10892(65.9)	64.703	<0.001
30+	5746(38.5)	9185(61.5)		
Region				
North	4427(20.6)	17026(79.4)	7062.898	<0.001
South	6960(65.9)	3052(30.5)		
Place of residence				
Urban	6859(62.2)	4165(37.8)	4979.707	<0.001
Rural	4527(22.1)	15913(77.9)		
Level of Education				
<Secondary	4300(20.0)	17236(80.0)	7776.768	<0.001
Secondary and above	7086(71.4)	2842(28.6)		
Wealth Index				
Lower	1983(12.6)	13740(87.4)	7565.155	<0.001
Upper	9404(59.7)	6338(40.3)		
Birth Order				
1 – 4	8591(42.1)	11821(57.9)	136.562	<0.001
>4	1030(31.3)	2260(68.7)		
Prenatal Care				
Yes	7350(54.6)	6107(45.5)	4958.398	<0.001
No	289(4.2)	6626(95.8)		

Factors associated with health facility delivery is as shown in table 2. Among respondents 30 years and above 5746(38.5%) delivered at health facility compared to 5641(34.1 %) of those below 30 years (p<0.001). Concerning region 6960(65.9%) of mothers from the south

delivered in the hospital compared to 4427(20.6%) of those from the north. (p<0.001). Table 2 also shows that other factors associated with hospital delivery are urban residence, secondary level of education and above, upper wealth index, 1 -4 birth order, and prenatal care (p<0.001) 13

Table 3 Determinants of Health facility based delivery in Nigeria 2008-2012, NDHS 2013

Characteristics	OR	95% C.I. for Exp (B)		p-value
		Lower	Upper	
<30 years	1			
30+ years	1.611	1.459	1.779	<0.001
North Region	1			
South Region	1.810	1.647	1.989	<0.001
Urban residence	1.946	1.771	2.139	<0.001
Rural residence	1			
<Secondary Education	1			
Secondary and above	2.501	2.275	2.750	<0.001
Lower Wealth Index	1			
Upper Wealth Index	2.181	1.960	2.426	<0.001
1 - 4 Birth Order	1.516	1.330	1.729	<0.001
>4 Birth Order	1			
Receive Prenatal Care	12.360	10.591	14.424	<0.001
No Prenatal Care	1			

Table 3 shows that those who received pre natal care were 12 times more likely to deliver in the health facility (95% CI= 10.56-14.42)p<0.001 . Other determinants of Health facility based delivery in Nigeria 2008-2012, NDHS 2013 were as shown in table 3. 14

Measure of public health impact

Table 4: Reduction in home delivery attributed to prenatal care in Nigeria 2008-2012, NDHS 2013

	Home delivery		
Prenatal care	Yes	No	Total
Yes (Exposed)	6107(45.5%)	7350(54.6%)	13457
No(Not Exposed)	6626(95.8%)	289(4.2%)	6915
Total	12733	7639	20372

$$= \frac{\text{Attributable risk in those not exposed to pre natal care- Attributable risk in those exposed}}{\text{Attributable risk in those not exposed to pre natal care}}$$

$$= \frac{95.8\text{-}45.5}{95.8}$$

$$=0.53$$

$$= 53\%$$

Table 4 shows the reduction in home delivery that can be attributed to prenatal care in Nigeria. As shown 6107(45.5%) of those who had prenatal care had home delivery while 6626(95.8%) of those who did not have prenatal care had home delivery. The subsequent calculation from these figures shows that in those who had prenatal care 53% reduction in home delivery occurred.

Discussion

The factors that were associated with facility based delivery were increasing maternal age, southern region, and urban residence, maternal level of education, upper wealth index, and prenatal care and birth order. Women with higher birth order, those residing in the north and in rural areas were more likely to deliver at home than in a health based facility; while increasing maternal age, lower birth order, those residing in urban areas and in the south,

maternal higher level of education and those who assessed prenatal care are associated with greater odds of facility based delivery.

This corroborates some studies which have cited several factors associated with facility-based delivery such as household wealth quintile, maternal socioeconomic status and distance to a facility as well as cultural factors.(Montagu et. al., 2011 , Ahmed et. al., 2010) According to some studies conducted in Nigeria, mother's education has a positive effect on access to health services, increases health awareness and contributes significantly to health facility utilization.(Moore et. al., 2011) These factors play major role in the decision to utilise a health facility for delivery.

A large proportion of the women in the studied population felt delivering their babies in the hospital was not important hence, they didn't utilize the hospital, other reasons given for the poor utilization of the health facilities for delivery were no mode of transportation to the health facility, the cost of services offered was too expensive, while others felt it was not customary for them to deliver their babies in the hospital probably due to cultural beliefs about child birth and the lack of support from the members of their families were also prominent barriers to facility delivery.

Hospital based delivery is associated low maternal and neonatal morbidity and mortality rate.(Stephenson et. al., 2006)However, poor utilization of health facilities for child delivery is multifactorial and has contributed to the high maternal morbidity and mortality rate. (Federal Republic of Nigeria, 2008)The maternal death rate in sub-Saharan Africa dropped by 41 per cent in 20 years (1990-2010).(United Nations Population Fund, 2015) However, Nigeria still has one of the highest maternal death rates in sub-Saharan Africa and this has been attributed to poor utilization of maternal health care services.(Doctor, 2011)

The target of the Millennium Development Goals (MDG) 4 (child health) and (MDG) 5 (maternal health)is to reduce under-five mortality rate by two-thirds and maternal mortality by 75% between 1990 and 2015. However, it will take an estimated 96 countries in the world more than 20 years to reach MDG 5 at the present pace, while most countries, particularly the sub-Saharan African countries are facing challenges achieving MDG 4 and 5 goals of decreasing maternal and under 5 mortality rate by 2015, it is estimated that only six (Central African Republic, Equatorial Guinea, Namibia, the former Sudan, Uganda, and Rwanda)are likely to meet MDG 5 target in another additional 25 years (year 2040).(Rajaratnam et. al., 2010, Lozano et. al., 2011)

One important way of addressing both maternal and neonatal mortality is to encourage pregnant women to attend Antenatal care clinics and deliver their babies in a health facility with provision of skilled obstetric care at the time of delivery.(Harvey et. al., 2007) In 2008 the Nigeria Demographic and Health Survey -NDHS)showed that only 38 % of women of child bearing age delivered in a health facility.(National Population Commission (NPC) [Nigeria] and Macro, 2009) Factors such as community perceptions of institutional based care, individual, household and other socio economic factors are various factors influencing maternal health services utilization.(Khalid et. al., 2006) Furthermore, the use of maternal health services also affects the neonatal health out comes as many neonatal deaths arise from complications associated with or arising from labour and delivery process.(Lawn et. al., 2005)

The prevalence of health facility delivery as at 2013 was 35.8% increasing by 0.8% compared to the previous prevalence in 2008. Despite the booming economy of Nigeria in Africa, it records a low prevalence of health facility utilization for delivery by women of child bearing age and this may be due to religious and cultural beliefs and high cost of health services provided although other factors may be responsible.(Osubor et. al., 2006) Similarly, low facility based delivery was recorded in other countries like Tanzania, Zambia, Guinea and Madagascar. (Rockers et. al., 2009, Gabrysch et. al., 2011 , Wang et. al., 2011) There were however some other countries with very low facility based delivery such as Niger, Ethiopia and Chad; some of these countries are war torn countries or ridden with natural disasters, this might be the reason for the low delivery rates at the health facilities.(Woldemicael, 2010)In contrast, there are studies that revealed a high utilization of health facilities for delivery by

pregnant women and this may be accrued to the economic differences across the nations, government involvement in providing free or low cost health services.(Faye et. al., 2011 , Galaa and Daare, 2008)

In the studied population, having received prenatal care was one of the major determinants of facility based delivery among other factors which were the same predictors associated with institutionalized delivery. Thus there was a reduction in the proportion of home delivery among those who assessed antenatal care compared to those who did not. This is most likely due to counselling and education regarding their health and care of their unborn babies that the pregnant women are exposed to during antenatal clinics. A high level of utilisation of maternal health services (antenatal care services, delivery in health facility and postnatal care service)was also recorded among pregnant women in rural communities in the south eastern part of Nigeria and these services were regarded as readily accessible, convenient and have a skilled birth attendant on duty with referral services should the need arise.(Emelumadu et. al., 2014)

A study conducted in southern Tanzania showed that women who had antenatal care or prenatal care were more likely to deliver under the supervision of a skilled attendant in a health facility and this was attributed to the fact that women who had antenatal care visits had a higher satisfaction with the quality of care provided. (Mpembeni et. al., 2007) Similar finding was also reported in Cambodia.(Yanagisawa et. al., 2006) There are other studies which have shown that the use of antenatal care service during pregnancy significantly affect the use of health facilities for delivery. This is probably due to the awareness created during each visits concerning the importance of health facility based delivery with a skilled birth attendant present. (Mengesha et. al., 2013, Abebe et. al., 2012)However, some studies have shown that antenatal care attendance is inversely proportional with facility based delivery. These studies conducted in the northern part of Nigeria have shown that despite a high antenatal care attendance among pregnant women, there was a low health facility delivery and this may be related to the quality of service provided by the care givers such that the mothers didn't receive all the necessary information during their ANC visits. (Idris et. al., 2006, Idris et. al., 2013)

Efforts to encourage the use of antenatal care services are pertinent to promote maternal and new born health and survival.(Ilesanmi et. al., 2013)

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