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Access and Utilization of Primary Health Care Facilities on Infant Mortality Rates in Akwa Ibom State, Nigeria.

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ABSTRACT
The study analyzed access and utilization of primary health care facilities on infant mortality rates in Akwa Ibom State, Nigeria. A multistage sampling procedure was adopted to select 360 rural household women. Data collected were analyzed using descriptive and inferential statistics. Results revealed that the rural communities with PHC-facilities recorded high accessibility and utilization of PHC services (Accessibility grand mean = 2.43; accessibility index = 81%; and utilization grand mean = 2.41; utilization index 80%) The PHC services were lowly accessed and utilized by rural communities without facilities (Accessibility grand mean = 1.47; index 49%; utilization grand mean = 1.46; index = 48%). Percentage change in IMR revealed a reduction of IMR at -72.5% for rural communities with facilities, while those without PHC facilities increased at 23.44%. Difference in difference estimates between the two categories of rural communities was -15.30. Which indicates that PHC services impact on the rural communities IMR. Paired t-test analysis revealed significant difference between their means IMR (t-cal = 3.19; P<0.05). The study concluded that PHC facilities impact positively on rural communities IMR. It is recommended that more PHC facilities be established in rural communities.
Keywords: Accessibility, Utilization, Infant mortality and Healthcare.

INTRODUCTION

Rural development projects are infrastructural forms of capital which enhance rural dwellers production, distribution and consumption activities and ultimately the quality of social, economic and cultural life of the rural people (Ekong, 2008). Some of these rural development projects include rural roads, health facilities, rural electrification, irrigational facilities, and storage facilities, among others. On every index of rural development the rural areas or communities score very poorly relative to the urban areas (Ekong, 2008, Obinna, 2010).

Critical components of health policy in Nigeria include, which by no means limited to: establishing a comprehensive health care facility in each rural community, within the Nation's Primary Health Care System; provision and dissemination of relevant health

information to rural population such matter as personal hygiene, environmental sanitation, prevention and control of communicable diseases (Olise, 2012).

Furthermore, integration of the operations of all healthcare agencies in local government areas and rural communities, to ensure rational and adequate coverage as part of robust integrated rural development (FMARD, 2000).According to Federal Ministry of Health (2007), National Policy Framework on health and development of adolescents and young people in Nigeria aimed at creating enabling environment for appropriate action, and provide the necessary impetus and guidance to national and local initiatives at all levels of health.

Primary health care is a grass-root approach meant to address the main health problems in the community by providing preventive, curative and rehabilitative services (Grofin, 2005; Olise, 2012; Aigbiremolen*, et al*., 2014). As defined in the Alma Ata declaration, primary health care is the essential carte based on practical, scientifically sound and socially acceptable methods and technology, made universally accessible to individuals and families in the community at every stage of their development in the spirit of self-reliance and self-determination (World Health Oragnization, 2012). It is an integral part of the Nigeria social and economic development, However, it is an individual and rural community first level of contact in the national health system, thus bringing health care to people where they live and work (Quill*, et al*., 2011, Ibrahim and Adamu, 2012, Efe, 2013;Adebisi*, et al*., 2017,).

Accessibility to health care amenities has been recognized as a key indicator of development. Convergence of opinions agreed that inadequate basic health care amenities has led to inadequacy in production, declining yield, short life expectancy and increased infant mortality rates (Gatrell and Elliot, 2002; Ajala, *et al*., 2005; Eshiobo and Omazuawo, 2007). According to Yemisrach, *et a*l. (2012) distance to health facility had a noticeable impact on less than five years mortality in poor and remote areas of Ethiopia. Furthermore, Opaluwa, *et al*. (2010) revealed that there was inadequate and uneven access to improved health care services in rural areas of Kogi State, Nigeria.

Primary health care utilization refers to the use of health care services. People use health care for many reasons including preventing and curing health problems, promoting maintenance of health and well-being, or obtaining information about their health status and prognosis (Andersen, 2008; Omotoso, 2010; Ayodeji and Michael, 2015). Infant mortality is the death of young children under the age of 1. Thus death toll is measured by the infant mortality rate (Salami *et al*. 2008; Alami et *al*.2008; Andersen, 2008; Bassey, 2014). Infant mortality rates are calculated as the number of deaths in the first year of life divided by the number of lives births, multiplied by 1000 (Ajilowo and Olujimi, 2007; Andersen, 2008; Efe, 2013; Bassey, 2014).

Government policies on establishing health care facilities for rural dwellers over the years have not being doubt; whether the establishment of the health care facilities in benefiting rural communities led to reduction in infant mortalities in the study area is in remained scanty. Apart from adding to existing literature and contributing towards the planning and implementation of health care programmes for rural dwellers, this study is relevant at this time as emphasis in health care has changed from healthcare for the people to health care by the people. Health is meant to be earned and maintained by the individuals.

Based on the foregoing, the broad objective of this study was to analyzedaccess and utilization of primary health care facilities on infant mortality rates in Akwa Ibom State, Nigeria.

The specific objectives were to:

1. ascertain the extent of accessibility to PHC services among rural dwellers in rural communities with PHC facilities and those without;
2. ascertain the extent of utilization of PHC services among rural dwellers in rural communities with PHC facilities and those without;
3. determine the infant mortality rates in rural communities with PHC facilities and those without in the study area.

Hypothesis

Ho_1: There is no significant difference in infant mortality rates between rural communities with PHC Facilities and those without in the study area.

METHODOLOGY

The study was carried out in Akwa Ibom State. The state is located in the coastal South-South part of the country, lying between latitudes 4^o 321 and 5^o 331 North, and longitudes 7^o 251 and 8^o 251 East. The state is bordered on the East by Cross River State, on the west by rivers state and Abia State, and on the south by the Atlantic ocean and the Southernmost tip of Cross River State. Akwa Ibom State is one of the thirty-six states of the federation (Nigeria) with a population over 5 million persons (NPC, 2006). It was created in 1987 from the former Cross River State and is currently the highest oil and gas producing state in Nigeria (Akwa Ibom State Ministry of Lands and Surveys, 2012).

Akwa Ibom State consists of thirty-one Local Government Areas divided into three senatorial districts with Uyo as the state's capital. The major language in the State is Ibibio. The population of the study comprised rural dwellers in rural communities with primary health care facilities and those without. A multi-stage sampling procedures was adopted in the selection of respondents for the study. In the first stage, simple random sampling technique was employed to select three local government areas from each of the senatorial district (9 local government areas). In the second stage, purposive sampling techniques was adopted to select 2 rural communities with PHC facilities from the 9 Local Government Area, that gave a total of 18 rural communities with PHC facilities and the same approach was adopted to select 2 rural communities without PHC facilities that gave a total of 18 rural communities without PHC facilities from the 9 local government areas. A total of 36 rural communities were selected for the study.

In the third stage, simple random sampling technique was adopted to select 10 rural household women from each of the 36 rural communities to have a total of rural 360 household women. In the fourth stage, purposive sampling technique was adopted to select 36 Traditional Birth Attendance (TBAs) and 18 health officers in charge of the primary health care facilities. In the fifth stage, purposive sampling technique was adopted to select 6 rural household women with one TBA and one health officer to constitute a focus group in each of the rural communities with primary health care-facility. Also, 6 rural household women with one TBA were selected to constitute a focus group in each of the rural communities without primary healthcare facilities in the study area. The Focus Group Discussion (FGDs) was organized in all the selected communities as to validate data collected for the study especially on infant mortality rates.

Primary data on the extent of accessibility and utilization, among others were collected from the rural household women, while data on infant mortality were collected from primary heath care centre death record files, TBAs, rural household women and validated during Focus Group Discussions. The data on infant mortality was collated for a period of 6 years starting from 2013 to 2018. the choice of the year 2013 to 2018 was because many rural communities in Akwa Ibom State benefited from primary health facilities between the year 2013 to 2018 (Akwa Ibom State Ministry of Health,2018).

Data collected were analyzed using both descriptive and inferential statistics. Specifically, objective one was analyzed using mean captured by three-point rating scale of highly accessible = 3; moderately accessible = 2; Not accessible = 1. The mean cut-off point of the respondents' responses based on the three-point rating scale was 3+ 2+ 1 = 6

$$\sum x/n = \frac{6}{3} = 2.0 \quad (1)$$

Therefore, any mean score ≤ 1.99 was considered not accessible, while any mean score between 2.0 – 2.4 was considered moderately accessible. Also, any mean score of > 2.4 was considered highly accessible. Objective two was analyzed using mean captured by using three-point rating scale of: Highly utilized = 3; moderately utilized = 2; Not utilized = 1. The mean cut-off point was 2.0. Therefore, any mean score ≤ 1.99 = Not utilized; 2.0 – 2.4 = moderately utilized; and mean score> 2.4 = highly utilized.

Objective three was analyzed using mean table to present the infant mortality rates of rural communities with PHC facilities and those without. The hypothesis which was stated in the null form thus: There is no significantly difference in infant mortality rates between rural communities with PHC facilities and those without in the study area was analyzed using percentage change in IMR outcome, difference in difference and paired t-test approaches. The formula for percentage change in IMR outcome is stated as:

$$\%\text{change in outcome} = \frac{\text{Outcome after} - \text{outcome before}}{Outcome\ before} \text{ x } 100 \quad (2)$$

Where,

Outcome after	=	IMR outcome after PHC intervention
Outcome before	=	IMR outcome before PHC intervention

A positive value from the percentage change is an increase, while a negative value is a decrease. Using percentage change alone cannot adequately attribute differences in their outcomes due to access and utilization of primary health care services. Therefore, the study further used difference in difference. The model specification for the difference in difference in-box approach is stated as

$$DD = \sum[Y_1^T] - \sum[Y_0^T] - (\sum[Y_1^C] - \sum[Y_0^C]) \quad (3)$$

Where,

DD	=	Difference in difference, which is the outcome difference between rural communities with primary health care facilities and those without
$\sum$	=	Summation sign
$[Y_1^T]$	=	Mean outcome of infant mortality rates of rural communities with PHC

Facilities after establishment of PHC facilities.

$[Y_0^T]$ = Mean outcome of infant mortality rates in rural communities with PHC facilities before establishment of PHC facilities.

$[Y_1^C]$ = Mean outcome of infant mortality rates in rural communities without PHC facilities after PHC facilities establishment in benefiting rural communities.

$[Y_0^C]$ = Mean outcome of infant mortality rates in rural communities without PHC facilities before establishment of PHC facilities in benefiting rural communities.

If DD = 1 and above mean PHC establishment impact on rural communities with PHC facilities and therefore, reject the null hypothesis, otherwise accept.

The intensity of significance of the outcome was tested using paired t-test at 0.05 percent level of significance. The model specification is stated thus:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} \quad (4)$$

Where,

t = T-calculated

$\bar{X}_1$ = Mean outcome difference of rural communities with PHC facilities

$\bar{X}_2$ = Mean outcome difference of rural communities without PHC facilities

S_1^2 = Variance of rural communities with PHC facilities

S_2^2 = Variance of rural communities without PHC facilities

n_1 = Total number of rural communities with PHC facilities

n_2 = Total number of rural communities without PHC facilities

If t-calculated value is greater than the critical or table value reject null hypothesis, otherwise accept.

RESULTS AND DISCUSSION

Extent of Accessibility to Primary Health Care Services

Result in Table 1 reveals that respondents in rural communities with primary health care facilities recorded high access for routine immunization ($\bar{x} = 2.56$), postnatal treatment ($\bar{x} = 2.51$), child delivery services ($\bar{x} = 2.50$), while moderate access were recorded for pediatric treatment ($\bar{x} = 2.36$), and antenatal services ($\bar{x} = 2.20$). The grand mean was 2.43. This implied that the primary health care services were highly accessed with accessibility index of 81%. This is because these healthcare facilities were located near to them. This outcome is in consonance with Orubuloye, (2003), that nearness of primary health care facility to the home of the patients influence access and health seeking behaviour of patients.

Furthermore, Table 1 revealed that respondents in rural communities without primary health care facilities recorded high access only for routine immunization ($\bar{x} = 2.50$), while other health care services listed were not accessed. The grand mean was 1.47. This implied that the primary health care services were not accessed with accessibility index of 49%. This could be attributed to the distance to the health care facilities since the PHC facilities

were not located in their communities. Nearness is a factor that influence access to Primary health care services (Orubuloye, 2003).

Table 1: Extent of respondent' accessibility to primary health care services (n = 180 each)

Services	Rural Communities with PHC facilities		Rural Communities without PHC facilities	
	Total	Mean($\bar{x}$)	Total	Mean ($\bar{x}$)
Antenatal services	400	2.00**	280	1.56*
Child delivery services	450	2.50**	240	1.30*
Postnatal treatment	451	2.51**	180	1.00*
Routine immunization	460	2.56***	450	2.50***
Pediatric treatment	425	2.36**	182	1.01*
Grand total		2.43		1.47
Accessibility index (%)		0.81		0.49

Source: Field survey, 2019. *** = Highly accessible; ** = moderately accessible and *= Not accessible

Extent of Utilization of Primary Health Care Services

Extent of respondents' utilization of primary health care services were determined and presented in Table 2. Results show that respondents' in rural communities with primary health care facilities recorded high utilization for routine immunization ($\bar{x} = 2.56$), postnatal treatment ($\bar{x} = 2.50$), Child delivery services ($\bar{x} = 2.50$), while pediatric treatment ($\bar{x} = 2.28$), and antenantal service ($\bar{x} = 2.19$), were moderately utilized. Table 2, also, revealed that rural communities without PHC facilities respondents utilization of routine immunization ($\bar{x} = 2.47$), was high. Other primary health care services were not utilized.

The grand mean of 2.41 for respondents' in rural communities with primary health care facilities implied that the primary health care services were highly utilized with utilization index of 80%. For respondents in rural communities without primary health care facilities recorded a grand mean of 1.46 implying that the primary health care services were not utilized with utilization index of 48%. This finding is in consonance with Opaluwa, *et al*. (2010) that distance from available heath care facilities negatively affect utilization.

Table 2: Extent of respondents' utilization of primary health care services (n = 180 each)

Services	Rural Communities with PHC facilities		Rural Communities without PHC facilities	
	Total	Mean($\bar{x}$)	Total	Mean ($\bar{x}$)
Antenatal services	395	2.19**	279	1.55*
Child delivery services	444	2.50***	240	1.30*
Postnatal treatment	450	2.50***	180	1.00*
Routine immunization	460	2.56***	445	2.47***
Pediatric treatment	410	2.48**	180	1.00*
Grand total		2.41		1.46
Utilization index(%)		0.80		0.48

Source: field survey, 2019. *** = High utilization; ** = Moderate utilization and * = Not Utilized or no utilization.

Infant mortality rates in Communities with Facilities and those without

Available data in Table 3 revealed that rural communities with PHC facilities recorded a total of 23 infant mortality rate with IMR mean of 7.70 between 2016 – 2018, after primary health care facilities intervention in their rural communities, whereas, for rural

communities without PHC facilities a total of 49 infant mortality rate with 1MR mean of 16.33 were recorded within the same period between 2016 – 2018. This implied that rural communities with PHC facilities witnessed a lower IMR when compared with rural communities without PHC facilities in the study area.

Before intervention of PHC facilities rural communities with facilities recorded a total of 84 infant mortality rate with IMR mean of 28 between 2013 – 2015, whereas rural communities without PHC facilities recorded a total of 64 infant mortality rate with IMR mean of 21.33. This is an indication that rural communities with PHC facilities recoded a reduction in infant mortality rate after benefiting from primary health care facilities in the study area.

Table 3: Distribution of infant mortality rates before and after PHC facilities

Years	**Rural communities with PHC facilities**	**Rural communities without PHC facilities**
After intervention		
2016	6	8
2017	7	24
2018	10	17
Total	23	49
Mean IMR	7.70	16.33
Before intervention		
2013	30	21
2014	28	19
2015	26	24
Total	84	64
Mean IMR	28	21.33

Source: Field survey, 2019

Percentage Change, Difference in Difference and Paired t-test Estimates of Impact of PHC Facilities on Infant Mortality Rates

Table 4 shows the difference in difference estimates of mean difference of infant mortality rates before and after PHC facilities intervention between rural communities with PHC facilities and those without. The mean difference in difference between the two categories of rural communities was -15.30 and more than 1. The negative value implies reduction in IMR meaning PHC facilities impact on benefiting rural communities (those with PHC facilities).

Table 5 reveals t-calculated value of 3.19 greater than the table or critical value of 1.645. This implies that the hypothesis of no significant variation in the IMR between rural communities with PHC facilities and those without was rejected. This findings is in consonance with Rourke (2008) that availability of primary health centres has the potential for reducing infant and child mortality rates, thus freeing resources that would been spent on treatment of diseases into other benefiting uses, as well as increasing farm productivity as a result of good health as hours are not lost due to sickness in rural areas.

Table 4: Results of difference in difference estimates of infant mortality rates

Variables	Total IMR		Mean		MD	DD
	After	Before	After	Before		
Rural communities with PHC facilities	23	84	7.70	28	-20.30	
Rural communities without PHC facilities	49	64	16.33	21.33	-5.0	-15.30

Source: Field survey, 2019. DD = Difference in difference, MD = Mean difference

Table 5: Result of paired t-test analysis of the difference in mean infant mortality rates

Variables	Mean difference	DD	S^2	t-cal
Rural communities with PHC facilities	20.30		362.74	
Rural communities without PHC facilities	5.0	15.30	59.18	3.19

Source: Field survey, 2019. df = 34, table value = 1.6456 at 0.05 level of significance.

CONCLUSION AND RECOMMENDATIONS

The study concluded that accessibility and utilization of PHC services by rural dwellers in rural communities with PHC facilities was high. The infant mortality rates for rural without primary health facilities was increasing, while that rural communities with facilities was reducing. Which indicates that utilization of primary care services has the potential for reducing infant mortality rates. It is recommended that:

1. Drastic measures are taken by government, non-governmental organizations, rural communities and other community-based organizations to ensure equitable establishment of PHC facilities in state.
2. Rural communities members are encourage to access and utilized available PHC services in their PHC facilities in their communities as to reduce infant mortality rates.

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