

## **Socioeconomic Effects on Household Access to Primary Healthcare Facilities in Selected Riverine Communities, Rivers State, Nigeria**



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**ABSTRACT:** Access to healthcare is complex and varies across countries, regions, communities and individuals. The study aimed to assess the socioeconomic effects on household access to Primary Healthcare (PHC) facilities in selected riverine communities in Rivers State, Nigeria. Objectives of the study are to characterise the socioeconomic condition of households in the study area; determine the spatial distribution of PHC facilities in the study area, identify the effects of the socioeconomic conditions of households to access to PHC facilities in the selected riverine communities in the study area, and suggest appropriate policy measures to improve households access to PHC facilities and services in the study area. The study employed Mixed Methods Research (MMR) approach and sequential explanatory research design for data collection and analyses. The study employed simple random and purposive sampling techniques. A total of 400 respondents (households) were interviewed including key informants (government agencies and professionals) and Geographic Information System (GIS) was used for map analysis to show spatial distribution of PHC facilities in the study area. However, 328 questionnaires were considered valid for analysis of data. The study revealed, most of the households' occupations are fishing, artisan and petty trading characterising low socioeconomic status. The study found PHC facilities are not evenly spatially distributed in the study area which has made households to use various available transport modes to access the facilities since the area is separated by creeks, rivers and sea. This has made travel time, distance and cost economically unfavourable to households in term of accessibility since they are relatively poor economically. The study has suggested the following recommendations including improvement of the socioeconomic status of households through education and vocational training programmes that will provide better employment opportunities, government should provide Mobile Healthcare programmes and services through water vessels and ambulances to reach remoted communities, proper study should be carried out to ascertain the population and their characteristics before locating PHC facilities for optimum utilisation, Smart Healthcare Services (SHCS) should be provided through Tele-Healthcare facilities to overcome distance and time, and government should collaborate with non-governmental organisations (NGOs) and multinational to provide Mobile Healthcare services in riverine communities to reduce challenges of accessibility and cost on households.

**KEY WORDS:** Socioeconomic, Access, Primary Healthcare Facilities, Riverine Communities

### **BACKGROUND TO THE STUDY**

Global population is increasing rapidly in recent times as it stands at 7.9 billion populations in 2021 (Worldometer, 2021). This increase has given concern to access to healthcare services to governments, international organisations and large population of the developing countries especially in Asia and African. Primary Healthcare (PHC) was endorsed in 1978 by the World Health Organisation (WHO) member countries as a paradigm designed to reduce inequities in health and partly through enabling universal access to health services (Rasanathan, Montesinos, Matheson, Elienne & Evans, 2009). The health status of the population in any country is important and can be used to determine the level of development of that country over time. The WHO (1948), defined health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. The concept health was redefined by WHO in 1986 during her First International Conference on Health held in Ottawa, Canada as the extent to which an individual or group is able to realize aspirations and satisfy needs and to change or cope with the environment. In broader perspective, Boruchovitch & Birgitte (2002), observed health is associated not only with the physiological functioning but with mental and moral soundness and spiritual salvation.

Globally, the first five countries that have the best access to PHC as ranked by WHO in 2020 are France (1<sup>st</sup>), Italy (2<sup>nd</sup>), San Marino (3<sup>rd</sup>), Andorra (4<sup>th</sup>) and Malta (5<sup>th</sup>) respectively (World Population Review (WPR), 2021). No Asian and African countries are in best 5 ranked countries in term of PHC. Nigeria is far to reach better access to PHC service to meet the Sustainable Development Goal (SDG) 3 (Good Health and Wellbeing). In Nigeria, the Primary Healthcare System is the third tripod of the three major

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healthcare systems and is meant to service the people at urban areas and rural communities. The healthcare systems in Nigeria are the tertiary, secondary and primary healthcare systems. The management of these healthcare systems is the responsibility of the federal, state and local governments having ministries of health and local health sector at the various levels. The private sector also renders support healthcare services which are managed by private providers.

Thus, in Nigeria many rural communities are faced with inadequate access to PHC, even though there are several PHC facilities in some rural areas. Rivers State in the Niger Delta region of Nigeria, many towns and communities especially in the riverine areas are faced with inadequate access to PHC facilities. PHC facilities can only be accessed through the meandering creeks and rivers by watercrafts such as canoes and small engine boats (locally called outboard engine boats and speed boats). This condition is observed more in island riverine communities where land transport access is very limited such as contiguous riverine island communities in Andoni, Opobo/Nkoro and Bonny Local Government Areas in Rivers State. Hence, this condition need to be investigated to assess to socioeconomic effects on household access to PHC facilities in selected riverine communities in Rivers State, Nigeria.

### **STATEMENT OF THE PROBLEM**

PHC facilities and services are basic, fundamental and social provision to people. According to the WHO (2017), access to healthcare is a fundamental right to everybody irrespective of their social class and living condition. This assertion by the WHO is important to everybody and society in the globe. However, in Rivers State many inland communities within the riverine areas are observed faced with the impediment of inadequate access to PHC facilities within their localities. This has caused many households in these riverine communities not to afford easily PHC services and is supposed to be a fundamental right to everybody. This may have been caused by spatially and remotely location of the available PHC facilities within the study area, disparity between households' income and household size. These conditions observed if not addressed will further increased poor access to PHC affecting their finance, time and distance to cover to access PHC facilities and services. There is need to access the socioeconomic effects on household access to PHC facilities in selected riverine communities in Rivers State, Nigeria that are nearly limited to only water transport access to PHC and suggest appropriate and sustainable framework to improve access to PHC facilities and services. This study will also add to the state of knowledge in access to PHC facilities especially in riverine communities that uses more of water transport to access PHC facilities and services.

### **AIM AND OBJECTIVES OF THE STUDY**

The aim of the study is to assess the socioeconomic effects on household access to Primary Healthcare facilities in selected riverine communities in Rivers State, Nigeria.

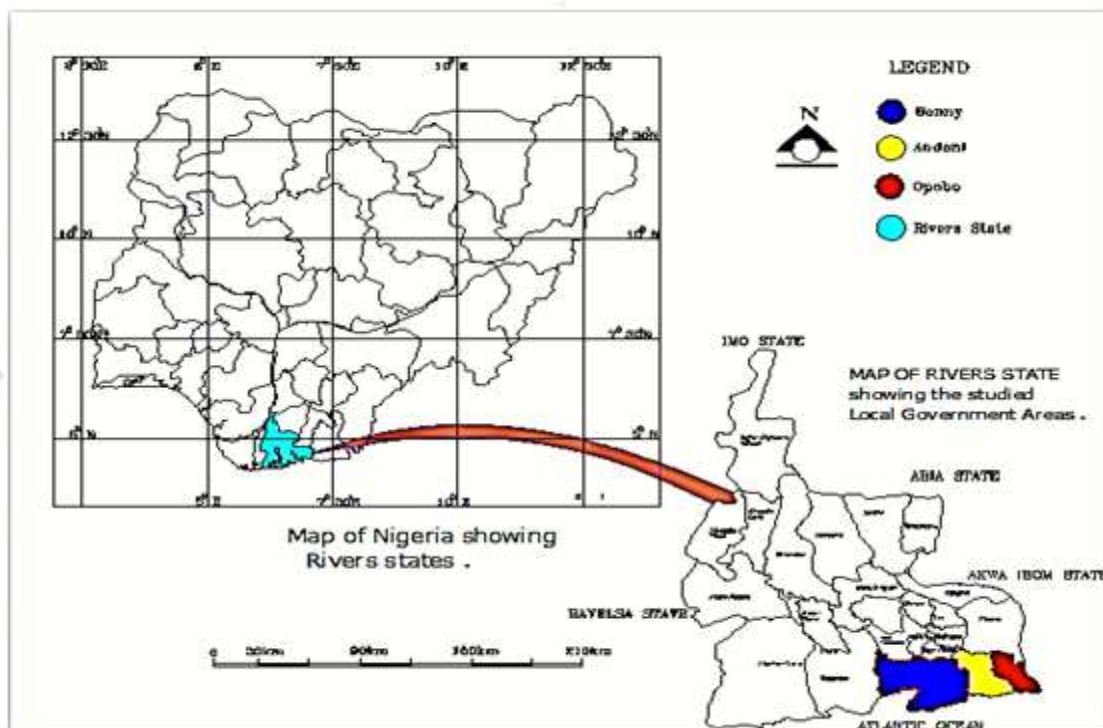
The objectives of the study are to:

- I. Characterise the socioeconomic condition of households in the study area;
- II. Determine the spatial distribution of PHC facilities in the study area;
- III. Identify the effects of the socioeconomic conditions of households to access to PHC facilities in the selected riverine communities in the study area;
- IV. Suggest appropriate policy measures to improve households access to PHC facilities and services in the study area.

### **SCOPE OF THE STUDY**

The geographical scope of the study covers selected riverine communities within Andoni, Opobo/Nkoro and Bonny LGAs of Rivers State, Nigeria (see Fig. 1). The content scope covers socioeconomic condition of households in the study area, determine the spatial distribution of PHC facilities in the study area, identify the effects of the socioeconomic condition of households to access to PHC facilities in the study area and suggest appropriate policy measures to improve households access to PHC facilities and services in the study area.

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**Fig. 1: Maps Showing Nigeria, Rivers State and the Study Areas**  
**Source: GIS Lab, Department of Urban & Regional Planning, RSU, 2021**

## GEOGRAPHIC AND CLIMATIC SETTINGS OF THE STUDY AREA

The selected communities for this study are in Andoni, Opobo/Nkoro and Bonny LGAs in Rivers State which is within Latitude  $4^{\circ}45'N$  and Longitude  $6^{\circ}50'E$ . They are bounded on the North by Khana, Gokana, Ogu/Bolo and Okrika LGAs, to the South by the Atlantic Ocean, to the East by Calabar River and to the West by Degema LGA (see Fig. 1). Andoni, Opobo/Nkoro and Bonny LGAs are located within the Niger Delta basin crisscrossed by a system of rivers and creeks. Their coastlines form part of the West African coastlines. This area frequently experiences an average temperature range of  $2c^{\circ}$  and high humidity between 84-86% annually (worldweatheronline, 2019). The shoreline is also characterized by an annual rainfall of between 1,500 and 4,000mm (Kuruk, 2004). Physically, it can be described as low-lying and mostly characterized by brackish and fresh water and mangrove swamp, tidal flat, fine sand beach, medium to coarse sand beach and mud flat. Temperature here is maintained by the cloud cover and by the generally damp air (Nwilo & Badejo, 2006). The vegetation found in the area are mangrove and rain forests having trees such as abura, oil palm and raffia palm as well as floating grasses and reeds. This zone has given many tourist economic opportunities, because of the plants significant economic characteristics.

## LITERATURE REVIEW

Peters, Garg, Blom, Waiker, Brieger & Rahman (2008), asserts that access to healthcare facilities is a multidimensional process involving the quality of care, geographical accessibility, availability of the right type of care for those in need, financial accessibility and acceptability of service. Access to healthcare is peculiar to the environment and resources. The United Nations (UN) in 2015 notes that “accessibility refers to the peoples’ ability to reach goods, services, activities and destinations from a given location, using the available means. Harold & Victor (1996), opined a household is constrained both by its budget which includes a time budget, because time spent obtaining health care can be traded off against competing uses of time, both for labour and leisure and by available medical technology. A tradeoff can occur at lighter levels of healthcare demand by household. Usually the distance covers to PHC facility for healthcare has weighty implication and relationship on travel time and cost of travel. This is because PHC is the most basic especially at emergency the most vital service needed in rural communities. PHC providers offer a broad range of services and treat a wide spectrum of medical issues. These factors are interconnected and must be completed functionally for a household’s health needs to be guaranteed. Hence the absence of one as at when due constitutes an impedance in household measure of access to healthcare regardless of urban or rural areas.

It was revealed that people in rural areas of United State of America covers an average of 10.5 miles (6.5km) from the nearest hospital and people living in suburban areas covers an average of 5.6 miles (3.5km) from the nearest acute care facility. Also, taking local traffic patterns into account, rural Americans have an average travel time of 17 minutes to the nearest hospital, while those in

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suburban and average travel time of 12 minutes (Ayia, 2018). This is attributed in part to much greater variation in rural areas (Claire, 2018). Accessibility in terms of travel distance, travel time and travel cost has been observed to be generic and professionally inclined. For instance, the transport planners generally focus on mobility, particularly vehicle travel while the landuse planners focus on geographic accessibility as distance between activities. Accessibility in the case of communication experts will focus on telecommunication quality received by households (Omirin & Stanley, 2017). In healthcare, the consideration can be viewed as the options available for specific groups of people to move and enter to use specific facility for service in the health sector. These can be interpreted to mean physical, social and economic and may have negative or positive impacts on accessing facilities.

Accessibility is a function of services rendered hence elements of accessibility are measurable. In support of this, Levesque (2003) cit Liddy, Joschko, Guglani, Afhkam & Keely (2019) opines that several dimensions of access can be measured. One of these is geographic accessibility which is based on (physical and temporal) distances between the location of users and the providers of services. Meanwhile economic accessibility is linked to the costs of services in relation to individuals' socioeconomic status (Starfield, 1998). Guagliardo (2004) devised a useful scheme to categorize healthcare access into four groups, defined by potential versus realized and actual care and by spatial access versus social access. They address healthcare financing arrangements and access challenges created by socioeconomic and cultural factors (Guagliardo 2004). The final two dimensions, availability and accessibility are spatial in nature. These two as specified address the adequacy of the supply of health care facilities and travel impedance to health care facilities in an area.

In details the traditional occupation of people living in the riverine communities is fishing and the practice is subsistent resulting to low income and this can impact on accessibility to healthcare facility. Household income is another variable and it has to do with the financial ability of the people to pay for available mode of transport to and from the location of healthcare facility. However, this situation is not always true due to some physical constraints such as the nature of tidal current and waves meandering river courses, width of creeks as well as water levels in the creeks to health care facility locations. These are factors that may increase travel time and costs of travel thereby resulting among others low level of accessibility. Relevant also is the household size. These socioeconomic indices of households cut across the social strata and in various dimensions. Their effects on the access by the lower stratum of society considered as the rural dwellers to PHC facility is major. According to Bolarin, Adekemi & Oluwatosin (2015) 43.5% of average household size of 8 members in an illiterate population whose major occupation is agriculture has an unequal access to modern healthcare facility in Ogun State in Nigeria. The contributory factors were identified as inadequate health workers, complex healthcare system, poor healthcare financing mechanism, poor quality of care, unavailability of drugs and vaccines. These instituted the major lacuna in access to healthcare facility between the urban and rural areas in the country.

Mpho & Sanni (2020), affirmed that poor people did not seek healthcare when sick, did not receive healthcare when needed it and usually patronise public health facilities. The contributory factors to these inequalities were low education and economic status of low income people as the case of Botswana. Atakiti, Mezgebu & Mihiretu (2021) in their study showed that household access to use of PHC facility is low and is significantly associated with education status, household size, economic status and payment mechanism. In related assessment Zahid, Mohammad, Wahid, Gazi, Jahangir, Ziaul, Mahabub & Sayem (2021), access to use of PHC facility was found low from government funded health protection scheme among the financially disadvantage below poverty line population in Bangladesh. These conditions of households suggested have effect on PHC facility accessibility.

### **METHODOLOGY**

The study employed Mixed Methods Research (MMR) approach and sequential explanatory research design for collection and analyses of data in the study. Simple random and purposive sampling techniques were adopted for collection of data in the study area. The sample size of the study was 400 respondents (households) and was determined through the application of Taro Yamane formula. To achieve the sample size, the population of the study area was projected from the Census report of 1991 at 305,289 populations (National Population Commission (NPC), 1991) to 2020 which is 1,895,845 populations using 6.5% (NPC, 2018) and average household size of 5 persons (National Bureau of Statistics (NBS), 2016) (see Table 1). Thus, questionnaire administration was carried out to collect primary data from households in the study area for the study using closed and opened ended questionnaires. Purposive sampling technique was also adopted to select key informants such as agencies and professionals using interview schedule for interviewing staff of Rivers State Ministry of Health, Rivers State Primary Health Management Board and medical professionals and town planners. The study also employed Geographic Information System (GIS) for map analysis to show spatial distribution of PHC facilities in the study area. However, after survey of households in the study area, 328 questionnaires were considered valid for collation and analysis of data for the study.

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**Table 1: Determination of Sample Size**

S/No.	Local Government Areas (LGAs)	No. of Communities in the LGAs	1991 Population	2020 Population Projected (6.5% Growth Rate)	Household Size of the LGAs (5 pers. Per HH)	Sampled Households in the LGAs
1	Andoni	140	180,156	1,118,769	223,754	236
2	Opobo/Nkoro	20	48,909	303,725	60,745	64
3	Bonny	63	76,224	473,351	94,670	100
	<b>Total</b>	<b>223</b>	<b>305,289</b>	<b>1,895,845</b>	<b>379,169</b>	<b>400</b>

NPC, 1991; NPC, 2018; NBS, 2016 & Researchers' Field Survey, 2020

**RESULTS**

**Socioeconomic Conditions of Households in the Study Area**

**Gender of Respondent**

In relation to socioeconomic profile of households of the study area, table 2 depicts 82% of respondents are male and 18% of the respondents are female.

**Table 2: Gender of Household Heads**

S/No.	Gender	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	Male	195	90.3	15	75	59	64.1	269	82
2	Female	21	9.7	5	25	33	35.9	59	18
	<b>Total</b>	<b>216</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>92</b>	<b>100</b>	<b>328</b>	<b>100</b>

Researcher's Field Survey, 2020

**Marital Status of Respondent**

Table 3 indicates the marital status of respondents in the study area. In the communities 75% aggregate of respondent were reported married and the least was 4% Divorced. Relatively, the table also showed that 85.1% respondent in Andoni L.G.A and 56.5% in Bonny L.G.A. were married. The least in this category was 45% in Opobo/Nkoro L.G.A.

**Table 3: Marital Status**

S/No.	Marital Status	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	Married	184	85.1	9	45	53	56.5	246	75
2	Single	9	4.2	6	30	17	18.5	32	9.8
3	Divorced	4	1.9	3	15	6	6.5	13	4
4	Widow/Widower	19	8.8	2	10	16	17.4	37	11.2
	<b>Total</b>	<b>216</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>92</b>	<b>100</b>	<b>328</b>	<b>100</b>

Researcher's Field Survey, 2020

**Households' Education Status Respondent**

A reflection of educational status of household heads is described in table 4. The data in presented showed that 17.9% of household heads completed primary school and 17.1% not completed primary school. Also, 12.2% not completed secondary school while 31.4% completed secondary school. A total of 9.8% of household heads have vocational education.

**Table 4: Education Status of Household Heads**

S/No.	Education Status	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	Primary school completed	51	23.6	5	25	3	3.3	59	17.9
2	Primary school not completed	41	19	2	10	13	14.1	56	17.1
3	Secondary school completed	59	27.3	3	15	41	44.6	103	31.4
4	Secondary school not completed	31	14.	4	20	5	5.4	40	12.2
5	University	16	7.4	1	5	21	22.8	38	11.6



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6	Vocational	18	8.3	5	25	9	9.8	32	9.8
7	Other	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>216</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>92</b>	<b>100</b>	<b>328</b>	<b>100</b>

Researcher's Field Survey, 2020

**Occupation of Household Heads**

Table 5 shows the occupation of household heads in the study area. The data presented showed 25.6% of the household heads are into fishing occupation, 20.7% were artisan and 15.9% petty trading. In all, farming and contractor were the least occupations with 0.3% respectively in the study area. However, in relation to the LGAs, Andoni 21.2%, 35% in Opobo/Nkoro and 33.7% in Bonny of respondents were engaged in fishing occupation.

**Table 5: Occupation of Household Heads**

S/No.	Occupation of Household Head	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		N	%	N	%	N	%	N	%
1	Civil and public servant	12	5.6	2	10	11	12	25	7.6
2	Artisan	41	18.9	4	20	23	25	68	20.7
3	Contactora	1	0.5	-	-	-	-	1	0.3
4	Company staff	5	2.3	-	-	-	-	5	1.5
5	Fishing	46	21.2	7	35	31	33.7	84	25.6
6	Boat Driving	27	12.5	3	15	14	15.2	44	13.4
7	Petty Trading	39	18.1	4	20.0	9	9.7	52	15.9
8	Security	5	2.3	-	-	4	4.3	9	2.7
9	Hunting	-	-	-	-	-	-	-	-
10	Farming	1	0.5	-	-	-	-	1	0.3
11	Religion practitioners	3	1.4	-	-	-	-	3	0.9
12	Retired	5	2.3	-	-	-	-	5	1.5
13	Applicant	31	14.3	-	-	-	-	31	9.5
14	Others	-	-	-	-	-	-	-	-
	<b>Total</b>	<b>216</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>92</b>	<b>100</b>	<b>328</b>	<b>100</b>

Researcher's Field Survey, 2020

**Monthly Income of Households (Naira)**

Table 6 explained monthly income of households (naira) in the study area. The data presented as aggregated, the highest of 29.7% of respondents generate and spend ₦18,000-₦39,999 averagely in a month. This was followed by households earning between ₦40,000 - ₦59,999 and ₦60,000-₦79,000 representing 21.9% and 10% respectively. The lowest income brackets earned by households averagely in a month are ₦120,000-₦139,999, ₦160,000-₦179,999 and ₦180,000-₦199,999 accounting for 2.8%, 0.9% and 0.3% respectively. Specifically, the highest amount earned by households monthly was ₦200,000+.

**Table 6: Monthly Income of Households (Naira)**

S/No.	Income Bracket (Naira)	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	Less than ₦18,000	40	19	-	-	-	-	40	12.5
2	₦18,000-₦39,999	88	41.7	4	22.2	3	3.3	95	29.7
3	₦40,000-₦59,999	41	19.4	4	22.2	25	27.5	70	21.9
4	₦60,000-₦79,999	18	8.5	-	-	14	15.4	32	10
5	₦80,000-₦99,999	10	4.7	4	22.2	4	4.4	18	5.6
6	₦100,000-₦119,999	6	2.8	-	-	17	18.7	23	7.2
7	₦120,000-₦139,999	-	-	3	16.7	6	6.6	9	2.8
8	₦140,000-₦159,999	1	0.5	-	-	13	14.3	14	4.4
9	₦160,000-₦179,999	1	0.5	2	11.1	-	-	3	0.9
10	₦180,000-₦199,999	-	-	1	5.6	-	-	1	0.3

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11	200,000+	6	2.8	-	-	9	9.8	15	4.7
	<b>Total</b>	<b>211</b>	<b>100</b>	<b>18</b>	<b>100</b>	<b>91</b>	<b>100</b>	<b>320</b>	<b>100</b>

Researcher’s Field Survey, 2020

**Household Size of Respondent**

Data in table 7 shows household size of respondent in the study area. The data presented revealed the highest household size is 5 persons representing 12.5%, closely followed 14+, 3 and 6 persons accounting for 10.7% and 9.8% respectively. The least household size as presented in the data are 11, 2 and 1 person(s) reflecting 1.2%, 1.8% and 3% respectively.

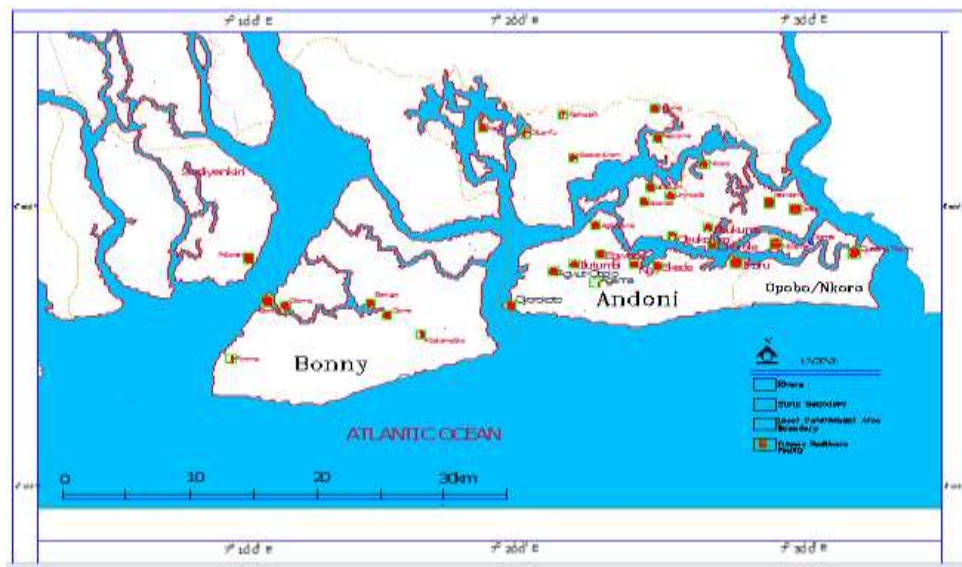
**Table 7: Household Size of Respondents**

S/No.	Household Size	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	1	7	3.2	-	-	3	3.3	10	3
2	2	2	0.9	2	10	2	2.2	6	1.8
3	3	14	6.5	2	10	16	17.4	32	9.8
4	4	12	5.6	-	-	17	18.4	29	8.8
5	5	19	8.8	2	10	20	21.7	41	12.5
6	6	17	7.9	3	15	12	13	32	9.8
7	7	14	6.5	2	10	7	7.6	23	7
8	8	12	5.6	1	5	5	5.4	18	5.5
9	9	15	6.9	3	15	5	5.4	23	7
10	10	16	7.4	1	5	2	2.2	19	5.8
11	11	4	1.9	-	-	-	-	4	1.2
12	12	18	8.3	-	-	-	-	18	5.5
13	13	15	6.9	2	10	-	-	17	5.2
14	14	17	7.9	1	5	3	3.2	21	6.4
15	14+	34	15.7	1	5	-	-	35	10.7
	<b>Total</b>	<b>216</b>	<b>100</b>	<b>20</b>	<b>100</b>	<b>92</b>	<b>100</b>	<b>328</b>	<b>100</b>

Researcher’s Field Survey, 2020

**Spatial Distribution of PHC in the Study Area**

Fig. 2 shows the spatial distribution of PHC in the study area. The map showed that Andoni LGA has the highest number of PHC facilities in the study area recording a total of 26, followed by Bonny LGA with 11 PHC facilities and Opobo/Nkoro LGA having 6 PHC facilities. This implies that available PHC facilities are more spatially distributed in Andoni LGA.



**Fig. 2: Spatial Distribution of PHC Facilities in the Study Area**  
Source: Researchers’ Field Survey, 2020

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### Quantity and Distribution of PHC Facilities in the Study Area

Table 8 present the quantity and distribution of PHC facilities in the study area. The data presented indicated Andoni LGA has 60.5% of the total quantity of provided PHC facilities in the study area, next is the Bonny LGA having 25.5% of the PHC facilities and the remaining 14% are located in Opobo/Nkoro LGA. Interview of staff of the Rivers State Ministry of Health said the criteria for location of PHC facilities in the LGAs are population and availability of land for development. Though, some PHC facilities are located where the threshold population cannot sustain the functionality and maintenance of the facilities. This condition is observed in many Bonny communities as the facilities cannot be accessed easily so are not functional.

**Table 8: Quantity and Distribution of PHC Facilities in the Study Area**

S/No.	LGAs	Quantity of PHC Facilities	% of PHC Facilities Distribution
1	Andoni	26	60.5
2	Opobo/Nkoro	6	14
3	Bonny	11	25.5
	<b>Total</b>	<b>43</b>	<b>100</b>

Source: Researchers' Field Survey, 2020

### Effects of Socioeconomic Conditions of Households to Access to PHC Facilities in the Study Area

#### Mode of Transport, Cumulative Average Travel Time and Distance of Households to Access PHC Facility

Table 9 shows the mode of transport used, cumulative average travel time and distance of households to access PHC facilities in the study area. The data presented showed most frequently used modes of transport to access PHC facilities in the study area are hand-pulled canoe and out-board engine fiber speed boat. Others modes of transport include foot, out-board engine wooden boat and motorcycle. The least used modes are bus, bicycle and taxi. The data in table 9 also shows that households using out-board engine fiber speed boat travel an average distance of 25km, those that uses motorcycle and hand pull canoe travel distance of 13km and 12km respectively. Other households travel distance of 6km, 3km, 1.5km and 1km representing out-board engine wooden boat, foot, bus, bicycle and taxi respectively as mode of transport to access PHC facilities in the study area. The data in table 9 further present the average travel time in hour(s) spent by households to travel to access PHC facilities in the study area. The data showed the highest average time spent by households to access PHC facilities is 18.5hrs. Representing hand-pulled canoe, closely followed foot and out-board engine fiber speed boat spending average travel time of 17hrs. and 16 hrs. respectively. Other average travel time by mode of transport are 8hrs. (out-board engine wooden boat) and 6hrs. (motorcycle). The least average travel time are 1hr and 0.5hr representing using bus, bicycle and taxi respectively.

**Table 9: Cumulative Average Travel Time and Distance of Households to Access PHC Facility**

S/No.	Mode of Transport	Average Travel Distance (km.)		Average Travel Time (hr.)	
		Km.	%	Hr.	%
1	Out-board engine fiber speed boat	25	40	16	23.7
2	Hand-pulled canoe	12	19.2	18.5	27.4
3	Motorcycle	13	20.8	6	8.9
4	Out-board engine wooden boat	6	9.6	8	11.9
5	Bicycle	1	1.6	0.5	0.7
6	Bus	1.5	2.4	1	1.5
7	Taxi	1	1.6	0.5	0.7
8	Foot	3	4.8	17	25.2
9	Private car	-	-	-	-
10	Other	-	-	-	-
	<b>Total</b>	<b>62.5</b>	<b>100</b>	<b>67.5</b>	<b>100</b>

Researchers' Field Survey, 2020

#### Annual Travel Cost of Households to Access PHC Facility

The data in Table 10 shows the annual travel cost (naira) of households to access PHC facilities in the study area. The data showed the highest annual travel cost of households to access PHC facility is between the range of ₦1,000-₦4,999 accounting for 16%, closely followed by ₦20,000-₦24,999 representing 13.1%, 11.9% and 11.5% accounting for ₦35,000-₦39,999 and less than ₦1,000, ₦5,000-₦9,999 respectively. The least travel cost of households to access PHC facilities in the study area as recorded in the data are ₦25,000-₦29,999, ₦45,000-₦49,999 and ₦30,000-₦39,999 representing 4.5%, 3.7% and 2.9% respectively.



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**Table 10: Annual Travel Cost of Households to Access PHC Facility (Naira)**

S/No.	Cost (₦)	Andoni		Opobo/Nkoro		Bonny		Aggregate	
		No.	%	No.	%	No.	%	No.	%
1	Less than ₦1,000	15	15.7	2	11.1	11	8.3	28	11.5
2	₦1,000-₦4,999	18	18.9	1	5.5	20	15.3	39	16
3	₦5,000-₦9,999	20	21.1	3	16.7	5	3.8	28	11.5
4	₦10,000-₦14,999	3	3.2	3	16.7	15	11.5	21	8.6
5	₦15,000-₦19,999	6	6.3	-	-	8	6.1	14	5.7
6	₦20,000-₦24,999	16	16.8	3	16.6	13	9.9	32	13.1
7	₦25,000-₦29,999	8	8.4	-	-	3	2.3	11	4.5
8	₦30,000-₦34,999	1	1.1	3	16.7	3	2.3	7	2.9
9	₦35,000-₦39,999	4	4.2	-	-	25	19.1	29	11.9
10	₦40,000-₦44,999	3	3.2	-	-	9	6.9	12	4.9
11	₦45,000-₦49,999	-	-	-	-	9	6.9	9	3.7
12	₦50,000+	1	1.1	3	16.7	10	7.6	14	5.7
	<b>Total</b>	<b>95</b>	<b>100</b>	<b>18</b>	<b>100</b>	<b>131</b>	<b>100</b>	<b>244</b>	<b>100</b>

Researchers' Field Survey, 2020

### DISCUSSION OF FINDINGS

#### Socioeconomic Conditions of Households in the Study Area

In profiling the characteristics of households socioeconomic conditions of the study area, the study revealed more male responded to interview conducted for the study than the female counterparts. This represented that 82% of the male are heads of their households compared to the females in the study area (see Table 2). This also reflected in their marital status, as 75% of the respondents are married, 11.2% are widows/widowers while few are single and divorcees. This implies most of the households have more than one person. Though, Andoni LGA has more married families of over 85% and Opobo/Nkoro has the least with 45% as married family in the study area (see Table 3).

The consideration of education status of household heads as discovered by the study painted an image of 17.9% of the heads completed primary school and also same figure that 17.1% were not able to complete their primary education. Also, 31.4% of the heads completed secondary school while 12.2% attempted secondary education but were not able to finish. Few of the heads accounting for 9.8% also attended vocation education so have some form of semi-skills (see Table 4). The data in table 4 revealed that more of the household heads are not well educated and this may influence their occupation they are engaged in. Thus, the study revealed from household head educational background over 60% of the heads engaged in primary occupation that requires less formal skills to operate. This is reflected on the predominant occupations as most household heads are into fishing, artisan and petty trading activities while the least occupation engaged by household heads is farming account for 0.3% which is insignificant (see Table 5). The farming occupation is influenced by the environment the inhabitants inhabit as it is a riverine environment. The occupation of households accounted for the average monthly income of families in the study area. The average income earns by households across the study area ranges between ₦18,000-₦79,999 accounting for over 70% of the households. However, within this range of income, the most earned income range is between ₦18,000-₦39,999 which is within the minimum income as approved by the federal government of Nigeria (see Table 6).

The study also revealed the highest number of persons in a household in the study area is 5 persons which reflects the same as the average household size of Nigeria as presented by NBS in 2016. Though, some households have 14+ and 6 persons as shown in table 7. The socioeconomic characteristics of residents of the study area showed more of relatively high population growth, low educational status, semi-skilled and unskilled labour force with average earning and large household size.

#### Spatial Distribution of PHC Facilities in the Study Area

However, as revealed from Fig.2, the study discovered that spatially PHC facilities are not evenly distributed in the study area. This is shown in the map presented as Andoni LGA is having the highest number of PHC facilities across the study area having 26 facilities out of the 43 PHC facilities found in the study area. Bonny and Opobo/Nkoro LGAs also have a share of the available PHC facilities in the study area. Though, put together the quantity of existing PHC facilities located in Bonny and Opobo/Nkoro LGAs is not up to the quantity of PHC facilities in Andoni LGA (see Table 8 and Fig. 4). The data in table 8 equally demonstrate that Andoni LGA account for 60.5% of the PHC facilities within the study area. This show lopsided in term of distribution and present threat of unequal access to PHC facilities by households in the study area. Though, Andoni LGA has more communities and population in the study area than the other LGAs put together. Opobo/Nkoro LGA with two clans is having only 6 PHC facilities

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making distribution of the facilities in the LGA inadequate and access difficult. The situation of Bonny LGA is even complex as there are more isolated communities separated by rivers, creeks and mangrove forests which makes accessibility cumbersome and difficult (see Fig. 2). Staff of the agencies and professionals also said what informed the decision sometimes in the location of PHC facilities is political as decision makers in the helm of affairs deliberately locate facilities in their domains and localities without considering threshold population (minimum population to support) and range of services (maximum distance and coverage) of the facilities. This defeats accessibility and sustainability principles in service provision.

### Effects of Socioeconomic Conditions of Households to Access to PHC Facilities in the Study Area

Thus, from the data presented in the study, it was revealed the modes of transport most households used to access PHC facilities in the study area are hand-pulled canoe and out-board engine fiber speed boat. These modes are used frequently by households because of the remoteness of the study area as riverine and coastal environment. Though, availability of other modes in some communities made households to use other modes such as out-board engine wooden boat and motorcycle, bus, bicycle and taxi. Some households use foot were the facility is close and motorised vehicles cannot ply (see Table 9 and Fig. 3). These modes of transport and remote nature of the study area condition households to travel longer distances to access nearest PHC facility to their communities as the facilities are not evenly spatially distributed in the study area (see Fig. 2).

Many households spent an average distance of 25km, 13km and 12km using out-board engine fiber speed boat, motorcycle and hand pull canoe. Though, some households spend between 1km to 6km using out-board engine wooden boat, foot, bus, bicycle and taxi to access PHC facilities in the study area. These mode of transport have made many households to travel in longer time in hour(s) such as 18.5hrs to access PHC facilities within the study area using hand-pulled canoe. Some households as revealed in the study spend 6hrs to 17hrs using foot, out-board engine fiber speed boat, out-board engine wooden boat and motorcycle to access PHC facilities. The minimum time (hrs.) spend by households are 0.5hr to 1hr plying bus, bicycle and taxi to access PHC facilities in the study area.

The travel distance in kilometres and hours spent by households to access PHC facilities in the study area have influenced and determined the annual travel cost to households. The study revealed from the data in table 10, many households spend between ~~₦1,000-₦4,999~~; ~~₦20,000-₦24,999~~; ~~₦35,000-₦39,999~~ and less than ~~₦1,000~~, ~~₦5,000-₦9,999~~ to access PHC facilities within the study area. Other households said they between ~~₦25,000-₦29,999~~; ~~₦45,000-₦49,999~~ and ~~₦30,000-₦39,999~~ to access the facilities. Though, this depends on the location of the community, PHC facility and available mode of transport to the household (see Figs. 2, 3 and Table 9). The household conditions in term their socioeconomic characteristics such as educational status, occupation, income and household size also determines the amount to spend to access PHC facilities in the study area (see Tables 3, 4, 5, 6 and 7). There are also physical constraints such as remoteness of communities in term of location, waterbodies including rivers, creeks and mangrove forests that impede navigation within the study area to access the location of some PHC facilities. There is also issue of uneven spatial distribution of PHC facilities across the study area which has increased disparity and segregation among communities and few households that earns higher compared to majority of the households in the study area (see Fig.2 and Table 6).



**Fig. 3: Out-board Engine Fiber Boat and Hand-pulling Canoe Used for Transporting Riverine Residents to Remote PHC in Bonny**

Researcher's Field Survey, 2020

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**Fig. 4: Akaradi Community Healthcare Centre in Andoni  
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### CONCLUSION

The riverine communities in Rivers State including the study area are basically islands communities with more of vulnerable population groups, portraying low socioeconomic characteristics of households and engaged in fishing and less formal education. The study discovered households use multi-modal transportation system especially water transport modes navigating creeks, rivers and sea, combining other forms of land transport modes to access PHC facilities in the study area. The unevenly spatial distribution of PHC facilities also stand as a major constraint that impedes accessibility to the facilities in the study area. This has contributed to longer time and distance covered by households to access PHC facility in the study area. The resultant effect of these conditions is the high costs suffered by households taken cognisance of their socioeconomic background which is relatively poor economically. These conditions have prompt the following recommendations to that will be policy framework to improve households access to PHC facilities in the study area and added to state of knowledge in PHC facilities accessibility in riverine communities in developing countries.

### RECOMMENDATIONS

- I. Improvement of the socioeconomic status of households through education and vocational training programmes that will provide better employment opportunities;
- II. Government should provide Mobile Healthcare programmes and services through water vessels and ambulances to reach remoted communities;
- III. Proper study should be carried out to ascertain the population and their characteristics before locating PHC facilities for optimum utilisation;
- IV. Smart Healthcare Services (SHCS) should be provided through Tele-Healthcare facilities to overcome distance and time;
- V. Government should collaborate with non-governmental organisations (NGOs) and multinationals to provide Mobile Healthcare services including dissemination of health related information in riverine communities to reduce challenges of accessibility and cost on households; and
- VI. Government should improve and construct rural roads and canalization of waterways ease access to PHC facilities and between communities.

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