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## *Trends in Health Service Utilization by Insured and Uninsured Patients at a Community-Based Health Insurance Scheme (2011–2023) in a Cottage Hospital in Niger Delta, Nigeria*

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### Abstract

**Background:** A community-based health insurance scheme (CBHIS) is a non-profit health insurance program that provides risk pooling to cover the cost of health care services to provide access to basic healthcare needs of the community members. This study examined the trend of utilization of health services by the CBHIS insured and uninsured clients at the Obio Cottage Hospital (OCH), Port Harcourt, Rivers State, Nigeria, between 2011 and 2013.

**Methods:** This was a retrospective cross sectional study design which reviewed health records at the OCH, between 2011 and 2023. The patients were disaggregated as insured or uninsured, outpatients, admissions, antenatal care, deliveries, family planning, and laboratory services. Data were analyzed in an Excel spreadsheet (descriptive statistics) and SPSS version 26 (chi square tests).

**Results:** There was a steady increase in the utilization of the CBHIS for the OPD from 3982 in 2011 to 11642 (292% increase) in 2023. The number of clients who used CBHIS for ANC also increased by 129% (from 2539 in 2011 to 3266 in 2023). There were statistically significant increase in the CBHIS utilization for health services in 2023 compared to 2011; OPD ( $\chi^2=0.043$ ,  $p=0.001$ ), Admission ( $X^2=119.4$ ,  $p<0.001$ ), Ante-Natal Clinic (ANC), ( $\chi^2= <0.014$ ,  $P=0.001$ ), deliveries ( $\chi^2=148.2$ ,  $p<0.001$ ), laboratory ( $\chi^2=330.2$ ,  $p<0.001$ ) and pharmacy ( $\chi^2=0.18$ ,  $p=0.001$ ).

**Conclusion:** The trend of utilization of health services by the CBHIS insured clients experienced significant increase at the OCH during the study period. This emphasizes the need for CBHIS in developing countries toward the realization of the Universal Health Coverage

**Keywords-** Community-Based; Health Insurance; Cottage Hospital, Niger Delta, insured



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## Introduction

The utilization of health services is a critical determinant of health outcomes and is essential for achieving universal health coverage and reducing health inequities.<sup>1,2</sup> In Nigeria, Primary Health Centres (PHCs) play a vital role in providing essential health services, including outpatient care, family planning, ante natal care, and baby deliveries.<sup>3,4</sup> However, the utilization of these services remains suboptimal, with varying levels of access and uptake across different populations.<sup>3</sup> Most of the clients at the primary health centres in the country are community members with limited access to financial resources for the needed health care packages such as caesarian section delivery or hospital admission.<sup>5,6</sup>

The usual source of healthcare financing at this level of care is out of pocket expenditures.<sup>5</sup> Though the essential services at the PHC are either free or highly subsidized, access to these services may be limited among the indigent clients who sometimes had to resort to catastrophic expenditures for health events such baby deliveries or a childhood febrile illness.<sup>7</sup>

In Nigeria, the National Health Insurance Authority (NHIA) introduced the Community Based Health Insurance Scheme (CBHIS) in 1999. This is as an informal sector health insurance program, an important tool for making health care affordable among poor community members. However, public sector implementation of this program has been very difficult.<sup>8</sup> The challenges of public sector implementation of CBHIS in Nigeria include inadequate funding, weak policy, lack of political commitment and consequently poor enrollment.<sup>9</sup>

In 2010, Shell Petroleum Development Company (SPDC) now Renaissance African Energy Company (RAEC), as part of its social performance initiatives in host communities, collaborated with the Rivers State government to upgrade the Obio Health Center in Port Harcourt to a cottage hospital and also facilitated the CBHIS. Indigenes in the scheme's target communities subscribed to it with the sum of N3,600 while others paid N7,200 per person annually and could access several services especially Maternal, Neonatal and Child Health (MNCH).<sup>10</sup>

There have been studies in the Niger Delta regions of Nigeria on CBHIS, but most of the research focused on willingness to pay for CBHIS.<sup>11,12</sup> Research on

utilization of health services among the clients on CBHIS are scarce in this region. The aim of this study therefore, was to investigate and compare the trend of health service utilization among CBHIS insured and non-insured clients at the Obio Cottage Hospital (OCH) from 2011 to 2023. The understanding of the patterns of healthcare service utilization, the underlying determinants, and the potential role of health insurance becomes paramount in bridging the healthcare divide in this resource-limited- setting

## Method

### Study location

Obio Cottage Hospital (OCH), situated in the heart of Port Harcourt, plays a crucial role in delivering healthcare services to the surrounding communities. The hospital is a 49 -bedded health facility serving communities in the Obio-Akpor Local Government Area (LGA), Rivers State, Nigeria.<sup>13</sup> The projected population of the LGA in 2020 was 742,238.<sup>14</sup>

This government-owned primary health center serves as a lifeline for many residents in its nine catchment communities in Obio-Akpor LGA, where healthcare options are often scarce.<sup>15</sup> One of the pivotal initiatives implemented at OCH is the Community-Based Health Insurance Scheme (CBHIS), which started in February 2010 as a model that seeks to enhance healthcare accessibility, ensure responsible utilization of resources, promote accountability and ultimately improve the overall health outcomes of the community. The CBHIS program is a partnership between River state government, the Shell Petroleum Development Company Joint Venture (SPDC JV) and local communities in Obio Akpor LGA of River state. The CBHIS is managed by a community development board that includes the community representatives, insurers, health service providers, and sometimes a third party. The board is responsible for making important decisions, such as fund allocation.<sup>16</sup> The community representatives are involved in key decisions on the scheme and community mobilization. They also act as the Liaison Officers between the community and the facility. These ensures accountability and enhance community participation

### Operational definitions

**Insured-** These are clients who registered for the CBHIS and access health care services at the Obio cottage Hospital.

**Non-insured** – These are clients who were not on registered on CBHIS, but accessed health care services at the OCH through out-of-pocket payment.

**Health services utilization-** refers to the extent to which the client's access and use healthcare services (OPD, FP, delivery, admission, pharmacy, Laboratory, etc.) at the OCH during the study period

### Study design

This is a retrospective cross-sectional study. The survey reviewed the hospital records of the Obio Cottage Hospital from 2011 to 2023. The record reviews were the annual summaries for the general outpatient patient department (GOPD), Family planning (FP), Laboratory, Antenatal Clinics (ANC), deliveries and hospital admissions. These were disaggregated based on the clients' utilization of the CBHIS.

### Study population

The study population were all clients who visited and received care from the hospital within the study period. Those eligible for the study were the clients whose hospital records were available during the study period. We excluded clients with missing, incomplete or inaccurate records.

### Data management

Data sources were the annual summary statistics obtained from the Family planning, General out-patient department, Antenatal clinics, Labour ward, Laboratory and pharmacy unit of the OCH. The data were collated at the record unit of the hospital and were entered into an EXCEL sheet. Data cleaning was done to remove incomplete, inaccurate, incomprehensible or spaces left for missing data. The clients were disaggregated as insured / non-insured. The line diagram for the trend analysis was drawn on the EXCEL Sheet, while further descriptive and Chi square analysis were done using the IBM SPSS version 26.

### Sample size and sampling technique

The minimum sample size for the survey was calculated using the Cochran formula <sup>17</sup>

$n = \frac{z^2pq}{d^2}$  where:  $n$  = minimum sample size;  $z$  = standard normal deviation set at 95% confidence interval ( $=1.96$ );  $p$  = proportion of clients who enrolled for CBHIS in a previous study= $4.5\%$ ; <sup>18</sup>  $q$  = complimentary probability; that is,  $q = 1 - p = 1 - 0.045 = 0.955$ ;  $d$  = maximum sampling error allowed (precision) at 95% confidence limit, that is,  $5\%$  ( $= 0.05$ ) Therefore,

$$n = \frac{z^2pq}{d^2} = \frac{(3.84 \times 0.045 \times 0.955)}{0.0025} = 66$$

The minimum sample size was 66 clients. This study involved a trend analysis; the researchers therefore used the Total sampling technique to include all clients with relevant and complete hospital records in the study.

### Ethical considerations

The permission to use the data was sought and obtained from the management of the Obio Cottage Hospital, Port Harcourt. The data were anonymized to protect the client identity, they were saved in secured, password-protected computers and were shared only on a need-to-know basis.

### Result

The results showed an increase in the utilization of health services by the CBHIS insured from the 1st year of implementation to the year 2023 as shown on the Table 1. The total outpatient from 2011 to 2023 was 290,242, average number of patients seen at the OPD per year was 24,187. There was a steady increase in the utilization of the CBHIS for the OPD from 3, 982 in 2011 to 11, 642 (292% increase) in 2023. The number of total admissions also experienced an increase over the years. While only 648 clients utilized the CBHIS for admission in 2011, the number increased by 517% to 3,353 in 2016, but dropped to 376% (2,441) in 2023. The number of clients who used CBHIS for ANC also increased by 153% between 2011 and 2016 (from 2,539 in 2011 to 3,894 in 2016), with a slight drop in 2023 (3,266), though this was still a 129% increase compared to 2011.

The Utilization of CBHIS for deliveries also increased from 2011 to 2017 with a slight drop in 2018. The highest utilization of CBHIS for pharmacy services was between the year 2012 and 2016. The average pharmacy service utilization during this period was 25, 021 clients per year. There was statistically significant increase in the CBHIS utilization of health services in 2017



compared to 2011 ( $p < 0.001$ ) There were also increase using CBHIS in 2023 compared to 2011; OPD ( $\chi^2 = 0.043$ ,  $p < 0.001$ ), Admission ( $\chi^2 = 119.4$ ,  $p < 0.001$ ), ANC ( $\chi^2 = 0.014$ ,  $P < 0.001$ ), deliveries ( $\chi^2 = 148.2$ ,  $p < 0.001$ ), laboratory ( $\chi^2 = 330.2$ ,  $p < 0.001$  and pharmacy ( $\chi^2 = 0.18$ ,  $p < 0.001$ ) Table 2. The trend for the utilization of health services is shown in figure 1. Increasing trends were depicted from 2011 to 2019, with a fall in 2019-

2021 and a steady rise to the year 2023. Table 3 shows that the outpatient department experienced more than 3.5 times increase in the utilization of the CBHIS (354%) with a 25% average year on year decrease for the None CBHIS clients. Admissions also increase for CBHIS-clients (average YoY) by 231% compared to an average of 57% decrease in number of clients who paid out of pocket for hospital admission.

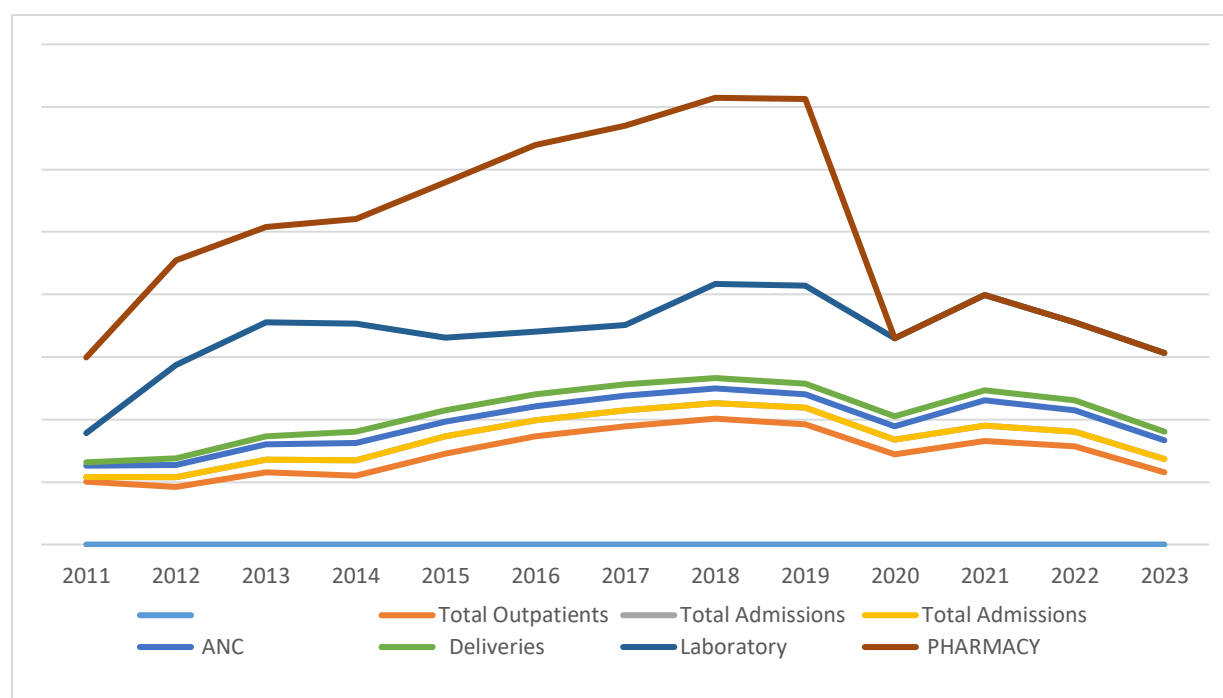


**Table 1:** Trend of Health Service utilization at the Obio Cottage Hospital from 2011 to 2023

SERVICES	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1. Total Outpatients	20,023	18,424	23,200	22,105	29,141	34,609	37,864	40,272	38,392	28,956	33100	31,341	23074
CHIS	3,982	13,595	15,462	14,534	18,924	23,189	23,425	24,184	22,776	15,634	17,946	15,485	11, 642
NCHIS	16,041	4,829	7,738	7,571	10,217	11,420	14,439	16,088	15,616	13,322	15,154	15856	11,432
2. ADMISSIONS													
Total Admissions	1,558	3,115	3,989	4,801	5,393	5,112	5,102	4,944	5,330	4,662	4998	4801	4227
CHIS	648	1,914	2,220	2,956	3,509	3,322	3,353	3,309	3,528	2,990	3271	2909	2441
NCHIS	910	1,201	1,769	1,845	1,884	1,790	1,749	1,635	1,802	1,672	1727	1892	1786
3. ANC (Total)	3641	3976	4800	5647	4693	4594	4706	4722	4291	4215	8095	6697	5949
CHIS	2,539	2,775	3,429	4,302	3,483	3,894	3,930	4,025	3,640	3,641	4362	3667	3,266
NCHIS	1,102	1,201	1,371	1,345	1,210	700	769	697	651	574	3733	3030	2,683
4. Total Deliveries	1,087	2,098	2,684	3,505	3,753	3,630	3,550	3,318	3,466	3,204	3221	3243	2781
CHIS	465	1,363	1,890	2,566	2,900	2,780	2,791,	2,618	2,691	2,410	2457	2311	1787
NCHIS	732	735	794	939	853	850	759	700	775	794	764	932	994
Laboratory	9329	29,733	36,473	34,681	23239	20081	19075	30109	31,308	24933	30394	24995	25254
5. CHIS	6861	24,014	25191	29,343	16,882	13,421	11,471	18,871	23,801	17,409	21534	16,155	15190
NCHIS	2468	5,719	11,282	5,338	6,357	6,660	7,604	11,238	7,507	7,524	8860	8840	10064
6. PHARMACY	24220	33648	30395	33445	49630	59836	63710	59546	59656	50623	57900	51885	44336
CHIS	19,183	26,919	24,496	25,929	38,118	48,092	52,327	48,661	48,312	40,224	45,287	38,699	30,077
NCHIS	5,037	6,729	5,899	7,516	11,512	11,744	11,383	10,885	11,344	10,399	12,613	13,186	14,259

**Table 2:** Comparison of client utilization of health services at baseline and at sixth and twelfth-years post-CHIS intervention

Services	Baseline (2011) Freq (%)	2017 Freq (%)	X <sup>2</sup> (p)	2023 Freq (%)	X <sup>2</sup> (p)
<b>Outpatients</b>					
CHIS	3,982 (20.3)	23,425 (61.9)	0.093	11,642(50.5)	0.043
NCHIS	16041 (54.6)	14,439 (38.1)	(0.001)	11432 (49.5)	(0.001)
<b>Admission</b>					
CHIS	648 (17.8)	3353(66.0)	289.7	2441(57.7)	119.4
NCHIS	910 (35.2)	1749 (34.0)	(0.001)	1786 (42.3)	(0.001)
<b>ANC</b>					
CHIS	2539 (41.1)	3937(83.7)	0.043	3266(54.9)	0.014
NCHIS	7318 (24.8)	769 (16.3)	(0.001)	2683 (45.1)	(0.001)
<b>Deliveries</b>					
CHIS	465 (16.2)	2791(78.6)	511	1787(64.3)	148.2
NCHIS	622 (43.9)	759 (21.4)	(0.01)	994. (35.7)	(0.001)
<b>Laboratory</b>					
CHIS	6861(21.9)	1147 (13.1)	0.67	15190 (60.1)	330.2
NCHIS	24,481 (78.1)	7604 (86.9)	(0.001)	10064 (39.9)	(0.001)
<b>Pharmacy</b>					
CHIS	5037 (17.2)	52,327 (82.1)	0.36	30077 (67.8)	0.18
NCHIS	24220 (82.8)	11,383 (17.9)	(0.001)	14259 (32.2)	(0.001)



**Figure 1:** Trend of Health service Utilization (2011-2023) in Obio Cottage Hospital, Port Harcourt, River State Nigeria



**Table 3:** Average Year on Year (YoY) increase in utilization of health services by both with CBHIS and Non-CBHIS clients

S/No	Service Parameter	Average increase YoY (CBHIS)	Average Increase YoY (NCBHIS)
1.	Outpatients	354%	-25%
2.	Admissions	231%	-57%
3.	Total clients at the ANC	45.8%	36%
4.	Total no of deliveries	502%	228%
5.	No of clients at the laboratory	183%	228%
6.	No of clients at pharmacy	103%	111%

## Discussion

The study shows that the trend of health services utilization by CBHIS clients, especially OPD, admission, Ante Natal Clinics and deliveries experienced substantial increase at the OCH during the study period. Most of the clients at this primary health centres were community members with limited access to financial resources for the needed health care packages.<sup>3,4</sup>

The possible cofounders to the observed increase in health service utilization are population growth, and service expansion at the OCH. But a close examination of the trend analysis shows that as the CBHIS users were increasing, the proportion of clients who accessed health care services through out-of-pocket payment were decreasing for most of the service parameters. The increasing utilization of the CBHIS as observed in this study were based on the clients' preference for CBHIS, even when the opportunity to pay out of pocket were available at the facility all through the years under consideration. This is similar to a previous finding in Rivers State where majority of the household heads in 3 LGAs in Rivers State<sup>11</sup> in Rivers State Nigeria. Global Journal of Medical Research: K Interdisciplinary. 2021;21(1):34-44. and another among the self-employed in Port Harcourt where the majority of the participants were willing to participate in a CBHIS<sup>12</sup> This shows that when CBHIS is available, and the and quality of the deliverables is satisfactory, the community members will utilize the opportunity to access the needed health care services.

We observed Antenatal care and deliveries were the most accessed services at the OCH. This was because the facility focused essentially on antenatal care, deliveries and pediatric services. This is also similar to a

previous study conducted in Nigeria where majority of the clients' utilization of the PHC services were for Ante Natal care and child welfare services.<sup>19</sup> A viable community-based health insurance program is therefore a strategic approach to promote the maternal and child health care and hence reduce the menace of maternal and child mortality. Previous surveys had shown that the Rivers State maternal mortality ratio MMR 889/100000,<sup>20,21</sup> Neonatal mortality rate 70/1000 live births,<sup>21</sup> In 2021, the under-five mortality rate in Rivers State was 100 deaths per 1,000 live births, making it the 13th highest in Nigeria<sup>22</sup> Replicating the OCH CBHIS in several other health facilities in Rivers State will be instrumental to reducing the current high maternal and neonatal mortality rate in the State.

This emphasizes the need for community-based insurance scheme in developing countries toward the realization of the Universal Health Coverage. The highest point of health services was at the pharmacy. This is because the pharmacy represents a focal point of service where virtually all the client's access for their medications. The implication of these is the need to ensure a robust pharmaceutical supply chain system that will ensure constant supply of drug and commodities at this hospital unit. The increase in patronage of the CBHIS could also be attributed to the cheap subscription charge of just N3,600 (two USD) for community members and N7,200 (4 USD) for other users per person. This would allow access to several services especially for Maternal, Neonatal and Child Health (MNCH) for a whole year! This further shows the tenacious interest of a conglomerate company like the SPDC (now RAEC), in the welfare of its host communities through a sustainable community social responsibility program such as the CBHIS.

Another contributory factor to the increasing trend of utilization of the CBHIS program was the public private partnership initiative at the OCH that ensure continuous delivery of quality essential health care services. The community members were patronizing the facility because of the trust that they would get the needed quality services. Previous studies from India <sup>23</sup> Bangladesh <sup>24</sup> and Nigeria <sup>25</sup> also showed public private partnership for the CBHIS could lead to increased community participation and access to essential health care services.

The limitation of this study is the use of secondary data; some relevant but incomplete data, which could have contributed to the outcome, were not included in the study. There is a need for future research with primary data on CBHIS and health service utilization in this region.

#### ***Strengths and limitations of the study***

The strength of this survey lies in its suitability, cost-effectiveness and, efficiency in determining the significant contribution of CBHIS to increase access to health care services at the Obio Cottage Hospital over a period of thirteen years. However, we could not use all available data because some pre-existing data were incomplete and sometimes inaccurate, which could lead to information or selection bias. We ensure that the data were large enough to ensure representativeness of the study population and to mitigate any potential biases

#### ***Implications of the findings of the study***

The findings from this study revealed that CBHIS is an essential strategy to improve access to Universal health Coverage. This study will be a reference point for health policy makers to Improve quality of care at the PHCs and expand access to CBHIS

#### ***Conclusion***

This study examined the utilization of health services by clients enrolled in the Community-Based Health Insurance Scheme (CBHIS) at Obio Cottage Hospital (OCH), Nigeria. The program, supported by the SPDC (now RAEC), has improved healthcare access for low-income community members, particularly for antenatal care (ANC), deliveries, and child health services. The affordability of the scheme and public-private

partnerships has contributed to its success, fostering trust and ensuring quality healthcare delivery. The study highlights the role of CBHIS in advancing Universal Health Coverage (UHC) in developing countries.

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***Author contribution:*** Authors' contribution: AF and AO conceived the idea of this study. AO collated the data and developed the initial manuscript. AF and AO and AA contributed to the writing and review of the manuscript.

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