

## Benefit Incidence Analysis of Public Health Expenditures and Households' Caregiver Preferences in Ogun State, Nigeria

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**Abstract:** The study seeks to determine the factors that influence public health care seeking behaviour based on the poverty status of households in rural areas. The primary data were collected with well-structured questionnaire while the secondary data were obtained from the local government health records. Descriptive analytical methods, benefit incidence analysis and Multinomial logit regression were employed for data analysis. The results show that average spending on health by households is ₦456.40, while the health subsidy accruing to household from government is ₦687.98. Benefit incidence analysis shows majority of government spending accrue to the poorest segment of the population. Also, the factors that significantly influence ( $p < 0.05$ ) households patronage of private clinics are years of education, presence of hygiene facilities and registration cost. Furthermore, age of household head, family size, presence of hygiene facilities, communication access (GSM), drug and registration cost will make household patronise chemist. Years of education of household head, registration cost and hygiene facilities will make household patronise self-care. Adequate education to alert households of the risks involved in inadequate decision regarding health problems and adequate funding of government hospitals were recommended, among others.

[Onademeru, S. and A.S. Oyekale. **Benefit Incidence Analysis of Public Health Expenditures and Households' Caregiver Preferences in Ogun State, Nigeria.** *Life Sci J* 2012;9(4):123-130]. (ISSN: 1097-8135). <http://www.lifesciencesite.com>. 21

Keywords: public health, poverty, benefit incidence analysis, Ogun state

### Introduction

The World Health Organization (WHO) defined health as a state of complete physical, mental and social well being, not merely the absence of disease or infirmity. In 1986, this definition was reformulated and health was defined as a resource for everyday life, not the objective of living. Individual health is a positive concept that emphasizes social and physical resources as well as physical and mental capacity (WHO, 1986). That is why people often say that "health is wealth" (FMOH, 2009).

Health care in much of developing world has developed into two tier systems comprising a sophisticated and expensive hospital care system in urban areas, and a network of primary health care (PHC) clinics that complement the hospital system and offer basic preventive services to low income families in both urban and rural areas. The latter concept gained widespread support following the Alma Ata Declaration of 1977 where serious emphasis was placed on disease prevention. After approval of this approach, PHC system proliferated across developing world. All over the world, health promotion programmes are gradually focusing

on the idea that providing knowledge about causes of ill health and choices availability will go a long way towards promoting a change in individual and household behaviour toward more beneficial health seeking behaviour (Ichoku and Fonta, 2006; FMOH, 2009).

A range of factors could influence people's health. Some of these may be fixed, while many are informed by socio-economic circumstances. There is also a growing acceptance that a wide range of social, economic, cultural and environmental factors, including poverty affect health. These may relate to living and working conditions and include experience of unemployment, quality of accommodation, level of education, social and community network and supports, the built environment and work environment as well as access to health care services (Onwujekwe *et al.*, 2011).

Million of people are trapped in a vicious circle of ill health and poverty. Over the past one and a half decades, the declining quality of life in Nigeria has received considerable attention in literature. Such studies have examined the incidence and dimension of poverty (NBS, 2005). The major conclusion

from these studies is that poverty is intense and widespread in the country. Thus, the way in which sick individuals or their caretakers in the home perceive their illness could determine what type of health care they will seek and how much money and household member's time is committed for seeking treatment. Also, while seeking care in the health sector, the sick face choices that vary from government hospitals and health centres or clinics to mission institutions among others (Ogunbekun, 2004).

In Nigeria where less than 6% of the population have access to modern health care services (Okojie, 1994), it suffices to say that health care delivery system is in shame and much serious effort needs to be exhibited by everyone involved in the health sector because it has taken many years of gross neglect. Inadequate funding, poor management of limited facilities and resources, social depreciation and economic depression of the people who have become underprivileged and deprived of their due share to enjoy good health are notable among the key contributing factors. Therefore, understanding the main determinants of health care demand behaviour can be vital in furthering knowledge of how changes in government policy will impact on individuals and their demand of health care services (FMOH, 2009; Okeke and Okeibunor, 2010).

The broad objectives of this study is to determine the factors that influence public health care seeking behaviour based on the poverty status of households. The specific objectives are to describe household access to public health services, compute the poverty status of the household in the study area, analyze the benefit incidence of government expenditure on primary health care, determine the factors that affect public health care seeking behaviour.

## Materials and Methods

### *Study area and sampling*

The area of study is Ijebu North East Local Government. The local government came into being on the 13<sup>th</sup> of December 1996 having been carved out of Ijebu Ode Local Government. The local government area is made up of 10 political wards. The predominant occupation of the people of the local government can be classified as farming, trading and civil service. The local government has 26 health care centres.

The study involved the use of primary data with the aid of a well structured questionnaire. The secondary data were collected from the health department and finance

department of the local government area to know government expenditure on health services. A simple random sampling technique was used to sample 10 households each in all the 10 wards of the local government. Secondary data were sourced from the Health Department of the local government.

### **Analytical methods**

The benefit incidence equation was used in the analysis of government expenditure on health. Multinomial logit regression model demand for health care from providers (self care, private clinics, government clinics, home nurses, religious centres, chemist, drug hawkers, traditional healers, quacks and herb sellers) in which the model assumes that household chooses the provider that gives highest level of utility was used to determine the factors that influence household behaviour in seeking health care.

### **Poverty line computation**

This was embarked upon to categorize households into different expenditure groups. The poverty status was used based on the headcount index using Foster, Greer, Thorbecke (1984) poverty measure. The FGT is given by;

$$P\alpha = n^{-1} \sum^q \left[ \frac{Z - Y_1}{Z} \right]$$

P = poverty status of respondents

Z = poverty line

Y<sub>1</sub> = per capital expenditure of each poor household

n = sample size

q = number of household below poverty line.

The FGT measure is calculated by taking the proportional shortfalls in expenditure for each poor person, raising the shortfalls to a power to reflect the concern for the depth of poverty, taking the sum of these for all poor individuals and normalizing the sum by the population size. The poverty line is an arbitrary divider of the poor and non-poor. The poverty analysis requires establishing a poverty line that was used in combination with welfare indicators. The poverty line is based on income or consumption/expenditure data. The proportion of the population below the poverty line provides a quick indicator of the scope of the poverty problem. Thus, from the analysis, households spending less than one-third of the mean per capital household expenditure (MHHE) are considered core poor, while moderately poor spend less than two-third of MHHE and the non-poor are those with equal or greater than MHHE.

**Benefit incidence analysis**

The group specific benefit incidence of government spending on primary health care is given as;

$$X_j = \frac{H_{ij}S_i}{H_i}$$

Where,  $X_j$  = value of total health subsidy charged to group i.e. expenditure groups

$S_i$  = Government net spending on health

$i$  = primary health care

$H_i$  = total number of registered patients

$H_{ij}$  = Number of registered patients of group  $j$

$S_i$  = Unit subsidy of providing health centre

$H_i$

$j$  = groups (poor and non poor)

Household per capital expenditure =  $\frac{\text{Total household expenditure}}{\text{Household size}}$

Household size

The total household per capital expenditure is calculated by finding the summation of the entire household's per capital expenditure for the sample household studied.

The mean per capital expenditure is calculated by dividing the total expenditure by the total number of household surveyed.

Mean per capital household expenditure =  $\frac{\text{Total household expenditure}}{\text{Household Surveyed}}$

Household Surveyed

**Multinomial Logit regression**

The household's choice of medical providers is a discrete decision, which is consistent with qualitative choice models. In this qualitative choice situation, we presume that an individual/household can choose several alternatives: to seek self care treatment, private clinics treatment, government clinics, home nurses, religious centres, chemist, drug hawkers, traditional healers, quacks and herb sellers. In choosing to obtain medical services from whom, individuals and households consider a variety of characteristics of the alternative providers, such as proximity and quality. The decision is also affected by the characteristics of individual's health status in the households, education, age, gender and so on. This can be elaborated upon with general descriptive with concepts from the standard micro economics theory of utility maximization. Utility in this instance, therefore depends upon the attributes of health care choice

$j$  which varies with both the choices and characteristics of the individual.

An individual or household chooses among alternatives based on the utility of each alternative. More specifically, based on McFadden and Train (2000) we can posit that the utility of choice option  $j$  to individual or household  $I$ ,  $U_{ij}$  is:

$$U_{ij} = V_{ij}(M_j, H_i) + \varepsilon_{ij} \quad (1)$$

$V(M_j, H_i)$  represents utility determined by observed data.

$M$  is a vector of provider characteristics.

$H$  is a vector of individual economic and health status.

$\varepsilon$  is a vector of unobserved components.

Where  $j$  denotes provider choice alternatives and  $\varepsilon$  which will be treated as a random variable.

Utility-maximizing behaviour implies that an individual/household  $I$  will only choose a particular alternative  $j$  if  $U_{ij} > U_{jk}$  is also random. The probability of any given alternative  $j$  being chosen by an individual/household can be expressed as:

$$P = P(U_{ij} > U_{ik}) \text{ for all } k <> j \quad (2)$$

By substitution of (9)

$$P = P(V_{ij} + \varepsilon_{ij} > V_{ik} + \varepsilon_{ik}, \text{ for all } k <> j) \quad (3)$$

Rearranging,

$$P = P(\varepsilon_{ij} - \varepsilon_{ik} > (V_{ik} - V_{ij}), \text{ for all } k <> j)$$

By knowing the distribution of the random  $\varepsilon$ 's the distribution of each difference  $\varepsilon_{ij} - \varepsilon_{ik}$  for  $j, j <> k$ , and by using equation (3) calculate the probability that the individual/household will choose alternative  $j$ .

Letting  $X_{ij} = (M_j, H_i)$  and assuming  $V$  to be a linear function of components of  $X$ , we operationalize equation 3 as;

$$U_{ij} = \beta_j X_{ij} + \varepsilon_{ij} \quad (4)$$

Where  $\beta_j$  is a vector of coefficient values indicating the effect of the various  $X_{ij}$ 's on individual  $i$ 's utility for option  $j$ .

Assuming that each  $\beta_{ij}$  for all alternative  $j$  is distributed independently, identically in accordance with the extreme value distribution and given this distribution for the unobserved components of utility, the probability that the household will choose alternative  $j$  is

$$\text{Prob}(\text{option}_j / X_{ij}) = \frac{\text{Exp}(\beta_j X_{ij})}{\sum_k \text{Exp}(\beta_k X_{ijk})} \quad (5)$$

where  $k=1$ . The parameters of this model can be estimated straightforward using maximum likelihood methods.

## Results and Discussions

### Socio-economic characteristics of respondents

Distribution of some socio-economic characteristics of the respondents is in table 1. This shows that 82% of the household heads that were sampled were male while only 18% were female. It was observed that there was a dominance of male over female household head, in cases where there were female household heads, it was due to the fact that they were either divorced or widowed or single individual.

The table shows that 78% of the household head sampled were married while only 22% of the household heads were not married. This shows that majority of the households survey are married. Table shows that 24% of the total household sampled have their household head less than or equal to 30 years in age, while 41% have their household head between the ages of 31-40 yrs. Also 24% of the household heads are between 40 and 59 years while only 11% have their household heads above 60 years of age. This shows that majority of the household heads in the study area are middle age individuals who are actually engaged in one activity or the other because the average age of household head is 40 years.

The table further shows that 19% of the total household head samples only had primary education, 34% had up to secondary school education, 29% had tertiary education and 18% of the household head had no education formal education. Majority (63%) of the sampled household heads in the study area are educated. Also, 21% of the household head are traders who are involved in selling 27% are Artisans 25% are civil servants who work with the government, 20% are farmers while 3% work with private establishments. The table shows that majority of the respondents are artisans and civil servants

Table 1: Frequency and percentage distributions of household heads' socio-economic characteristics

Socio-economic variables	Frequency	Percentage Distribution (%)
<i>Sex</i>		
Male	82	82
Female	18	18
<i>Marital status</i>		
Married	78	78
Not Married	22	22
<i>Age</i>		
≤ 30 years	24	24
31 – 40	41	41
40 – 59	24	24
≥ 60	11	11
<i>Education</i>		
Primary	19	19
Secondary	34	34

Tertiary	29	29
None	18	18
Trading	21	21
Artisan	27	27
Civil Service	25	25
Farming	20	20
Others	4	4
Private Establishment	3	3

Table 2. Distribution of treatment venue among households

	Frequency	Percentage Distribution (%)	Cumulative Percentage
Government	51	51	51
Self care	10	10	61
Private	15	15	76
Chemist	24	24	100
Total	100	100	

Table shows that 51% of the household patronise government hospitals, 15% private hospitals and 24% visits chemist and over the counter stores for treatment when they are ill. This shows that households prefer to go to government hospital when in need of treatment. However it is worth noting that a considerable visit of households to chemist gives room for concern.

Table 3: Distribution of ailments that affects households

Ailment	Frequency	Cumulative
Malaria	70	70
Others	30	100
Totals	100	

Table 3 shows that 70% of the ailment that affects household is malaria while 30% constitute other ailments such as tuberculosis, dysentery etc. this shows that households in the sample area are more prone to malaria.

Table 4: Distribution of preferred treatment venues across marital status of household head

	Marital Status		Total
	Single	Married	
Government Hospital	4	47	51
Self care	5	5	10
Private hospital	6	9	15
Chemist	7	17	24
Total	22	78	100

Table 4 shows that 47 of married household heads patronise government hospital while 17% of married household heads prefer patronising chemists, 7 household heads that are single patronise chemist. This implies that married household have more confidence in

government hospitals and chemist shops in times of ill health of any member of the household.

**Poverty status of respondents**

Poverty status of respondents was based on the head count index using Foster, Greer, Thordecke (1984) poverty measure. This was done by taking the proportional shortfall in expenditure for each poor household, raising the shortfall to a power to reflect the concern for the depth of poverty, taking the sum of these for all poor individuals and normalising the sum by the population size. The degree of concern for the poverty was fixed at  $\alpha$  equals zero. This gave the headcount index the respondents were categories into core poor, moderately poor and non-poor based on the mean per capita household expenditure on basic needs. The relative poverty measure was used. The categories are

1. Those that spend less than 1/3 of the mean household per capita expenditure are referred to as core poor.
2. Those that spent more than 1/3 of the mean household per capita but not more than 2/3 of it are known as moderate poor group
3. Those that spend more than 2/3 of mean per capita household expenditure are called non poor.

From the survey, the mean per capita household expenditure is ₦7,003/month because there are average of 4 persons per household. However, two-third of that is ₦4668.7 which is the poverty line.

Table 5: Poverty status category of the respondents

Group	Amount (N)	Percentage Distribution (%)
Core poor	<2,334.37	20
Moderate poor	2334.37 – 466878	40
Non poor	>4668	40

The table shows that 40% of the households belong to the non poor group while 20% are in the core poor group. Also, 40% of the respondents are moderately poor. This implies that about 60% of the total surveyed area are poor and do not enjoy better quality of the basic requirements. With almost more than half of the household survey being poor, it confirms the growing concern of the increase in the number of poor.

Table 5: Distribution of Treatment venue Across Poverty Status

	Poverty status			Total
	Non Poor	Moderate Poor	Poor	
Government	11	27	13	51
Self care	16	8	7	31
Private	11	4	-	15
Chemist	2	1	-	3
Total	40	40	20	100

Table 5 shows that 11% of households who patronise government hospitals are non-poor, 16% who prefer self-care are non-poor, 11% who prefer private clinics are non-poor. It also shows that 40% of poor households patronise government hospital most, while only 15% prefer self-care treatment. This shows that majority of poor households prefer to go to government hospital because of the low cost of health services.

**Distribution of Government Subsidy in the Provision of Health Care**

In order to determine government subsidy in the provision of health care, government expenditure account was used in estimating unit subsidies. Unit subsidy is based on actual expenditures by government. Thus, government unit subsidy represents the total amount of government spending per patient. It was calculated using the

$$\chi_{(poor)} = H_{(poor)} \times \frac{S_i}{H_i}$$

formula where

$S_i$  = Government spending in the local government

$H_i$  = Total number of required patients in the local government

From the data obtained from the local government health authority in Ijebu North East Area,

Total number of registered patient = 11,6144

Total expenditure on health per annum = ₦7,990,142.80

Therefore, using  $\frac{S_i}{H_i}$  to calculate government unit subsidy

$$\frac{7,990,142.80}{11,614} = ₦687.98$$

Unit subsidy = 11,614

Average amount spent by household on health/month = ₦456.40

Total spending on health = N 687.98 + N456.40  
= N1144.38

Table 6: Household and government spending on the health care

Health spending	Amount (N)	% Distribution
Average household spending	456.40	39.9
Government unit subsidy	687.98	60.1
Total	1144.38	100.0

From the table, it shows that government health care spending is higher than household health spending in the local government area. This implies that for every N1 of government unit subsidy for proving health care to households, the household spend 0.60k in gaining access to the health care provided by the government.

Specific benefit incidence of government spending on health case according to group.

Benefit incidence of government expenditure is given by  $X_j = H_{ij} \frac{S_i}{H_i}$

Where  $X_j$  = value of health subsidy charged to group

$H_{ij}$  = number of patients registered of group g at the group level.

government subsidy = N 687.98

total number of patient = 11,614

total health subsidy = 687.98 x 11,614

= N7,990,199.72

$H_i$  = total number of patients (poor group)  
= 11,614 x 0.60

= 6,968.4  $\approx$  6,968 patients

$H_i$  = total number of patients (non-poor group)

= 11,614 x 0.4

= 4,645.6  $\approx$  4,646 patients

The benefit incidence of government spending on health care to the moderately poor group

$$\chi_{(poor)} = H_{(poor)} \times \frac{S_i}{H_i}$$

Where  $X_{(poor)}$  = value of total health subsidy changed to the poor

$H_{(poor)}$  = Number of registered patients of the poor group

$\therefore X_{(poor)} = 6968 \times 687.98$

= N 4,793,844.64

Benefit incidence of government spending on health care to the non poor

Where:  $X_{(non\ poor)}$  = value of total health subsidy changed to the non poor

$H_{(non\ poor)}$  = Number of registered patients of the non poor group

$\therefore X_{(non\ poor)} = 4,646 \times 687.98$

= N3,223,874.28

Table 7: Benefit incidence of health spending by group

Group	Benefit incidence	Percentage Distribution
Poor	4,793,844.64	59.8
Non poor	3,223,874.28	40.2
Total	8,017718.92	100.0

From the table, it is observed that the higher percentage of government spending accrues to the poor group. This is so because this group utilizes the services provided by the government most since they have the highest number of patients. This implies that the more the use of government provided facilities, the greater the benefit incidence of government unit subsidies accruing to the poor people in the society.

### Factors Explaining Households' Health Facility Preferences

From the Multinomial Logit regression analysis that was carried out to determine the preferred health care alternatives i.e. (government, self care, private clinic and chemist) in which government health centres stands as the reference, the following observations were inferred. It was observed that factors that make households to prefer private clinics (health centres owned by individuals, groups and specialists) are number of years of education of the household head, ownership of means of transport e.g. car, presence of hygiene facilities (flush toilet and piped water) and ability to afford transport cost.

It was observed that the total number of years of education of the household head exhibited a positive relationship with the patronage of private clinics in that the higher the level of education (access to further education from elementary to tertiary level) the higher the preference for private clinics to government owned hospitals. This can be attributed to increase in tastes, exposure and knowledge due to education.

It was observed that the ownership of means of transport by household makes them patronize private clinics because distance to their choice of clinics that gives them the utility they want is not a barrier. Though the presence of hygienic facilities were significant, they exhibited a negative relationship with private clinics patronage i.e. the lower and lesser in number of hygiene facilities, the higher the tendency to patronize private clinics for proper check up.

It was observed that the significant factors that will make household to patronize chemist rather than government hospitals were age of household head, household size, presence of communication facilities, availability of hygiene facilities in the house and cost of transportation and drugs. The result showed that the younger household head will patronize chemist because of little experience in family management and may not see the need for proper medical attention due to lack of experience and the rush for career development for successful living. Household with small number of members will also patronize chemist because of cost effectiveness. The presence of hygiene facilities such as fridge, flush toilets and piped water makes the hygiene status of household higher and this makes household not to patronize government hospitals but rather chemists in times of mild ailments.

The higher the cost of drugs, the less likelihood of the patronage of government hospital and the higher the tendency to go to chemists for dispensing because it will be cheaper. It was observed that the factors that will make households patronize self-care (quacks, religious centres, traditional healers, hawkers, home nurses, and herb sellers) were the number of years of education of household head, presence of hygiene facilities and cost of registration for health care needs.

The result showed that the lower the level of education of the household head, the more likely of the patronage of self-care. This is due to the low level of exposure and knowledge of the decision maker in the house. Many other households visit self-care medication due to the diabolical and mystical nature of their illness. High cost of registration will also make the patronage of self-care higher due to the inability of households to afford the cost.

Table 8: Multinomial logit regression of a health care provider

	Private	Chemist	Self care
Constant	-7.2828	6.6094	-0.7707
Household head age	-0.0648	-0.0898 **	-0.0392
Years of Education	0.8921**	0.0584	- 0.4084**
Household size	-0.0199	- 0.2579**	0.1169
Fridge	4.3983	4.3833	-2.4433
Car	3.2739**	1.9678	1.2812
GSM	-1.8527	- 2.7144**	0.8197
Flush Toilet	-5.4909 **	- 4.8699**	8.9537**
Piped Water	-3.4273	-2.2461	-0.9480
Transport Cost	0.0220	0.0347**	0.0103
Registration cost	0.0040	-0.0030	- 0.0408**
Drug	-0.0046	0.0098**	0.0031
Waiting time	-0.0811	-0.0042	0.0285
Severity of illness	0.1513	0.2579	0.5473

Significant at 5%\*\*

### Conclusion and Recommendation

This paper shows that more households were using health care facilities provided by government. The study revealed that government subsidy is adequate in the provision of health care services and that poor households cannot conveniently access and utilize health care services provided by private owners because of high cost. It is recommended that there should be a better way of educating the public on their health needs and the way they should go about seeking treatments. This is very paramount because our results show that self care was used by many households which portends some risks. Also it was found that education reduces the tendency of indulging in self care by the households. Also, there is the need for better funding of public health care services in Nigeria because our findings show that the poor were benefiting more than the rich from such expenditures. Also, due to its expensiveness, private health centres were least patronized. The government needs to consider a workable health insurance that can stimulate demand for private health services in Nigeria.

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9/5/2012