



Financing Healthcare in Nigeria: Impact of Out-of-Pocket Expenditure

Egiyi Modesta Amaka
Godfrey Okoye University
modesta.egiya2020@gmail.com

Publication Process

Date

Received

April 22, 2019

Accepted

April 26, 2019

Published

July 11, 2019

ABSTRACT

This research work scrutinized the impact of out-of-pocket expenditure on healthcare financing in Nigeria. It was observed that out of pocket expenditure of Nigeria within the period under review has been marginally increasing. The stated hypothesis was tested using ordinary least squares regression method with a data span from 2004 to 2014. Empirical finding reveals that out of pocket expenditure has no significant impact on healthcare financing in Nigeria.

Keywords: *Out-of-pocket expenditure; healthcare financing; healthcare services*

1. Introduction

Research on health care financing has received overwhelming attention in recent times in both developed and developing countries. This may be due to the importance of strong health in achieving economic growth and development (Alfred, 2016). In Nigeria, due to the national policy on mixed economy, private providers of healthcare have been playing a significant role in health care service deliveries. The selection of suitable and efficient methods of financing and good organizational delivery structure for health services is essential for a country in achieving its national health objective of providing good health (Olakunle, 2012).

The organization of health services in Nigeria is complex. It includes a wide range of health-care service providers in both the public and private sectors (private for-profit providers, community-based organizations, non-governmental organizations, religious, and traditional care providers) (Olakunle, 2012). The way a country finances its health care system determines its ability in achieving universal health coverage (UHC) as this enables the government to make the system available and affordable.

Health care financing can be described as a flow of funds from patients to health care providers in exchange for services. A good healthcare financing strategies must be able to mobilize resources for healthcare; achieve equity and efficiency in use of healthcare spending; ensure that healthcare is affordable and of high quality; ensure that essential healthcare goods and services are adequately provided for and most recently ensure that the money is spent wisely so that the millennium development goals (MDGs) could be achieved (Palmer, Mueller, Gilson & Mills,

2004; Uzochukwu, Ughasoro, Etiaba, Okwuosa, Envuladu, et al, 2015). The commonly used mechanisms for implementing these functions include tax-based financing, donor funding, health insurance (social and private) and out-of-pocket payments (Olakunle, 2012).

In Nigeria today, revenue for financing the health sector is collected primarily from pooled and un-pooled sources. The pooled sources are collected from the budgetary allocation, direct and indirect taxation as well as donor funding (Uzochukwu, et al, 2015). One of the common means of funding healthcare finance is the Out-of-pocket payments (OOPs) method. OOPs, are part of the health financing landscape in all countries relying on user fees and co-payments to mobilize revenue, rationalize the use of health services, contain health system costs or improve health system efficiency and service quality. It is one of the major source of healthcare financing in Nigeria. It has been difficult sustaining satisfactory levels of financing primary healthcare as out-of-pocket spending (OOPS) remains the main mechanism for payment for these services.

Like many public services, the various health insurance finance scheme practised earlier in the country has been graced with difficulties. They were not equally accessible to all people and so, limited physical access to basic health care continues to be a major impediment to achieving the goal of health care for all (Joseph & Phillips, 1984; Alfred, 2016).

In the face of these difficulties, out-of-pocket spending (OOPS) has remained the main mechanism for payment of healthcare services in Nigeria. However, studies have shown that Out-of-pocket spending is regressive, as lower-income groups pay disproportionately more of their income when compared with higher-income groups (Ruger & Hak-Ju Kim, 2007).

In Nigeria today, OOP health payments have been reported to have caused a financial catastrophe to households which have further pushed them into the poverty line. It is in light of the above that the paper evaluates the out-of-pocket payment system as a primary mode of health care finance in Nigeria.

Statement of Problem

The cost of health care service in both public and private health facilities has skyrocketed in the recent past and it seems this will continue in years to come except an urgent intervention is put in place. While the ability to purchase health care is diminishing, there is increasing poverty in the country (Nigeria), as it is the case with most developing nations. Therefore, there is a need for urgent intervention at all levels and quarters to bring about access to all, no matter their position or where they live. The continuous inability of the sick and households to pay for health services is a common phenomenon in many health facilities across the length and breadth of Nigeria. This is, however, more common among the poor rural households and semi-urban dwellers. The situation may be so precarious that the sick's relation may have to sell some properties of the sick or of the household in order to pay for medical bills. In other instances, loans with high interest rates may be obtained on behalf of the sick and this is usually not devoid of the consequence of causing more impoverishment of both the sick and his household. In extreme cases of poverty, the sick are often left at home without treatment or if already on treatment at a health centre she/ he is taken home and left at the mercy of death. These unfortunate happenings could be attributed to lack of commitment on part of the government at the three levels, federal, state and local governments. These antagonizing problems of healthcare financing in Nigeria motivated this research work.

Objectives

1. To determine if out of pocket expenditure has any significant impact on healthcare financing in Nigeria.
2. To determine the extent out of pocket expenditure has been declining over the years under review.

Hypothesis

Out of pocket expenditure has no significant impact on healthcare financing in Nigeria.

2. Conceptual Framework

Health Care Financing

Healthcare financing is defined as the deployment of funds for healthcare services (Oyefabi, Aliyu & Idris, 2014). It is seen as the provision of money, resources or funds by the government to ensure adequate maintenance of peoples' health. The concept of healthcare financing concisely deals with the quantity and quality of resources a country spends on health care. This is proportionate to the country's total national income. The amount of resources allocated for healthcare in a country is a reflection of health value placement vis-à-vis other categories of goods and services. Metiboba (2012) is of the opinion that the nature of health care financing defines the structure and the behaviour of different stakeholders and the quality of health outcomes. The pattern of healthcare financing is therefore intricately and indivisibly linked to the provisioning of healthcare services (Riman and Akpan, 2012; Rao, Salvaraju, Nagpal and Sakthivel, 2009). Riman & Akpan argued that the definition of health care financing cannot be narrowly conceived and confined to raising enough resources to fund health care needs of people only, but also engrosses the questions of affordability of health care services and equitable distribution of healthcare services, including guaranteed financial risk protection.

In the same vein, Metiboba (2012) contended that when it comes to analyzing health care financing, it is fraught with some nuances since some types of health care services are skewed towards benefitting groups and the community collectively. Worth mentioning, are a vaccination against certain communicable diseases, malaria control and sanitation of the environment. Other issues that make an analysis of health care financing difficult are public expenditures on clothing, food, education and shelter. One of the complex issues and nuances associated with the analysis of health care financing is the identification of healthcare expenditure given the delineation between curative and preventive health care services. The proposed integration of traditional medicine practitioners into the mainstream formal health sector will further pose a challenge to the analysis of health care financing as claimed by Metibioba (2012).

3. Theories of Health Care Financing

Theory of Elasticity

The factors that affect out-of-pocket medical expenses will be explained by the use of elasticity theory. According to Ramskov (2001) elasticity examines how sensitive the demand for a good or service is to changes in the price of the good or service itself or to changes in the price of related goods or services and to changes in income. Campbell (2008) stated that the demand for goods is a function of several factors and not only price. The concepts of elasticity include Own price elasticity, Income elasticity and Cross-Price elasticity (Ramskov, 2001).

The concept of own price elasticity is also referred to as price elasticity. It illustrates the percentage rise in the demand at a percentage rise in the price of a good itself. Simply put, own price elasticity shows the responsiveness of the demand of a certain good to changes in its own price (Campbell, 2008).

Demand curves generally have negative slopes as the Law of Demand states when the price of a good increase, the demand for the good decreases. Price elasticity of demand is computed as the percentage change in quantity demanded divided by the percentage change in the price of the same good. According to (Campbell, 2008), own price elasticity of demand results may be Elastic, In-Elastic, Perfectly Elastic, Perfectly In-Elastic and Unitary Elastic. Elastic demand occurs when the elasticity value is greater than one so that the quantity moves proportionate more than the price. Demand is In-elastic when the elasticity result is less than one, meaning that the quantity of demand moves proportionately less than the price. In other cases, the elasticity of demand result will be one or unit implying that the quantity moves the same amount proportionately as the price. In extreme cases where elasticity is zero, demand is normally said to be perfectly inelastic and it is drawn vertically. In this case, no matter how the price changes, the quantity of demand remains constant. This, when shown graphically normally, illustrates the demand curve becoming flattered and flatter as the elasticity rises. Conversely, demand is perfectly elastic when the price elasticity of demand approaches infinity and the demand curve becomes horizontal, reflecting the fact that very minute changes in the price lead to significant changes in quantity demanded.

The concept of income elasticity of demand is used to measure how the quantity demand changes as the consumers' income changes. This is computed as the percentage change in quantity demanded divided by the percentage change in income.

The concept of income elasticity of demand describes the nature of goods as either normal or inferior. Most goods are normal if the rise in income of consumers leads to the rise in quantity demanded of the good itself since income and quantity demand tend to move in the same direction and thus are directly related having positive elasticity. The demand for inferior goods, on the other hand, tends to decrease with the increase in the income of consumers. Thus, the demand for inferior goods move in the opposite direction with an increase in consumers' income and thus they normally have negative elasticity.

The concept of Cross-price elasticity of demand measures how the quantity demanded of one good changes as the price of another good change. It is measured as the percentage change in quantity demanded of good A divided by the percentage change in the price if good B. Cross price elasticity of demand describes whether two goods are either substitutes or compliments.

Substitutes are goods that are typically used in place of another whereas compliments are goods which are typically used together. For substitute goods, the cross-price elasticity of demand result is always positive and thus the increase in the price of good A will lead to the increase in consumption of good B since consumers will find good B to be cheaper and affordable. For compliment goods, the cross-price elasticity of demand result is normally negative indicating that an increase in the price of good A reduces the quantity of demand for good B.

Theory of Income

Income is the consumption and savings opportunity gained by an entity within a specified time frame which is generally expressed in monetary terms. For the case of households and individuals, income is the sum of all the wages, salaries, profits, interest payments, rents and other forms of earnings received within a given period of time. Theory of income is normally explained by the concepts of the Permanent Income Hypothesis and Relative Income Hypothesis.

According to Milton Friedman as cited in (Coastas, 2004) consumers always wish to smooth consumption and not let it fluctuate with short-run fluctuations in income. Individuals/consumers base their consumption on a long term view of an income measure on a notion of lifetime wealth or a notion of wealth over a reasonably long horizon. According to his hypothesis, individuals consume a fraction of permanent income in each peach period and thus the average propensity to consume equals the marginal propensity to consume. The ingredients of Friedman's model of permanent income hypothesis are permanent income, permanent consumption, transitory consumption and transitory income. According to Coastas (2004), measured income is the sum of permanent and transitory income and measured consumption is the sum of permanent and transitory consumption. The consumption plan of an individual does not depend on the transitory components and transitory components are uncorrelated to each other and uncorrelated to permanent components. Friedman shows that the slope coefficient of regression of observed income leads to an underestimate of the marginal propensity and to positively estimated intercept. Therefore, the rate of attenuation of the marginal propensity to consume is equal to the ratio of the variance of the permanent income to total income. Permanent income hypothesis shows that permanent income goes up and thus for a given level of observed income, permanent income is higher in later years than in earlier ones. In his explanation, Friedman stated that the joining of the average points of

consumption-income across time recovers a function that implies the marginal propensity is equal to the average one the key point here being that average income reflects average permanent income since the transitory components average out by the law of large numbers. For example, on an interpretation of why blacks save more than whites in America, Friedman observed that the former have a lower permanent income than whites. Similar arguments can also be made when we compare the self-employed to the salaried workers or farm to non-farm households, the first in each pair having larger transitory components to their income. The concept of Relative Income Hypothesis, on the other hand, states that the satisfaction or utility an individual derives from a given

consumption level depends on its relative magnitude in the society for example, relative to the average consumption rather than its absolute levels (Duesenberry, 1949).

According to Palley (2008), the present consumption is not influenced merely by present levels of absolute and relative income, but also by levels of consumption attained in the previous period and It is difficult for a family or an individual to reduce the level of consumption once attained. This is because the aggregate ratio of consumption to income is assumed to depend on the level of present income relative to past income. Therefore, according to Palley (2008), the relative income hypothesis maintains that consumption decisions are motivated by relative consumption concerns also known as keeping up with the Joneses. The theory also shows that consumption patterns are subject to habit and are slow to fall in the face of income reductions and therefore it is difficult for an individual to reduce his/her expenditures from a higher level than for him/her to refrain from making high expenditures in the first place (Palley, 2008).

4. Empirical Review

Oyibo (2011) assessed the constraints and implications of out-of-pocket payment for health services among government employees in Abakaliki, Ebonyi State, south-east Nigeria. Frequencies and Percentages were used for analysis. Over half of the respondents (62.8 %) reported a history of illness in their household in the preceding four weeks before the study. Sixty-nine per cent of these respondents relied on out-of-pocket payment in order to pay for health services at the moment of seeking medical treatment for themselves or their dependents; while 28.4 % and 2.6 % relied on a pre-payment package (National Health Insurance Scheme) and borrowed money respectively to pay for health services at the moment of seeking medical treatment for themselves or their dependents. The vast majority of respondents (63.6 %) who relied on out-of-pocket payment reported their difficulties in accessing quality health care services as a result of financial hardship at the moment of seeking medical treatment. Most of them (47.7 %) resorted to self-medication, while 28.4 %, 17.1 % and 6.8 % of them delayed seeking health care, patronized herbalists and ignored their illness respectively.

Onah & Veloshnee (2014) explored Out-of-Pocket Payments, Health Care Access and Utilisation in South-Eastern Nigeria. They employed a combination of quantitative and qualitative analysis to investigate the gendered impact of OOPs on healthcare utilisation in south-eastern Nigeria. 411 households were surveyed and six single-sex Focus Group Discussions conducted. Their study confirmed the socioeconomic and demographic vulnerability of female-headed households (FHHs), which contributed to gender-based inter-household differences in healthcare access, cost burden, choices of healthcare providers, methods of funding healthcare and coping strategies. FHHs had higher cost burdens from seeking care and untreated morbidity than male-headed households (MHHs) with affordability as a reason for not seeking care. Findings also revealed a high utilisation of patent medicine vendors (PMVs) by both households (PMVs are drug vendors that are unregulated, likely to offer very low-quality treatment and do not have trained personnel). OOP payment was predominantly the means of healthcare payment for both households, and households spoke of the difficulties associated with repaying health-related debt with implications for the medical poverty trap. They recommended however that the removal of user fees, introduction of prepayment schemes, and regulating PMVs be considered to improve access and provide protection against debt for FHHs and MHHs.

Amakom & Ezenekwe (2012) researched the implications of households catastrophic out of pocket (OOP) healthcare spending in Nigeria. Using intensity and incidence methods, their findings showed that 24% of Nigerian households suffer catastrophic health expenditure and this was more prevalent among the richest income quintiles in Nigeria and as such has succeeded in changing the poverty situation (pushing households below poverty line) of most households who were originally on or above the poverty line. They, however, recommended the need for expansion of social health insurance through the National Health Insurance Scheme to cover the informal sector as a means of increasing resources for healthcare services to ensure universal access and the provision of financial protection to the poor and vulnerable.

5. Research Methodology

This study employs a simple regression model.

$$Y = b_0 + b_1X + \mu$$

Where

Y = variable to be predicted (dependent variable)

b_0 = the intercept

b_1 = the slope

X = the predicting variable (independent variable)

μ = error term

The above model can thus be applied in this study as:

$$\text{PHE} = b_0 + b_1\text{OOP} + \mu \dots \dots \dots \text{Eqn. (I)}$$

Where

PHE – Public Health Expenditure to Total Health Expenditure (a proxy for health care financing)

OOP – Out-of-pocket Expenditure to health expenditure (a proxy for out-of-pocket expenditure)

Techniques of data analysis employed by the researcher are the ordinary least square method using the Statistical Package for Social Sciences (SPSS) Version 23. The researcher chose this method because it minimizes the squares of the residuals. The formulas for obtaining the estimates of the beta coefficients, standard errors, etc. are all based on this principle. The aim of using this method is to minimize the error in our prediction of the dependent variable, and by minimizing the residuals, an error will be minimized. By using the "squares" the researcher is precluding the problem of signs thereby giving positive and negative prediction errors the same importance.

6. Data Presentation and Analysis

Table Out-of-Pocket Expenditure to total health Expenditure and Public Health Expenditure to Total Health Expenditure from 2004 to 2014

Year	OOP	PHE
2004	95.33733	32.69228
2005	95.79992	29.16951
2006	95.62363	32.94085
2007	95.829	32.92245
2008	95.65731	36.76917
2009	95.80051	31.2791
2010	95.67174	26.17992
2011	95.66048	31.23428
2012	95.53121	31.31686
2013	95.77063	23.82951
2014	95.74394	25.14543

Source: World Bank Database

Fig 1 Out of Pocket Expenditure of Nigeria from 2004 to 2014

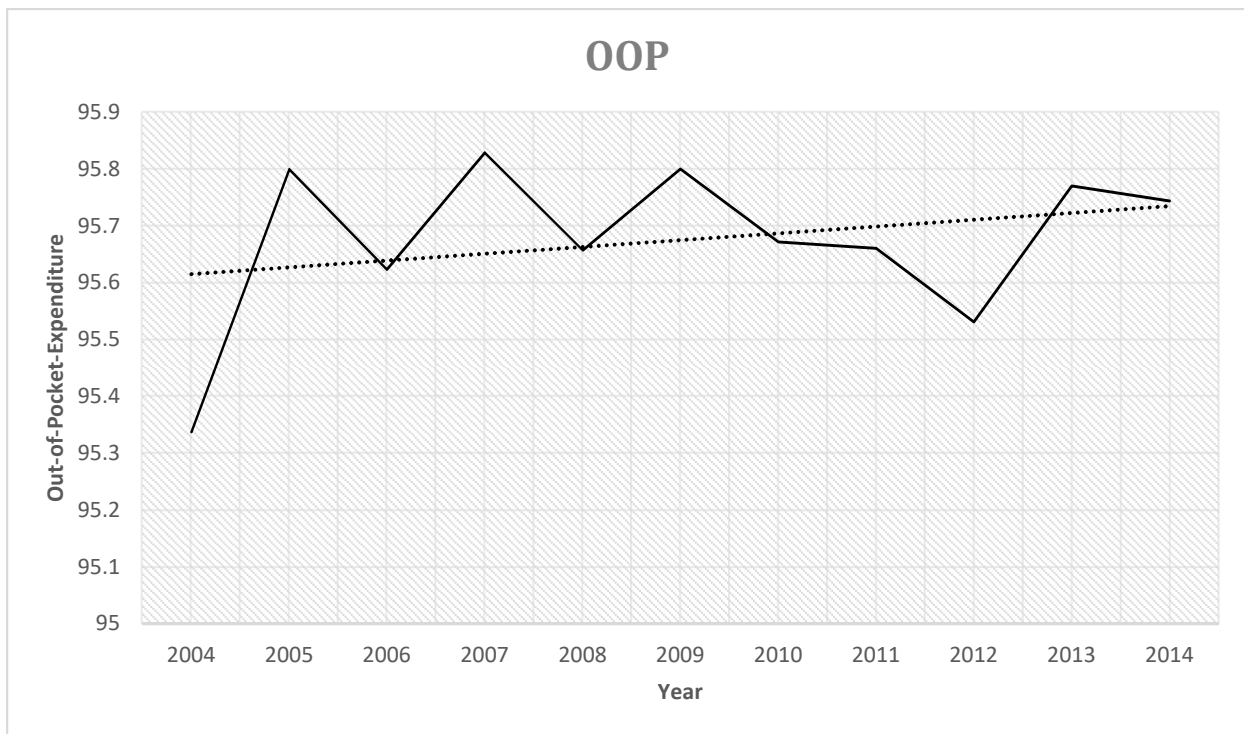
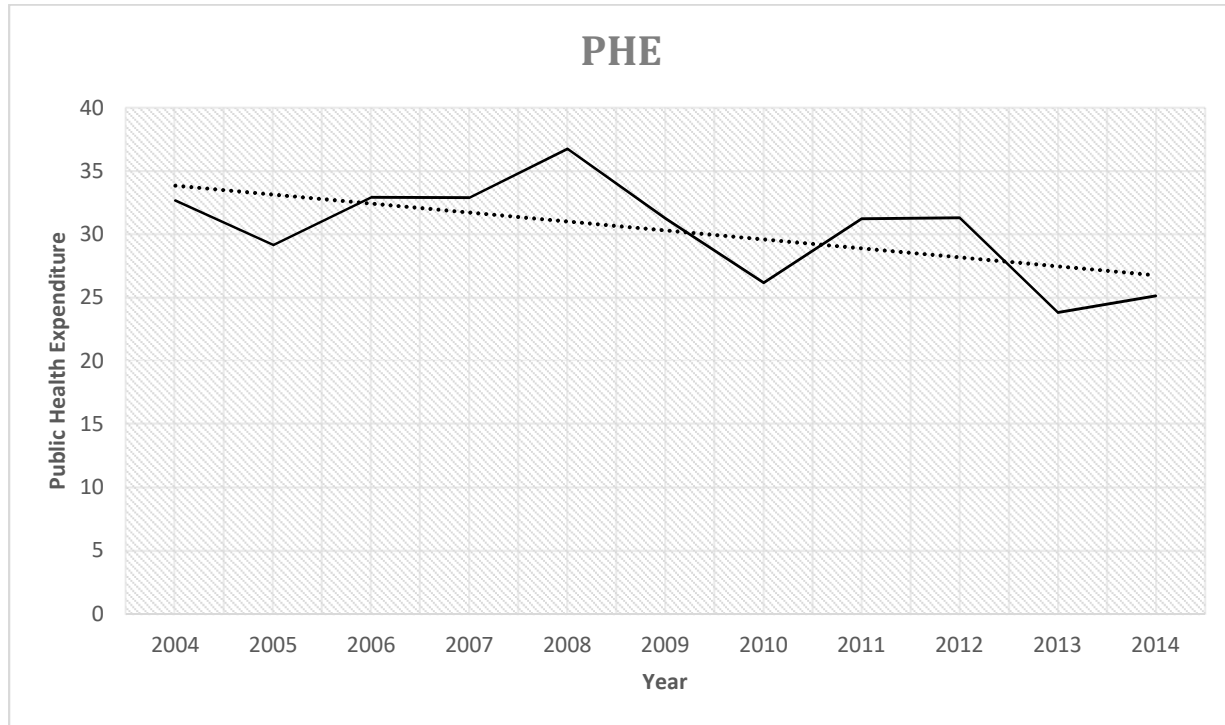


Fig 2 Public Health Expenditure of Nigeria from 2004 to 2014



Data Analysis

Table 6.1 Model Description

		Type of Variable
Equation 1	PHE	Dependent
	OOP	predictor & instrumental

Table 6.2 Model Summary

Equation 1	Multiple R	.321
	R Square	.103
	Adjusted R Square	.003
	Std. Error of the Estimate	3.879

Table 6.3 ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Equation 1	Regression	15.541	1	15.541	1.033	.336
	Residual	135.436	9	15.048		
	Total	150.977	10			

Table 6.4 Coefficients

		Unstandardized Coefficients		Beta	T	Sig.
		B	Std. Error			
Equation 1	(Constant)	859.629	816.069		1.053	.320
	OOP	-8.668	8.530	-.321	-1.016	.336

The R of .321 shows that there is a weak positive relationship between the dependent variable (PHE) and the explanatory variable (OOP) as the R is very far from 1. The R² of .321 shows that 10.3% of the variation in the dependent variable can be explained by the independent variable. The ANOVA table shows that the model fit is very non-significant (p = .336 > .05). The intercept of 859.629 shows the value of the dependent variable when the independent variable is equal to zero. The slope of -8.668 shows that at every unit increase in OOP (a proxy for out-of-pocket expenditure), PAT will increase by 8.668 units. The regression model will take the following shape: PHE = 859.629 – 8.668OOP + 3.879

Hypothesis: Out of pocket expenditure has no significant impact on healthcare financing in Nigeria.

Decision

The P-value on which basis we can reject the null hypothesis that out of pocket expenditure has no significant impact on healthcare financing in Nigeria is .334. Since the p-value (.336) > .05, the researcher rejects the null hypothesis and affirms that out of pocket expenditure has no significant impact on healthcare financing in Nigeria.

Conclusion

Strengthening and improving healthcare systems is one of the primary responsibilities of government. No matter what the choice is, the choice of health care financing should be able to mobilize resources for health and improve access to quality care at the same time. Due to weak institutional capacities, lack of expertise as well as a high level of poverty in the country, Nigeria need to adopt a combination of mechanisms in order to achieve effective health care financing system.

Recommendation

In order for Nigeria to move towards sustainable health spending that will lead to a sustainable health outcome, there is a need for investments in the improvement of healthcare. If this is achieved, more and more people will escape from poverty and this can only be achieved through well-targeted government spending and subsidy to the sector. Roles of the government in the sector must be redefined and sharpened. Financial provisions shall be made for poor and vulnerable groups in the form of direct payments, subsidies, paying for insurance contributions or any other methods. Similarly, there is the need for expansion of social health insurance through the National Health Insurance Scheme (NHIS) to cover the informal sector as a means of increasing resources for health thereby ensuring universal access to care and providing financial protection to the poor and vulnerable. In other words, there is the need for a pragmatic and sustainable risk pooling mechanism; introduction of means to remove physical and

financial barriers to access of healthcare services for the poor accompanied by financial protection policy; as well as the usage of socio-economic characteristics of households to provide evidence for policy focus.

Other strategies that could help the country include increased Public-Private Partnership (PPP) – looking at government partnership with private health care providers, traditional health providers and non-governmental health care providers. The government can also embark on contracting out health services in public health institutions to these groups and increased investment in rural health facilities. Finally, strengthening the regulatory and supervisory role of a private organization will lead to more efficient use and reallocation of available resources.

References

- Abayomi, S. O. (2012). Factors Influencing Household's Willingness to Pay for National Health Insurance. Scheme (NHIS) in Osun State, Nigeria. *Ethnomed*,6(3):167-172.
- Amakom, U., & Ezenekwe, U. (2012). Implications of households catastrophic out of pocket (OOP) healthcare spending in Nigeria. *Journal of Research in Economics and International Finance*, 136-140.
- Campbell, R. M. (2008). *Economics Principles, Problems and Policies* (7th Ed.). New York: McGraw-Hill.
- Coastas, M. (2004). *A Retrospective on Friedmans Theory of Permanent Income* (3rd Ed. Vol. 1). London: University College London and Institute For Fiscal Studies Press.
- Duesenberry, S. J. (1949). *Income, Savings and the Theory of Consumer Behaviour* (2nd Ed., Vol. 2). Cambridge: MA: Havard University Press.
- Federal Ministry of Health Revised National Health Policy (2004). Federal Ministry of Health (FMOH), Abuja, Nigeria.
- Gottret, P., & Schieber, G. (2006). *Health financing revisited: A Practioner's guide*. Washington DC: The International Bank for Reconstruction and Development/TheWorld Bank
- Metiboba, S. (2012). *Contemporary Issues in Health Sociology (A revised and enlarged edition)*: Owerri, Banter Multimedia Network.
- O'Donnell, O, van Doorslaer E, Rannan-Eliya, R. P, Somanathan A., Adhikari, S. R, Akkazieva, B. (2008). Who pays for health care in Asia? *Journal of Health Economics*: 27,460-75.
- Onah, M. N., & Veloshnee, G. (2014). Out-of-Pocket Payments, Health Care Access and Utilisation in South-Eastern Nigeria: A Gender Perspective. *Plos One*, 1-11.
- Onwujekwe, O. E, Uzochukwu, B. S, Obikeze, E. N, Okoronkwo, I., Ochonma, O. G, & Onoka, C. A. (2010). Investigating determinants of out-of-pocket spending and strategies for coping with payments for healthcare in South East, Nigeria. *BMC Health Serv Res*. 10:67
- Onwujekwe, O.; Uzochukwu, B. and Onoka, C. (2011). *Assessing the Use and Costs of Healthcare services and Catastrophic expenditures in Enugu and Anambra States, Nigeria*. Consortium for Research on Equitable Health Systems (CREHS), Policy Brief. Available on www.crehs.lshtm.ac.uk. Accessed on 24/10/2017.
- Oyefabi, A. O., Aliyu, A. A. & Idris, A. (2014). Sources of Healthcare Financing among Patients at the Ahmadu Bello University Teaching Hospital, Zaria, Nigeria. *Journal of Medicine in the Tropics*, 16(1), 27-31.
- Oyibo, P. G. (2011). Out-of-pocket payment for health services: constraints and implications for government employees in Abakaliki, Ebonyi State, Southeast Nigeria. *African Health Sciences*, 481-485.
- Palley, T. I. (2008). *The Relative Income Theory of Consumption: A Synthetic Keynes -Duesenberry Friedman Model*. Boston: University of Massachusetts Amherst.
- Palmer, N., Mueller, D. H., Gilson, L., Mills, A. & Haines, A. (2004). Health financing to promote access in low-income settings -how much do we know? *Lancet*, 364(13), 65-70.
- Ramskov, Jacob J. M. (2001). *Elasticities: A Theoretical Introduction*. Retrieved August 2nd, 2017, from Baltimore Project Website: <http://baltimore.com/doc/b-ElastTheory>
- Rao, S. K.; Salvaraju, S.; Nagpal, S. and Sakthivel, S. (2005). *Health Financing in India*. Available online: www.whoindia.org. *Commission on Macroeconomics and Health Finance*

Riman, H.B. and Akpan, E.S. (2015). Healthcare Financing and Health outcomes in Nigeria: A State Level Study using Multivariate Analysis. *International Journal of Humanities and Social Science*, 2(15), 296-309.

Uzochukwu, A. and Uju, E. (2012). Implications of Households Catastrophic Out-Of-Pocket (OOP) Healthcare Spending in Nigeria. *Journal of Research in Economics and International Finance (JREIF)*, 1(5), 136-140.

Uzochukwu, B. S., Ughasoro, M. D., Etiaba, E., Okwuosa, C., Envuladu, E., & Onwujekwu, O. E. (2015). Health care financing in Nigeria: Implications for achieving universal health coverage. *Nigerian Journal of Clinical Practice*, 437-444.

World Health Organization (2012). Nigeria – national expenditure on health. Geneva: World Health Organization

World Health Organization, Associated terms, out – of – pocket spending by private households (OOPS): National Health Account, World Health Organization Statistical Information System (WHOSIS) 2008

Copyrights

The Copyright for the published article is reserved by the author(s), with initial publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the [Creative Commons Attribution License](#).