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Out-of-pocket expenditure and human welfare in Nigeria: Evidence from a fully modified ordinary least squares regression

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Abstract

This study assesses the connection between out-of-pocket expenditure and human welfare in Nigeria using a Fully Modified Ordinary Least Squares regression. The assessment is based on data from the World Development Indicators (2023), from the periods of 2000 to 2023. The results attest that the status of human welfare in the areas of health, education and living standard is just slightly above the average global benchmark of 0.5. However, on an average basis, households in Nigeria pay 71% of their total health expenses directly from their pockets to health care providers. Also, OOP spending and human welfare had a significant negative relationship. Therefore, to improve the health component of human welfare in Nigeria, the policymakers should heavily subsidize the health care services. Both government health expenditure and GDP per capita had a direct but insufficient impact on human welfare in Nigeria. Therefore, for Nigeria to experience a significant improvement in human welfare via public health input and GDP per capita, the policymakers in the country should be allocating at least 15% of its total annual budget towards healthcare as recommended during the Abuja Declaration in 2001 with a view to lessening OOP spending of the households. *(Afr J Reprod Health 2025; 29 [2]: 151-159).*

Keywords: Out of pocket expenditure; health; education; living standard

Résumé

Cette étude évalue le lien entre les dépenses personnelles et le bien-être humain au Nigeria à l'aide d'une régression des moindres carrés ordinaires entièrement modifiées. L'évaluation est basée sur les données des Indicateurs de développement dans le monde (2023), pour les périodes de 2000 à 2023. Les résultats attestent que l'état du bien-être humain dans les domaines de la santé, de l'éducation et du niveau de vie est légèrement supérieur à la référence mondiale moyenne de 0,5. Cependant, en moyenne, les ménages nigérians paient 71 % de leurs dépenses totales de santé directement de leur poche aux prestataires de soins de santé. En outre, les dépenses directes et le bien-être humain entretenaient une relation négative significative. Par conséquent, pour améliorer la composante santé du bien-être humain au Nigeria, les décideurs politiques devraient subventionner massivement les services de soins de santé. Les dépenses publiques de santé et le PIB par habitant ont eu un impact direct mais insuffisant sur le bien-être humain au Nigeria. Par conséquent, pour que le Nigeria connaisse une amélioration significative du bien-être humain via la santé publique et le PIB par habitant, les décideurs politiques du pays devraient allouer au moins 15 % de son budget annuel total aux soins de santé, comme recommandé lors de la Déclaration d'Abuja en 2001, en vue de réduire les dépenses des ménages. *(Afr J Reprod Health 2025; 29 [2]: 151-159).*

Mots-clés: Dépenses personnelles ; santé; éducation; niveau de vie

Introduction

Out-of-pocket (OOP) expenditure on health is a critical issue[1-5], with far-reaching implications for human welfare. In many developing countries, including Nigeria, a significant portion of healthcare financing is borne directly by individuals and households[6,7]. This mode of healthcare financing, where individuals pay for services at the point of use, can lead to substantial financial burdens, particularly for the poor and vulnerable populations. OOP expenditure refers to payments made by individuals

directly from their own resources for health services, excluding prepayments for health insurance or government-provided services[8]. The heavy reliance on OOP payments in Nigeria is indicative of the broader issue within the health system, including inadequate health financing, limited access to uncompromising healthcare products, and the absence of a robust social health insurance system.

In Nigeria, the health system is largely underfunded, with public health spending representing a small fraction of total health spending. The National Health Accounts (NHA) report indicates that household OOP spending occupies over 70% of total health input in the country[9]. This heavy dependence on OOP payments for healthcare services not only imposes a significant financial burden on households but also exacerbates inequalities in access to healthcare and ultimately impacts human welfare. The relationship between OOP expenditure and human welfare is complex, involving multiple dimensions such as access to healthcare, financial protection, and the overall well-being of individuals and communities[10,11].

The high level of OOP spending in Nigeria is symptomatic of the broader challenges facing the health sector. Despite efforts to improve healthcare financing through mechanisms such as the National Health Insurance Scheme (NHIS), coverage remains inadequate, which is not up to 5% of the population enrolled[11]. Consequently, a huge proportion of the populace, particularly those that occupy the non-formal sector, continues to rely on OOP spending for healthcare deliveries. This overdependence on OOP payments can snowball to catastrophic health spending, defined as health spending that exceeds a certain proportion of a household's income, leading to impoverishment or financial hardship[7].

The impact of catastrophic health expenditure is particularly severe in Nigeria, where a significant percentage of the populace lives in poverty. According to the World Bank[12], about 40% of Nigerians live below the poverty line, making them particularly vulnerable to the financial consequences of ill health. For these households, OOP payments for healthcare can result in the depletion of savings, the sale of assets, or the diversion of resources from essential needs such as food, education, and housing. This not only compromises their ability to access necessary healthcare services but also has larger implications for their overall well-being and human welfare.

Moreover, the high OOP expenditure in Nigeria contributes to inequities in access to healthcare. In a country with significant regional disparities in income and access to services, the reliance on OOP payments exacerbates these inequalities. Wealthier households are better able to afford healthcare services, while poorer households may be forced to forgo care or resort to less effective alternatives. This unequal access to healthcare services further entrenches poverty and social inequities, undermining attempts to attain universal health coverage (UHC) and improve human welfare.

Human welfare is intricately linked to health outcomes. Good health is not only a fundamental human right but also a pertinent content of human development. Health influences economic productivity, educational attainment, and overall quality of life[13,14]. Conversely, poor health can lead to a vicious cycle of poverty and deprivation. In this context, the high level of OOP expenditure in Nigeria poses a significant threat to human welfare. When individuals are unable to access or afford necessary healthcare services, the outcomes of their health are likely to be in danger, leading to a decline in overall human welfare.

The influence of OOP expenditure on health status is particularly evident in the context of maternal and child health. In the case of Nigeria, which has one of the highest maternal and child mortality rates in the world. It has been estimated that the level of maternal mortality in Nigeria is 512 per 100,000 live births and under-five mortality is 117 per 1,000 live births (United Nations Children's Fund[15]. These alarming statistics are closely linked to the hurdles in accessing quality healthcare services, alongside the high cost of care. For many women and children in Nigeria, the cost of healthcare, especially during pregnancy and childbirth, is prohibitively high, leading to delays in seeking care or reliance on unskilled providers. This not only increases the risk of complications and mortality but also has perpetual implications outcomes on the health and well-being of women

and children, and by extension, the broader community[16,17].

Furthermore, the high level of OOP expenditure has implications for the problem of communicable and non-communicable diseases in Nigeria. Communicable diseases such as malaria, HIV/AIDS, and tuberculosis, as well as the rising burden of non-communicable diseases (NCDs) like hypertension, diabetes, and cancer, require ongoing treatment and management. For many Nigerians, the cost of these treatments is a significant barrier, leading to delayed or inadequate care. This not only exacerbates the health burden at the individual level but also places additional strain on the health system and undermines struggles to ensure improvement of public health outcomes and overall human welfare.

Financial protection is a key component of UHC and is critical to ensure that citizens could have access to healthcare services they desire without suffering financial hardship. In Nigeria, inadequate financial protection mechanisms, like social health insurance or government subsidies, means that many individuals are not protected from to the problem of catastrophic health expenditures. The NHIS, established in 2005, was intended to provide financial protection by pooling risks and resources across the population. However, the scheme has faced numerous challenges, including limited coverage, inadequate funding, and the lack of efficiencies in service delivery.

As a result, the majority of Nigerians, particularly those in the informal sector and rural areas, remain outside the formal health insurance system and continue to rely on OOP payments. This lack of financial protection affects accessibility to healthcare and larger motivations for poverty reduction and economic development. When households are compelled to spend a major proportion of their wealth on healthcare, it can push them into poverty or deepen existing poverty, creating an unending cycle of ill health and economic deprivation.

The high OOP expenditure also undermines efforts to achieve UHC, which is a key goal of the SDGs. UHC has a target of ensuring that all households and communities have accessibility to the any spectrum of health services they might need, ranging from promotion of health, palliative care, prevention, treatment, and rehabilitation, without suffering causing any financial hardship. However, in Nigeria, the huge dependence on OOP spending for healthcare services is a major barrier to achieving UHC. Without adequate financial protection mechanisms, the goal of UHC will remain elusive, and the overall welfare of the population will continue to be compromised.

Addressing the issue of high OOP spending in Nigeria requires a multifaceted approach that includes policy reforms, increased spending in the health sector, and the expansion of social health insurance coverage. One of the key policy priorities should be to strengthen the NHIS and expand its coverage to include a larger proportion of the household, especially those in the non-formal sector and rural areas. This could be achieved through innovative financing mechanisms, like community-based health insurance schemes or the integration of informal sector workers into the formal health insurance system[18]. In addition to expanding insurance coverage, a need for increased public investment in the health sector to reduce the reliance on OOP payments is paramount. This includes not only increasing the budget allocation for health but also ensuring that resources are used efficiently and effectively to cause an improvement in accessing quality healthcare services. Strengthening primary healthcare deliveries, especially in local and underserved centers, is critical for declining the need for expensive tertiary care and for ensuring that individuals can access care close to where they live and work.

Furthermore, there is a need for targeted mechanisms to proffer solution to the specific health needs of vulnerable populations, such as women, children, and the elderly. This could include the provision of free or subsidized healthcare services for maternal and child health, as well as the establishment of social safety nets for the elderly and other vulnerable groups. Such interventions would not only improve access to healthcare but also contribute to reducing the financial burden on households and improving overall human welfare.

Literature review

Adesina and Ogaji[19] conducted a research focusing on OOP payment for facilitating health care and its advantages on welfare of families in Yenagoa, Nigeria using a descriptive community-based survey. According to the study, the most common way people spent on healthcare services was out-of-pocket, and families who made these payments had a greater frequency of chronic illness than those that had insurance. Okunogbe *et al*.[20] assessed nexus among health shocks, health insurance and household welfare in Nigeria. The findings of this study indicated that insurance lowers medical expenses paid out of pocket by 42% in one hand, and the insurance coverage improved household welfare significantly in the study on the other hand. Adeniji[21] investigated the hurdle of OOP payments among households suffering from cardiovascular health challenges in private and public health facilities in Ibadan, Nigeria, a descriptive cross-sectional design was utilized for the study. It was discovered from the study that out-of-pocket payments was not strong enough to cater for hypertensive heart failure, as such universal health care was needed to improve human welfare of households suffering from cardiovascular disease in Ibadan.

Hamadu *et al*.[22] assessed the determinants of families' OOP health maintenance costs in Nigeria using health maintenance households' survey data. The study used generalized linear models. The findings indicated that income, family size, and employment were important socioeconomic factors that responsible for the OOP expenditure of the families in the country. Richardson *et al*.[23] investigated interlink between general health expenditure and health status in Nigeria using statistical analysis. The authors asserted that spending more on public health extended life expectancy and lowered the newborn death rate. While per capita wealth had little impact on health status, but urban populace and incidence of HIV negatively affected health outcomes in the country. Aregbeshola and Khan[24] examined OOP health-care spending and its determining factors among families in Nigeria with the application of Harmonized Nigeria Living Standard Survey. The findings indicated that the following factors increased the likelihood of paying for healthcare out of pocket: chronic sickness self-sufficiency, employment of household heads, South East area residency, primary or secondary education, and more than five members. Salari *et al*.[25] examined danger and impoverishing impact of OOP healthcare payments, using data from the 2018 Kenya Household Health Expenditure and Utilisation Survey. According to the study, OOP expenditure caused a disastrous impact on human welfare in the country because, over 1.1 million households fell into poverty due to OOP expenses. Further evidence from the study revealed OOP expenses worsened socioeconomic status, the prevalence of the elderly ill health, and the existence of chronic illnesses in the country.

Methods

To determine the linkage between OOP expenditure and human welfare in Nigeria, secondary data between 2000 and 2023 from the World Bank**,** World Development Indicators[12] was used. Consequently, in order to estimate the relationship between the independent and the dependent variables, this study modified model from Ai *et al*.[26] and Zhou *et al.*[27] with the inclusion of some control variables like government health expenditure, per capita GDP, inflation, trade openness with a view to enhancing the robustness of the model. The model is stated thus;

$$HDI=f\ (OPE, GE, GDPPC, INF, TOP) \quad (1)$$

Model (1) was restated in econometric term as follows;

$$HDI_t = \alpha_0 + \beta_1 OPE_t + \beta_2 GE_t + \beta_3 GDPPC_t + \beta_3 INF_t + \beta_4 TOP_t + \mu_t \quad (2)$$

Therefore, it is important to state that the full interpretations of all abbreviations in models 1 and 2 were discussed in the table 1. Table 1 presents an overview of the operational definitions of the study's various variables.

Data analysis

After sourcing data from the World Bank Development Indicator[12], the preferred method of estimation of this data is Fully Modified Least Squares regression. This is the method of analysis designed for estimating unknown variables in the study. In this type of regression, the errors are permitted to be correlated among all the equations, over time and alongside the regressors as well. Similarly, the regression is structured in a manner that the normal least squares process leads to asymptotically efficient estimators**.** Meanwhile, the study further utilized descriptive statistics. This is because the use of descriptive statistics explains distribution and patterns of the variables under assessment by the mean value which was calculated by adding all the observations from 2000 and 2023 and divided by the years involved, which is 24.

Ethical consideration

There was no involvement of human or animal subject in this study. The data utilized in this study is from the World Bank. WDI website[12]. Hence, further ethical clearance was not needed for this study.

Results

development index, (HDI) is 0.583. The median value of HDI is 0.523, being slightly lower than the mean. The HDI has maximum and minimum values of 0.649 and 0.449 respectively. Meanwhile, out of pocket expenditure (OPE) has maximum and minimum values of 77.2% and 60.1% respectively with a mean value of 71%. In the same vein, government expenditure on health (GEX) has a maximum value of 1.20% and a minimum value of 0.44% with a mean value of 0.63%. The gross domestic product per capita (GDPPC) has a maximum value of 12.4% and a minimum value of -4.26% with a mean value of 1.99%. Inflation (INF) has a maximum value of 18.8% and a minimum value of 5.3% with a mean of 12.1%. Trade openness (TOP) has maximum and minimum values of 53.2% and 20.7% respectively with a mean value of 36%.

The relationship between OOP spending and human welfare in Nigeria was estimated using a Fully Modified Ordinary Squares regression (FMOLS) with the following findings. Considering the significant results first, OOP expenditure and human welfare had a significant negative relationship. Similarly, trade openness and human welfare had a significant negative relationship. However, inflation and human welfare had a significant positive relationship. Whereas, domestic general government health expenditure and human welfare had an insignificant positive relationship. Likewise, gross domestic product per capita and human welfare had an insignificant positive relationship. Additionally, while evaluating the model's power, the value of R-squared signifies that about 68% of the variation in human development index was explained by all the explanatory variables. This suggests that the study's model has a moderate level of explanatory power for the variables included in the study

Discussion

In assessing the level of human welfare in Nigeria from 2000 to 2023, the mean value of human development index was 0.583. This suggests that the level of human welfare in the areas of education, health, and living standard is just slightly above the average global benchmark. This should draw the attention of the country`s policymakers to the urgent need to embark on policies and programs that will improve education, health and living standard of the citizenry in order to ensure a sustainable human welfare improvement in the country. In the same vein, the median value of HDI, which is 0.523, being slightly lower than the mean, indicates that most data points are clustered below the average, with a few higher values pulling up the mean. This disparity suggests inequality in human development over the period 2000 to 2023 in Nigeria. Therefore, to ensure an annual sustainable level of human welfare in Nigeria, the policymakers should use a holistic approach in addressing challenges confronting education, health and living standard respectively. Since these three variables are the critical components of human capital that guarantee a decent human welfare in any country.

Table 1: Measurements of variables

Abbreviation	variable	operational definition	expected sign
HDI	Human Development Index	HDI summarizes a country's human welfare in three fundamental spheres of human development which are health – proxied with life expectancy at birth, knowledge-proxied by school enrolment and standard of living. (Further reference to details of how to measure HDI could be sourced from the technical note of the Human Development Reports which is available in United Nations Development Program website[28].	Dependable variable
OPE	Out-of-pocket expenditure	Out-of-pocket expenditure is a term used to describe the direct spending by households on healthcare and suppliers of goods and services intended to improve or restore health. It includes gratuities and in-kind contributions. Therefore, it is proxied in this study thus; OOP expenditure as % of current health expenditure.	+
GEH	Government expenditure on health	Government expenditure refers to the amount of money the government spends on healthcare. This is measured by general government health expenditure as percentage of GDP.	+
GDPPC	Gross domestic product per capita	GDP per capita is an economic metric that measures a country's economic output per capita, indicating its prosperity based on economic growth. GDP per capital growth is used in this study.	+
INF	Inflation	Inflation refers to the steady decline in purchasing power that is manifested in a general increase in the cost of goods and services.	-
TOP	Trade openness	Trade openness is expressed as the ratio of exports plus imports over GDP. It is measured by trade (% of GDP).	+

Table 2: Descriptive statistics

	HDI (0-1)	OPE (%)	GDHX (%)	GDPPC (%)	INF (%)	TOP (%)
Mean	0.583	71.287	0.631	1.997	12.164	36.055
Median	0.523	72.786	0.532	2.908	12.307	33.542
Maximum	1.449	77.270	1.202	12.457	18.874	53.278
Minimum	0.449	60.162	0.446	-4.260	5.388	20.723
Std. Dev.	0.212	4.699	0.219	3.840	3.342	9.112
Skewness	3.149	-1.090	1.441	0.430	-0.024	0.209
Kurtosis	12.849	3.300	3.887	3.542	2.671	2.125
Jarque-Bera	136.667	4.843	9.099	1.032	0.111	0.940
Probability	0.000	0.089	0.010	0.597	0.946	0.625
Sum	13.994	1710.887	15.134	47.939	291.945	865.311
Sum Sq. Dev.	1.036	507.748	1.104	339.065	256.954	1909.732
Observations	24	24	24	24	24	24

Table 3: Fully Modified Ordinary Squares regression results of out-of-pocket spending and human welfare in Nigeria

Regressors	Coefficient	Std. Error	t-Statistic	Prob.
OPE	-0.021859	0.006771	3.228309	0.0049
GDHX	0.102235	0.115371	0.886140	0.3879
GDPPC	0.010605	0.007043	1.505731	0.1505
INF	0.017920	0.006553	2.734841	0.0141
TOP	-0.005963	0.002634	2.263515	0.0370
R- squared	0.683499			
Adjusted R- Squared	0.531587			

Dependent Variable: Human welfare

However, out of pocket expenditure (OPE) had maximum and minimum values of 77.2% and 60.1% respectively with a mean a value of 71%. This implies that on an average basis, households in Nigeria pay 71% of their total health expenses directly from their pockets to health care providers. It is important to stress that out of pocket expenditure in Nigeria is extremely bigger than those of the residents of Sub Saharan Africa who pay 30.35%, East Asia and Pacific who pay 25.28%, EU countries who pay 14.44% and South Africa who pay 5.36% respectively[12].

Government expenditure on health as percentage of GDP (GEX) had a maximum value of 1.20% and a minimum value of 0.44% with a mean value of 0.63%. This shows that, annually, the Nigerian government spends about 0.63% of its GDP on general health of its citizens. This is far below what other big economies in Africa such as South Africa which spends 5%, Algeria which spends 3.2%, and Egypt which spends 1.7% of their GDPs respectively. WDI 2023. The inadequate public investment in health in Nigeria reinforces the reason why there is a perpetual rise in out of pocket expenditure in the country over the time. Also, according to the finding, GDP per capita growth in Nigeria had a mean value of 1.99%. It is important to stress that the need for economic expansion in Nigeria should not be undermined in order to create more financial strength for the policymakers to embark on massive investment on public health in the country.

In addition, in testing whether a significant relationship exists between OOP expenditure and human welfare in Nigeria, it was inferred from the study that out of pocket expenditure and human welfare had a significant negative relationship. Based on the finding from this study, a unit change in out of pocket expenditure reduced human welfare by 0.02. This means that out of pocket expenditure in Nigeria does not possess capacity to improve life expectancy, knowledge and living standard which are the components of human welfare in this study as expected. The reason for this unpleasant result in Nigeria might be attributed to the continuous rise in out of pocket expenditure in which majority of the Nigerian households cannot afford due to high poverty level. In the same vein, unaffordability of basic health care might be one of the reasons why life expectancy has not been improved in Nigeria over the time.

Therefore, to improve the health component of human welfare in Nigeria, the policymakers in the country should heavily subsidize the health care services, this will give a room for a substantial reduction in out of pocket expenditure by the households. Private companies should provide health insurance plans for their employees, covering a range of medical services. This approach will alleviate the financial burden on employees by allowing them to contribute to insurance premiums, which are often more affordable.

Moreover, trade openness had a negative impact on human welfare. 222A unit change in trade openness reduced human welfare by 0.005. This finding contradicts the "*a priori"* expectation. It is important to stress that the reason why this finding followed this pattern might be arrogated to the

perpetual trade deficits recorded in Nigeria over the years. Similarly, Nigeria is over dependent on foreign items in which exchange rate volatility has made it almost impossible for the majority of the country`s households to have access to the basic necessities of life, this will invariably cause unpleasant situation for human welfare in the country. And this result is tandem with the finding of Ou *et al*.[29] in a related study.

Inflation had a positive impact on human welfare, and this result contradicts the finding of Chen *et al*.[30] which states that an increase in inflation would lead to a decrease in human welfare. This shows that the pass-through effect of inflation on health aspect of human welfare seems to be very weak in Nigeria. Whereas, both government health expenditure and GDP per capita had a positive but insignificant impact on human welfare in Nigeria. Therefore, for Nigeria to experience a significant improvement in human welfare via government health expenditure and GDP per capita, the policymakers in the country should be committed to allocating at least 15% of its total annual budget towards healthcare as recommended during the Abuja Declaration in 2001 with a view to lessening out-of-pocket expenditure of the households. Similarly, the policies and programs that will catalyze economic expansion and financial prosperity for all citizens should embarked upon by the government. This will enable the Nigerian households to be self-sufficient in financing their health expenses, health education, and at the same time live a decent life, which are the strategic components of human welfare.

Study strengths and limitations

Besides the well stated research question, this study utilized a holistic approach in measuring human welfare in three fundamental spheres of human development which are health, knowledge and standard of living. Therefore, the advent of this new empirical evidence serves as the strengths of this study. Meanwhile, this study is limited based on its horizon, as the study focuses on Nigeria. The results might not be strong enough for generalization of the situation reports of the entire West Africa sub region. Further studies could therefore be carried out on the entire West African countries to provide a broader policy document for the entire sub region or the continent.

Conclusion

This study therefore concludes that the level of human welfare in the areas of education, health, and living standard is just slightly above the average global benchmark. However, on an average basis, households in Nigeria pay 71% of their total health expenses directly from their pockets to health care providers. Also, OOP expenditure and human welfare had a significant negative relationship. Therefore, to improve the health component of human welfare in Nigeria, the policymakers in the country should heavily subsidize the health care services, this will give a room for a substantial reduction in out of pocket expenditure by the households.

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