HEALTH RISKS IN POOR URBAN HOUSEHOLDS IN NIGERIA

[1]Adewara, S.O., [1]Ijaiya, G. T., [1]Arosanyin, G. T., [1]Bello, R.A., & [2]Atoyebi, G.O.
[1]Department of Economics, Faculty of Social Sciences, University of Ilorin, Ilorin, Nigeria
[2]Department of Economics, College of Business and Social Sciences, Landmark University, Omu-Aran, Nigeria
Correspondence Author's E-mail: oladewara02@gmail.com

Abstract
Until recently, the general perception was that child health outcomes are better in urban than in rural areas in sub-Saharan Africa. Due to this general perception, previous efforts on health are focused on children in the rural areas. However, the 2012 UNICEF State of the World Children Report shows that children in most of the urban areas across the globe are facing greater health risks associated with urbanisation. In Nigeria, about 50 per cent of the over 160 million people in the country live in urban areas. This study investigated if poor households are facing higher health risks in Nigeria and to explain reasons if so. The paper first used concentration index to determine the magnitude and direction of change in rural-urban disparity in child nutritional status measured by height for-age z-scores between 1999 and 2008. Secondly, it adjusted the gaps in children health outcomes for differences in rural and urban population characteristics. While concentration index was used to measure socioeconomic health inequality, Blinder-Oaxaca decomposition was used to determine the degree of health inequality between the rich and the poor in the urban and rural areas. The results showed that childhood malnutrition measured by negative height for-age z-scores persisted and even deteriorated to the disadvantage of children in poor urban households. The results further show that gaps in maternal and paternal levels of education, gaps in maternal heights and geo-political variations were the main causes of the prevalence of stunting amongst poor children in both rural and urban areas in Nigeria. The paper, therefore, argues that urbanisation without concerted efforts to reduce existing gaps in the determinants of health outcomes does not benefit the poor.

Key Words: Health inequality, Poor, Urbanisation, Chronic malnutrition, Blinder-Oaxaca decomposition, Nigeria
JEL Classification: I14, I18, I32, I38

Introduction

The world population is becoming increasingly urbanised. Developing countries, including Nigeria, are also experiencing an urbanisation process of remarkable scale. United Nations International Children's Emergency Fund (UNICEF) Report on the state of the world children (2012) shows that about 50 per cent of global population lived in the urban cities and towns with about 1 in 3 of urban population living in slums areas (UNICEF 2012).

The implication of increasing trends in urbanisation is that childhood experience is also becoming increasingly urban. Increase in urbanisation without a corresponding increase in the provision of basic needs poses great health risk to the poor especially children in urban poor households. In 2010 alone, over 8 million children died before the age of 5 years due to communicable diseases such as pneumonia and diarrhea (UNICEF, 2012). Targeted health policies in most of the developing countries in the past were focused on poor households in the rural areas due to the general perception that poverty is more pronounced among rural dwellers than in urban areas. International organisations, such as the World Bank, International Monetary Fund (IMF) and World Health Organisation's efforts are mostly pro-rural in the developing countries. Without a clear understanding of health implication of the increasing urbanisation in the country, poor households, especially those with children, face an increasing risk of neglect which may be inimical to the Millennium Development Goal (MDG) that aims to reduce health

inequality by half across the globe by 2015. While many children are benefiting from urbanisation in form of access to higher quality education, quality health care, access to safe drinking water and electricity, many other children living in ramshackle dwellings and overcrowded settlements in the same urban cities lack access to these basic needs, with negative health consequences. Urban children in the poor households are starving in the midst of plenty. It is very important for policy makers to understand the conditions of the poor households in urban cities with the aim of making urban environment conducive for the protection of children's fundamental human rights.

The picture painted above is not different from the situation in Nigeria that has about 50 per cent i.e. over 80 million of its people living in the urban areas, with Lagos in Nigeria (one of the 20 largest cities in the world) alone having a population figure of over 15 million people. Given this situation, Nigeria was said to occupy the 12th position in the list of countries with the highest rate of under-five mortality (UNICEF, 2012).

To ascertain this position, this paper examined the extent of inequality in chronic child malnutrition within-urban households in Nigeria in 1999 and compare this with the subsequent ten years in 2008. In addition, the paper also analysed the determinants of within-urban inequality in chronic child malnutrition in the country between 1999 and 2008.

Review of Related Literature

Bicego & Ahmad (1996) used Demographic and Health Survey (DHS) data from 20 developing countries to analyse socio-economic related health inequality, using mortality rates as their measure of health outcomes. Their result shows that mortality of children under-5 years old born to women with secondary education was 50 per cent lower than that of those born to women with no education. In another study, Woelk & Chikuse (2000), focused their study on inequalities in stunting, the number of underweight children and the incidence of diarrhea in Zimbabwe. From their study, they concluded that children in poor households in the country are prone to being underweight three times more than children in non-poor households. Haddad, Ruel, & Garrett, (1999), used DHS data for countries in Africa, Asia and Latin America to analyse variations in the prevalence of stunting in rural and urban areas. Their results show that levels of stunting were greater in urban areas than in rural areas. In a similar study, the findings of Menon, Ruel, & Morris, (2000), confirmed that inequality in stunting in Africa, Asia and Latin America are larger in urban than in rural areas.

Wagstaff, van Doorslaer, & Watanabe (2003) decomposed inequality in stunting in Vietnam, using concentration indices for the years 1993 and 1998. Their findings show that inequalities in consumption and commune-level effect are the main causes of the prevalence of stunting amongst lowest income quintile in the country. In addition, they find that both the increase in average consumption inequality and general improvements at the commune level accounted for the change in stunting inequality between 1993 and 1998. William, Mishra, & Navaneetham, (2009), argue that the distribution of endowment and positive maternal characteristics accounted for the widening gap in child malnutrition between poor and the non-poor households in India. Van de Poel & Speybroeck, (2009), used Blinder-Oaxaca decomposition to decompose the differences in child malnutrition between Scheduled Castes and the remaining Indian population. Their results show that inequality in stunting between the Scheduled Castes and the remaining population was caused by inequalities in wealth, education and use of health care services. In another study on health inequalities in 42 developing countries, Wagstaff (2002), enumerated four approaches to a better understanding of the impact of anti-inequality policies on health inequalities. These approaches are: cross country comparative studies, before-and-after country based studies with controls, benefit-incidence analysis, and decomposition analysis. His results show that health inequality has been rising in both developed and developing countries in recent times.

All the studies above, with the exception of the research of Wagstaff et al. (2003) focused on comparisons of income inequality under two regimes while some examined health inequality at a point in time. We are not aware of any study which compares within-urban health inequality in Nigeria between two periods.

The questions this paper seeks to answer are: (i) does growing within-urban health inequality evident in some developing countries applicable to Nigeria? (ii) what are the causes of increase in within-urban health inequality in Nigeria over this period?

Definition, Methods and Measurement of Childhood Malnutrition

Various indicators to measure and analyse socioeconomic inequality in child's health outcomes have been discussed in the literature. Some of these are infant mortality, incidence of diseases such as diarrhea, life expectancy, morbidity and the recently anthropometric measures of underweight scores (low weights for age z-scores (WAZ) and stunting (low heights for age z-scores (HAZ) of children. We used this last method which has been judged in the literature as the most objective measure of health outcomes especially as measures of childhood malnutrition (Wagstaff, 2002; Kabubo-Mariara, Ndenge, & Mwabu, 2009; WHO, 2002; and Anthro, 2009). This indicator is also suitable for health comparisons across time and location. Data from the Demographic and Health Survey (DHS) on Nigeria also enables us to have access to much needed anthropometric measures of children in rural and urban areas in the country for 1999 and 2008.

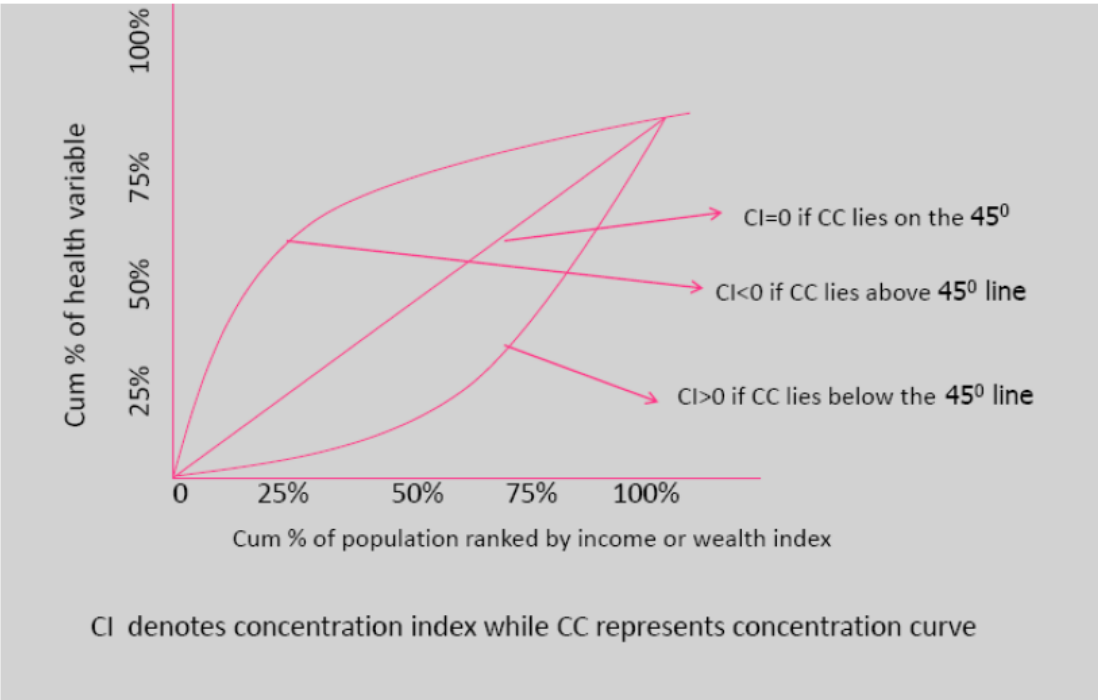
In this paper, we measure HAZ of children aged 0-36 months in Nigeria in 1999 and 2008 respectively. The 1999 and 2008 DHS contains information about children below the age of 37 months in the country. Thus we are able to carry out a comparison of child health inequality between the two years. We focus on the problem of stunting, which we measure by using negative height-for-age z-scores of children between age 0-35 months. Negative z-scores convey important information on the severity of stunting rather than the probability of whether a child will be stunted. We then multiply the negative z-scores by -1 for the purpose of our analysis, following trends in the literature (Skoufias 1998; Wagstaff, et al. 2003; O'Donnell, et al. 2007). Based on the WHO recommendation, children with z-scores lower than -6 are excluded from our analysis method (Pradhan, Sahn, & Younger, 2003; Goesling & Firebaugh 2004; Meng & Qian, 2005).

For us to be able to measure inequality in health outcomes between the rich and poor in both rural and urban areas within the two periods, we first use principal component analysis (PCA) to measure households' asset indices, due to the non-availability of income and expenditure information in the DHS dataset. Recent studies show that asset indices derived from PCA are good predictors of health outcomes as well as a good alternative to income and expenditure data (Filmer and Pritchett 2001; Sahn & Stifel 2003). The asset index is also used here to group households into five asset quintiles, from the poorest group to the richest group.

Measurement of Health Inequality using the Concentration Index

As earlier indicated, inequality in health between the poor and the rich may be in the form of unequal access to health services and to benefits from health expenditure or subsidies or in the form of inequality in health outcomes. The latter, which is our main focus is the most comprehensive measure of health inequality. We used concentration indices to determine whether inequality exists in stunting among children aged 0-36 months in Nigeria. This is the first step in our analysis of health inequality. The Concentration index is twice the area between the concentration curve and the line of equality (O'Donnell et al; 2008). In the illustrated graph below, the 45^0 line is the line of equity between the poor and the rich. The concentration index is equal to zero at any point along this line, meaning that there is no inequality between the poor and the rich in the distribution of the variable under consideration. If the curve lies above the line, the variable is concentrated amongst the poor, and the value of the index will be negative. On the other hand, if the curve lies below the line, then the variable is concentrated amongst the rich and the value of the concentration index in this case will be positive.

Fig. 1: Graphical illustration of the Concentration Index



Source: WHO, 2010

Households are ranked based on their socioeconomic status, and the concentration index is then computed to determine the group where the health variable of interest is severe, the variable in our case being incidences of stunting or chronic malnutrition. If stunting is severe amongst the poor, the index takes a negative value but if stunting is severe amongst the rich, the index value is positive. Because stunting is an indicator of ill health, a negative value of the concentration index means that ill health is severe or intense amongst the poor. If there is no inequality in the health variable under consideration, the index will be equal to zero. If the index is positive, then the variable under consideration is prevalent amongst the rich. A comparison of the concentration index between 1999 and 2008 will show whether inequality in ill health between the poor and the rich has been reduced or become worse. Therefore, if increase in urbanisation between 1999 and 2008 in Nigeria favour the poor, it is expected that inequality in stunting will be lower in urban areas in 2008. We used the well known Kakwani, Wagstaff, & van Doorslaer, (1997) method to compute inequality in stunting, in 1999, 2003 and 2008 respectively. The index is given as:

$$C = \frac{2}{\mu} \sum y_i R_i - 1 \quad (1)$$

where; C is the concentration index, which is a measure of relative inequality, like the Gini coefficient. μ is the mean of y, y is the health variable. R is the fractional rank of the ith person in the income distribution. Therefore, doubling of the score for every individual's health does not affect the concentration index but rather leaves the index unchanged. The concentration index value is bounded between -1 and 1.

The next step in our analysis of health inequality in Nigeria is to find a way of explaining differences in health outcomes between the poor and the rich in the country. We used Blinder-Oaxaca decomposition methods to explain differences in the severity of stunting between the poor and the rich in the country. The decomposition method enables us to show how inequality in the chronic malnutrition can be explained by inequality in other factors that affect stunting. Therefore, if inequality in other factors that affect stunting are responsible for inequality in child health, then, it will be easier to reduce within urban inequality in stunting by reducing inequality in its determinants. This is the main benefit of decomposing health inequality into its contributing factors.

$$y^{urbanrich} - y^{urbanpoor} = \beta^{urbanrich} x^{urbanrich} - \beta^{urbanpoor} x^{urbanpoor} \quad (2)$$

Where: $x^{urbanrich}$ and $x^{urbanpoor}$ represent vectors of the determinants of health outcomes such as child-specific characteristics, environmental variables,and household-specific characteristics evaluated at the means for the rich and poor respectively (Jalan & Ravallion 2003; Khanna 2008; Kabubo-Mariara et al. 2009).

Assuming there are only two explanatory variables x_1 and x_2 then,

$$y^{urbanrich} - y^{urbanpoor} = (\beta_0^{urbanrich} - \beta_0^{urbanpoor}) + (\beta_1^{urbanrich} x_1^{urbanrich} - \beta_1^{urbanpoor} x_1^{urbanpoor}) + (\beta_2^{urbanrich} x_2^{urbanrich} - \beta_2^{urbanpoor} \beta_2^{urbanpoor}) \quad (3)$$

$$= G_0 + G_1 + G_2$$

The gap in y between the poor and the rich is assumed to be due to (i) differences in the intercepts (G_0), (ii) differences in x_1 and β_1(G_1) and (iii) differences in x_2 and β_2(G_2): For instance, G_1might measure the gap in mean outcomes that is due to differences in access to piped water x_1 and the effects of piped water β_1

Oaxaca decomposition further helps to explain the total or specific gap in the explanatory variable that is due to (i) differences in x′s (explained component) and the gap due to (ii) differences in β′s (unexplained component). It further explained the gap between the mean health outcomes for the rich and the poor in two ways:

$$\boldsymbol{y^{urbanrich} - y^{urbanpoor} = \Delta x \beta^{urbanpoor} \Delta x \beta^{urbanrich}} \quad (4)$$

Where $\Delta \boldsymbol{x} = x^{urbanrich} - x^{urbanpoor}$ and $\Delta\beta = \beta^{urbanrich} - \beta^{urbanpoor}$ $, or\ as$

Therefore, the decomposition in (4) is seen as a special case of a more general decomposition:

$$\boldsymbol{y^{urbrich} - y^{urbanpoor} = \Delta x \beta^{urbanrich} + \Delta \beta x^{urbanpoor}} \quad (5)$$

$$y^{urbanrich} - y^{urbanpoor} = \Delta \boldsymbol{x \beta^{urbanpoor}} + \Delta \boldsymbol{\beta x^{urbanpoor}} + \Delta \boldsymbol{x} \Delta \boldsymbol{\beta} \quad (6)$$

$$= E + C + CE$$

From the above, the gap between the urban rich and urban poor mean health outcomes is due to a gap in endowments (E), a gap in coefficients (C), and a gap due to interaction of endowments and coefficients (C E).

Measurement of other Variables

We measured all our variables using the DHS datasets on Nigeria for 1999 and 2008. Age of the child was measured in months from 0-35 months old. We limit our analysis to 36 months for easy comparison, because the 1999 survey only measured children aged 0-35 months. We include Child's age square to account for nonlinearity in the relationship between child's health outcomes and age in months, as specified in the literature (Glewwe, Gragnolati & Zaman, 2000; Wagstaff, et al. 2003). Other child related variables included are the gender and twin variables to control for the effect of multiple births, and the variable indicating whether a child had a fever within the two weeks preceding the survey (Note that multiple birth children are smaller in weight and height early in life compared to children of single births, due to their sharing of breast milk that would have been available to a single child. Diarrhea is omitted due to its correlation with access to safe drinking water).

Household variables included are the asset index, a dummy for safe drinking water (piped and borehole water), sanitation (access to flush toilets), and height of the mother, Mothers' and Fathers' levels of education, age of the household head (this variable account for the effects of experience on child up bringing while 'head age' squared controlled for the non-linear relationship between experience and HAZ) and number of children in the household. We also control for the effects of unobservable characteristics of the six geopolitical zones by including regional fixed effects. All these variables are theoretically and empirically confirmed to relate to child health outcomes.

Analysis, Presentation, Interpretation and Discussion of Results

The use of a concentration index is more appropriate for a better understanding of socioeconomic health inequality between two periods. In this section we present our analysis and comparison of health inequality for children below the age of 36 months in Nigeria for the years 1999 and 2008. As earlier explained, when the value of the concentration index is positive, stunting or chronic malnutrition is severe or prevalent amongst the rich but when it is negative it is more severe amongst the poor. Note also that the value of the index lies between 1 and -1.The closer the concentration index is to zero, the lower the inequality in the variable under consideration. Understanding this relationship is crucial to an understanding of our analysis of health inequality as presented in the rest of this paper.

There was considerable variation in the prevalence and changes in our measure of malnutrition among children in Nigeria. From our analysis of the concentration index shown in Table 1, childhood malnutrition in the country was disproportionately concentrated amongst children living in poor households in 1999 and 2008 both in the urban and rural areas. However, the magnitude of inequality in chronic malnutrition varies both within and between urban and rural areas for the two periods. In the first place, inequality in stunting between the poor and the rich was about 3.36 per cent lower in the rural households in 1999 while it was about 50 per cent lower in the rural households in 2008. Between 1999 and 2008, inequality in stunting marginally reduced by 14.9 per cent or from -0.0536 in 1999 to -0.0456 in between the rich and poor households in the urban areas. However, in the rural area, inequality in stunting between children in poor households and the rich significantly reduced by about 50 per cent or from -0.0518 in 1999 to -0.0228 in 2008. The results indicate that children in poor households were worse-off in the urban areas between the two periods of our analysis in the country.

Table 1: Concentration Indices of Stunting in Urban and Rural areas in Nigeria

Health Outcomes (Malnutrition Inequality	1999			2008			2008 (%Δ)	
	Urban	Rural	%gaps	Urban	Rural	%gaps	Urban	Rural
Stunting CI	-0536** (0.0145)	-.0518*** (0.00946)	3.36	-.0456*** (0.0061)	-0.0228* (0.01099)	50	14.9	56

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1 and %Δ indicates percentage change
Source: Authors' computation, 2013.

However, we cannot fully explain the causes of the rise in inequalities in stunting without a decomposition of the concentration indices into the determinants of health inequality. Therefore, the next step in our analysis is to decompose stunting concentration index into the contribution of inequality in the distribution of the determinants of stunting between the two periods.

Changes in Variables Determining Health Inequalities between 1999 and 2008

We present, in Table 2, the mean, concentration indices and change in the indices between 1999 and 2008 for children below 36 months in Nigeria. There are three columns for each year, which are the mean, the concentration index (CI) of each variable and the standard error of the concentration index (std). When the concentration index (measure of inequality) of a variable is positive, such variable is advantageous to rich people if it is a good outcome, such as a health subsidy. On the other hand, when the concentration index of a variable such as infant mortality is positive, infant mortality is disadvantageous to the rich compared to the poor. The value of the concentration index is bounded between a minimum of -1 and a maximum of 1. Inequality is zero if the value of the concentration index is 0 (zero). The closer the concentration index of a given variable is to -1 the more that variable is prevalent amongst the poor.

Our results for the two years under consideration show that the concentration indices (CI) of most of the variables are positive, which indicates that the distribution of these variables is advantageous to the rich group. The incidence of fever, as expected was concentrated in the poor households, as indicated by the negative sign of CI. In 1999, ownership of assets favoured the rich, with a CI of 0.256 point. Inequality in asset indices increased to 0.276 in favour of the rich by 2008. The food consumption index was also concentrated among the rich in the two years of our analysis. It should be noted that there was a significant increase in food index inequality to the advantage of the rich, from 0.016 in 1999 to 0.071 in 2008. This is an indication that the gap in food security between the poor and the rich had widened, to the disadvantage of the poor.

Table 2: Selected Variables' Mean and Concentration Indices

Variables	1999			2008			
	Mean	CI*	Std**	Mean	CI*	Std**	ΔCI***
Age in months	16.26	0.032	0.008	16.025	0.014	0.003	-0.018
Age squared	362.54	0.054	0.013	356.79	0.024	0.004	-0.03
Child=male	0.508	0.003	0.014	0.503	0.002	0.006	-0.001
Twin dummy	0.049	0.06	0.083	0.041	0.053	0.033	-0.007
Asset index	2.934	0.256	0.004	2.88	0.276	0.002	0.02
Food index	0.752	0.018	0.026	2.20	0.071	0.006	0.053
Safe Water	0.367	0.277	0.018	0.354	0.276	0.008	-0.001
Sanitation	0.737	0.085	0.009	0.637	0.134	0.005	0.049
Breast feeding	0.912	0.003	0.004	0.974	0.000	0.000	-0.003
Maternal education	0.846	0.282	0.013	0.840	0.31	0.006	0.028
Maternal height	155.6	-0.000	0.002	158.5	0.002	0.000	0.002
Urban	0.295	0.375	0.019	0.269	0.457	0.008	0.082
Number of children	2.158	-0.013	0.008	2.285	-0.009	0.003	0.004
Head age	40.86	0.008	0.005	40.48	-0.004	0.002	-0.012
Hage^2	1823.1	0.015	0.010	1793.4	-0.013	0.004	-0.028
Paternal education	1.1	0.221	0.011	1.07	0.258	0.005	0.037
Fever	0.311	-0.056	0.021	0.176	-0.035	0.012	-0.021
Maternal weight	57.81	0.022	0.004	58.73	0.029	0.002	0.007

Note: ∗ and ∗∗ represent concentration indices and the standard errors of the indices respectively, while ∗∗∗ denotes change in the concentration index of each variable.
Source: Authors' computation, 2013.

Access to safe drinking water and sanitation was also more prevalent among the rich, with inequality in access to sanitation nearly doubling between 1999 and 2008 to the detriment of the poor. There was no significant inequality in breast feeding between the rich and the poor, since every child have access to being breast fed except if the child is an orphan. Inequality in maternal and paternal education consistently disfavoured the poor and inequalities over the years widened. While inequality in mothers' education rose from 0.283 in 1999 to a peak of 0.311 in 2008, that of fathers' education rose from 0.221 in 1999 to 0.258 in 2008.

Blinder-Oaxaca Analysis of Group Differences in Malnutrition

As shown in Table 3, we use Blinder-Oaxaca group mean differences in stunting to check the robustness of our concentration indices. The mean differences between poor and non-poor children confirmed the persistency and severity of within-urban chronic malnutrition between 1999 and 2008 in Nigeria. In addition, the Blinder-Oaxaca group mean differences in stunting show that there was a significant increase in inequality between poor and non-poor children at the one per cent level within rural area in 1999. Similar to the change in the concentration indices, we observed that there was a slight but significant decrease in inequality in stunting, from 0.441 to 0.287, between 1999 and 2008 in the rural area. On the other hand, there was no significant difference in inequality in malnutrition between poor and no-poor children in the urban area in 1999. In 2008 however, inequality in chronic malnutrition was significant at 5 per cent. This is an indication of increase in the gap between the welfare of the rich and non-rich households in the country. Interestingly, inequality in malnutrition was lower in the rural area in 2008 compared to 1999. In addition, column 7 indicates a significant increase in chronic malnutrition in the urban areas in 2008. Our results show that the poor are worse-off in the country with increase in urbanisation

Table 3: Blinder-Oaxaca Group Differences in Urban and Rural Areas in Nigeria

Health outcomes (Malnutrition inequality	1999			2008		
	within urban	within rural	urban-rural gap	within urban	within rural	urban-rural gap
Blinder-Oaxaca	0.433 (0.272)	0.441*** (0.0979)	0.00345 (0.0916)	0.235** (0.100)	0.287*** (0.0374)	0.337*** (0.0356)

Note: standard errors are in parentheses while ** and *** indicates Blinder-Oaxaca inequality significant at 5% and 1% respectively

Source: Authors' computation, 2013.

In the following analysis, as shown in Tables 4-6, we decomposed our results in Table 3, column 5-7 into the causes of persistence inequality in the country in both urban and rural areas. To achieve this objective, we use Blinder-Oaxaca decomposition to explain inequality due to differences in the magnitudes of the determinants (otherwise known as endowment effect) of health outcomes and those due to the effects of these determinants (also known as coefficients effect) in 2008. With this method we are able to decompose inequality in malnutrition without the inclusion of an asset index and we are able to explain the relationship between malnutrition and each determinant. An additional advantage of this method is that we are able to adjust for possible selection bias that may arise from grouping households into poor or non-poor groups. A negative sign of the variable indicates that the gap in the distribution of malnutrition between poor and non-poor children is narrowing, while a positive sign indicates increasing inequality in malnutrition levels between poor and non-poor children.

Table 4: Decomposition of Rural-Urban Differences in Chronic Child Malnutrition in Nigeria

Variables	Endowments		Coefficients		Interaction	
Age in months	-0.0357**	(0.0159)	0.0261	0.283	-0.000898	(0.00973)
Age squared	0.0297**	(0.0138)	0.128	(0.176)	-0.00704	(0.0100)
Gender	-0.00213	(0.00292)	-0.0412	(0.0351)	0.000712	(0.00114)
Twin	-0.000135	(0.000558)	0.0164***	(0.00628)	0.000585	(0.00231)
Food index	0.00687	(0.00605)	0.0526	(0.0447)	-0.00851	(0.00731)
Safe water	0.00947	(0.0227)	-0.00494	(0.0466)	0.00292	(0.0276)
Safe sanitation	0.00886	(0.0239)	-0.0133	(0.0777)	0.00451	(0.0264)
Breast feeding	0.00190	(0.00169)	0.158	(0.280)	-0.000705	(0.00134)
Maternal education	0.0424*	(0.0256)	-0.0393	(0.0653)	0.0191	(0.0317)
Mother's height	0.0234***	(0.00584)	1.391**	(0.694)	-0.0104*	(0.00546)
No.of children	0.000560	(0.00244)	-0.0539	(0.0712)	-0.00212	(0.00288)
Head age	-0.00469	(0.00620)	0.863	(0.599)	0.00830	(0.00832)
Head age2	0.00569	(0.00916)	-0.343	(0.266)	-0.0126	(0.0111)
Paternal education	0.0407*	(0.0233)	0.0169	(0.0233)	-0.00700	(0.0279)
Head fever	-0.00468	(0.00320)	0.0235	(0.0148)	0.00548	(0.00369)
South-east zone	0.00138	(0.00175)	0.0354	(0.0244)	0.00243	(0.00249)
North-east zone	0.0151**	(0.00681)	0.0261	(0.0285)	0.00659	(0.00732)
North-west zone	0.0655***	(0.0169)	0.0235	(0.0240)	0.0187	(0.0192)
North-central zone	0.0185***	(0.00691)	0.0267	(0.0185)	-0.0116	(0.00818)
South-south zone	0.0229	(0.0167)	0.0362	(0.0263)	-0.0229	(0.0167)
Total	0.246***	(0.0374)	0.106**	(0.0417)	-0.0142	(0.0433)
Constant			-2.225***	(0.803)		
Observations	8,955		8,955		8,955	

Note: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.South West Nigeria is reference zone.

Source: Authors' computation, 2013.

The result of the Blinder-Oaxaca decomposition of group differences in stunting shows that the endowment effect between poor and non-poor contributed a total of 0.246 or 73 per cent of the total urban-rural gap in stunting between poor and non-poor children in 2008. The endowment effect's total contribution to inequality in stunting is significant at the one per cent level to the disadvantage of poor children, as shown in Table 4. Column (2) in Table 9 shows that characteristics of children such as age distribution influence the levels of inequality in stunting.

Table 5: Decomposition of Within-Rural Differences in Chronic Child Malnutrition in Nigeria

Variables	Endowments		Coefficients		Interaction	
Age in months	-0.0225*	(0.0118)	0.557*	(0.290)	-0.0179	(0.0120)
Age squared	0.0156	(0.00952)	-0.208	(0.180)	0.0122	(0.0114)
Gender	0.000261	(0.00238)	-0.0303	(0.0363)	-8.15e-05	(0.000751)
Twin	-0.00540**	(0.00264)	-0.00631	(0.00776)	0.00189	(0.00243)
Food index	-0.00343	(0.00446)	-0.0204	(0.0455)	0.00285	(0.00637)
Safe water	0.0187**	(0.00897)	0.0660**	(0.0293)	-0.0302**	(0.0135)
Safe sanitation	0.00318	(0.0126)	-0.0165	(0.0550)	0.00503	(0.0168)
Breast dummy	7.88e-05	(0.000655)	-0.147	(0.267)	6.10e-05	(0.000515)
Maternal education	0.0570**	(0.0229)	0.0103	(0.0613)	-0.00614	(0.0365)
Mother's height	0.00798**	(0.00341)	0.905	(0.705)	-0.00323	(0.00277)
No.of children	-2.36e-05	(0.000178)	-0.0834	(0.0731)	0.000197	(0.00109)
Head age	0.00443	(0.00564)	-0.370	(0.544)	-0.00265	(0.00482)
Head age2	-0.00925	(0.00797)	0.140	(0.239)	0.00459	(0.00822)
Paternal education	0.0183	(0.0216)	-0.0436	(0.0620)	0.0230	(0.0327)
Head fever	8.59e-06	(0.000711)	0.0330*	(0.0180)	-2.02e-05	(0.00167)
South-east zone	-0.00338	(0.00321)	0.0659*	(0.0351)	-0.00374	(0.00384)
North-east zone	0.0711***	(0.0194)	0.0453	(0.0277)	0.0485	(0.0297)
North-west zone	0.0661***	(0.0132)	0.0605	(0.0425)	0.0252	(0.0179)
North-central zone	-0.00914	(0.0128)	0.0392	(0.0357)	-0.0261	(0.0238)
South-south zone	-0.00407	(0.00783)	0.0302	(0.0256)	-0.0163	(0.0139)
Total	0.206***	(0.0292)	0.0639	(0.0483)	0.0171	(0.0426)
Constant			-0.963	(0.823)		
Observations	6,596		6,596		6,596	

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1 South West Nigeria is reference zone.
Source: Authors' computation, 2013.

Table 6: Decomposition of Within-Urban Differences in Chronic Child Malnutrition in Nigeria

Variables	Endowments		Coefficients		Interaction	
Age in months	-0.0411	(0.0346)	1.157	(0.769)	-0.0505	(0.0524)
Age squared	0.0465	(0.0306)	-0.420	(0.492)	0.0386	(0.0503)
Gender	0.00182	(0.00694)	0.152	(0.0941)	0.00261	(0.0101)
Twin	-0.000121	(0.000738)	-0.00835	(0.0158)	-0.000668	(0.00354)
Food index	0.00594	(0.00677)	-0.0976	(0.124)	0.0157	(0.0207)
Safe water	0.00822	(0.0220)	0.0897	(0.134)	-0.0453	(0.0676)
Safe sanitation	0.00834	(0.0206)	0.188	(0.198)	-0.0477	(0.0505)
Breast dummy	-0.00216	(0.00264)	-2.363**	(1.014)	-0.0171	(0.0167)
Maternal education	0.0679*	(0.0351)	0.385	(0.235)	-0.231	(0.141)
Mother's height	0.0231**	(0.00940)	-6.647***	(2.228)	0.0599**	(0.0280)
No. of children	0.00112	(0.00678)	0.0707	(0.188)	0.00729	(0.0196)
Head age	-0.0213	(0.0285)	1.281	(1.690)	0.0598	(0.0836)
Head age2	0.0148	(0.0303)	-0.522	(0.762)	-0.0613	(0.0930)
Paternal education	0.0579	(0.0353)	-0.0150	(0.228)	0.00838	(0.228)
Head fever	-0.00799	(0.00633)	-0.00154	(0.0359)	-0.000594	(0.0138)
South-east zone	-0.000462	(0.00181)	0.195**	(0.0800)	-0.0143	(0.0280)
North-east zone	0.0912**	(0.0425)	0.0787	(0.0759)	0.151	(0.146)
North-west zone	-0.0474***	(0.0154)	0.0190	(0.0968)	-0.0102	(0.0521)
North-central zone	-0.0354**	(0.0160)	0.0303	(0.0498)	0.0263	(0.0437)
South-south zone	0.0419	(0.0273)	0.249	(0.182)	-0.227	(0.166)
Total	0.213***	(0.0552)	0.358*	(0.212)	-0.336*	(0.201)
Constant						
Observations	6,596		6,596		6,596	

Note: Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1. South West Nigeria is reference zone.
Source: Authors' computation, 2013.

Inequality in maternal education levels was significant at the ten per cent level while difference in maternal height was significant at 5 per cent level. Differences in paternal educational level also contributed to urban-rural inequality in the country.

The total contribution of coefficient effects (effects of the determinants) to total inequality in stunting between the poor and non-poor was 0.106 or about 30 per cent in 2008 (shown in column (4). Variation in geo-political zones in the country significantly contributed to the prevalence of chronic malnutrition from our result. The three geo-political zones in the north have higher level of chronic malnutrition compared to other zones in the southern part of the country. It may be necessary therefore for the government to target disadvantaged geo-political zones in the country in the provision of public goods.

In Table 5, endowments effect was the main reason for within-rural inequality in chronic malnutrition. It contributed 0.206 or 72 per cent at one per cent significant level to health inequality within the rural areas in 2008. Further disaggregation of the endowment effects contribution shows that differences in maternal education, maternal height and gap in access to safe drinking water are the main causes of inequality in chronic malnutrition in the rural areas in 2008.

The results of the decomposition of group differences in stunting in within urban areas, shown in Table 6 were similar to findings with regard to tables 4 and 5. Column (2), shows that endowment effects contributed significantly to within-urban inequality in chronic malnutrition, at 0.213 or 90 per cent of the total inequality in malnutrition between poor and non-poor children in the country. At individual variable level, the contribution of differences in maternal education, maternal height and regional fixed effects are the main causes of urban health inequality in the country. Tables 4-6 indicate that prevalence of inequality in chronic malnutrition in poor households between rural and urban areas, within rural areas and within

urban dwellers in Nigeria is due to inequality in educational levels and heights of the nursing mothers in the country.

Summary, Policy Implications and Conclusion

In this paper we have considered the problem of chronic childhood malnutrition in poor urban households in Nigeria between 1999 and 2008, in particular, we investigate the problem of inequality in stunting in the presence of growing urbanisation.. Our main aim has been to present empirical evidence on whether health inequality between poor and non-poor children has declined between rural and urban areas, within rural areas and within urban areas in the country. Secondly, we also seek to identify the main determinants of health inequality in the country. From the findings, the study established that inequality in stunting has persisted and worsened amongst the poor households between 1999 and 2008. The study further shows strong evidence of within-urban variation in inequality with regard to malnutrition in as presented in the descriptive analysis and the regression analysis. Further analysis from the decompositions show that the main causes of inequality in urban and rural areas are: differences in maternal and paternal levels of education, and unequal access to safe drinking water.

Policy implications of the above findings are that: (i) growing urbanisation, without concerted efforts to improve existing maternal education and reduce food insecurity may worsen the health situation for children in poor households; (ii) the Nigerian government should concentrate on reducing inequality in access to education especially in the urban areas in order to reduce urban health inequality in the country; (iii) it is also necessary for the government to investigate factors responsible for regional variations in health in the country in order to give equal attention to the peculiar needs of each region which may facilitate reduction in regional agitations among the regions; and (iv) equitable provision of basic services such as access to safe drinking water and sanitation, must be a priority if the government wishes to reduce existing health disparities.

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