

Your job or your health? Analysis of unemployment issues and health outcomes in Nigeria

Anthony Orji¹; Jonathan E. Ogbuabor²; Onyinye I. Anthony-Orji³; Chinonso Okoro⁴; Blessing U. Aniorji⁵

Abstract

This study investigates the impact of unemployment on health outcomes in Nigeria. Prevalence of disease (morbidity) was used as health outcome indicator. Adopting the Classical Linear Regression Model and estimation technique, the results show that government health expenditure has a significant negative relationship with prevalence of morbidity, while high unemployment rate also contributes to negative health outcomes in Nigeria. Furthermore, prevalence of HIV and Malnutrition were found to contribute negatively to health outcomes in Nigeria. The study therefore recommends that the government and private sector players should create decent jobs and enhance job security for the citizens in order to reduce deaths that occur as a result of employment in certain sectors of the economy. Occupational hazards should be minimized in earnest to safeguard the health of the masses. Again, there is need for an effective National Food and Nutritional Policy in order to improve health and reduce morbidity among the populace.

Key Words: Unemployment, Public, Health, Spending, Outcomes

JEL Classification: E24; H51; H75; I15

1. Introduction

One of the numerous responsibilities of the government of any economy remains to invest in the various sectors of the economy which includes the health sector (van den Berg, Paul, and Reinhold, 2020; Johansson, Bockerman and Lundqvist, 2020; Oluwatoyin, Folasade and Fagbeminiyi 2015). According to World Health Organization statistics (2016), Nigeria is ranked 187 out of 191 countries in its ranking of the world's health system performance. Nigeria is just better than 4 countries (Democratic Republic of Congo, Central African Republic, Myanmar and

¹ Department of Economics, University of Nigeria, Nsukka, e-mail: anthony.orji@unn.edu.ng

² Department of Economics, University of Nigeria, Nsukka, e-mail: jonathan.ogbuabor@unn.edu.ng

³ Department of Economics, University of Nigeria, Nsukka, e-mail: onyinye.anthony-orji@unn.edu.ng,
Corresponding Author

⁴ Department of Psychology, University of Nigeria, Nsukka, e-mail: binonso.okoro@unn.edu.ng

⁵ University of Nigeria, Nsukka, e-mail: amakab@rocketmail.com

Sierra Leone) out of 191 countries. Countries like Chad (178th), Cameroon (164th), Botswana (169th), Niger (170th), South Africa (175th), and Ghana (135th) are all ranked ahead of Nigeria. Thus, Nigerian government seems not to be making enough investment necessary to improve health outcomes in the economy as the burden of health care financing in Nigeria rests heavily on individuals and households. Moreover, comparing Nigerian public health spending to that of other developing countries of the world also show that Nigerian government needs to put in more effort in its contribution to health in order to achieve a broader positive health outcome. Figure 1.1 (in appendix) shows the public health expenditure as a percentage of total health expenditure in Nigeria and some sub Saharan African Countries.

Available data from World Development Indicators (2016) as depicted in figure 1.1 shows that, Nigeria is among the lowest country in public health spending (% of total health spending) with 25.1% as compared to some other countries. Country like Niger which is concentrated around subsistence agriculture with little export of agriculture and uranium ore, is one of the lowest ranked (188th) according to the United Nations human development index (HDI 2014) yet they invest more in health with public health expenditure % of total of 55.2 compared to Nigeria despite our abundant human and natural resources. That explains why Niger is higher than Nigeria in terms of life expectancy. Also, other countries like South Africa, Ghana, Burkina Faso, Senegal, The Gambia, Benin, etc. contributed more of their public resources to health than Nigeria and thus have a better health outcome. It is important to note that country like Guinea Bissau spent less than Nigeria (20.5%) and yet they have a higher life expectancy than Nigeria which implies that they are more efficient in spending than Nigeria (see figure 1.2 below in appendix). According to Lambo (2014), Public health expenditure in Nigeria is less than \$8 per capita compared to the \$34 recommended internationally. This explains why it is very important and urgent for the Nigerian government to pay attention to the health sector of the economy.

Figure 1.2 (in appendix) shows life expectancy values (female and male) in some developing countries. From the figure, Nigeria is the third lowest in life expectancy with 55.6 for female and 53.4 for male (WHO 2015). Countries like South Africa, Cameroon, Ghana, Niger, Egypt, etc. are all better than Nigeria in terms of life expectancy.

One way in which health outcomes can be affected in Nigeria is through unemployment and general economic conditions. According to the National Bureau of Statistics (2016), the economically active population or working age population (persons within ages 15 and 64) increased from 106.69 million in the second quarter

of 2016 to 108.03 million in the third quarter of 2016. This represents a 1.26% increase over the previous quarter and a 3.57% increase when compared to the third quarter of 2015. Also, the labor force population (i.e those within the working age population willing, able and actively looking for work) in the third quarter of 2016, increased to 80.67 million from 79.9 million in the second quarter of 2016, representing an increase of 0.98% in the labor force during the quarter.

According to NBS (2018), unemployment remains one of the greatest challenges facing the Nigerian economy and has maintained a rising trend over the years. In the third quarter of 2016, the labor force population (i.e those within the working age population willing, able and actively looking for work in Nigeria) increased to 80.67 million from 79.9 million in the second quarter of 2016, representing an increase of 0.98% in the labor force during the quarter (Nigerian National Bureau of Statistics 2018). In 2010, the National bureau of statistics in their national manpower stock and employment generation Survey (2010) showed that the national unemployment rate is 21.1 percent of the labor force in 2010, which showed 1.2 percent increase over the 2009 rate (which was 19.7). In 2016, The number of people who were unemployed in the labor force, increased by 554,311 persons, resulting in an increase in the national unemployment rate to 13.9% in the third quarter of 2016 from 13.3% in the second quarter, 12.1% in the first quarter 2016, 10.4% in the fourth quarter 2015 and 9.9% in the third quarter 2015 (NBS 2018). The number of people who are underemployed in the labor force (those working but doing menial jobs not commensurate with their qualifications or those not engaged in fulltime work and merely working for few hours) increased by 501,074 or 3.25%, resulting in an increase in the underemployment rate from 19.3 % in the second quarter of 2016 to 19.7% (15.9 million persons) in the third quarter of 2016. Generally, there were a total of 27.12 million persons in the Nigerian labor force in the third quarter 2016, that were either unemployed or underemployed compared to 26.06 million in the second quarter and 24.5 million in the first quarter of 2016. NBS (2018) equally revealed that the unemployment rate increased from 18.8% in Q3 2017 to 23.1% in Q3, 2018. Currently as a as a result of the Covid-19 global pandemic many people have lost their jobs and many jobs are in jeopardy in the near future. The pandemic has worsened the unemployment situation in Nigeria. For instance, the unemployment rate in Nigeria before the pandemic stood at 23.1 per cent (CSEA, 2019; National Bureau of Statistics, 2018; NSEG, 2019). However, due to the pandemic, the unemployment rate is estimated to rise to about 33 per cent by the end of 2020 (Obiezu, 2020).

One of the dangers of high rate of unemployment in the economy is that it involves loss of income which affects the standard of living of those who are involved. Also, the loss of individual incomes in the economy will reduce the aggregate income (through reduction in tax) which affects the ability of the government to raise

enough revenue necessary to run its administration. This will generally affect many sectors of the economy including health sector. Given the high rate of unemployment and lower public health spending in the Nigerian economy, the health status of the Nigerian economy remains very uncertain. According to United Nations International Children's Emergency Fund (UNICEF (2015) "every single day, Nigerians loses about 2300 under five years old and 145 women of child bearing age, this makes Nigeria the second largest contributor of maternal mortality and under five death in the world". Moreover, according to World Health Organization statistics (2015) Nigeria is among the lowest country in terms of life expectancy which is seen clearly from the graph below.

Also, figure 1.4 below shows under5 mortality rate in some sub Saharan Africa countries. From the graph below, Nigeria is seen to be the 5th highest in terms of under5 mortality rate per 1000 live birth with under5 mortality rate of 113 compared to other countries included in the sample. Country like Guinea Bissau spent less than Nigeria any yet is better in terms of under5 mortality. This is very challenging to the Nigerian economy and therefore calls for more effort on the part of the government before the situation becomes worse.

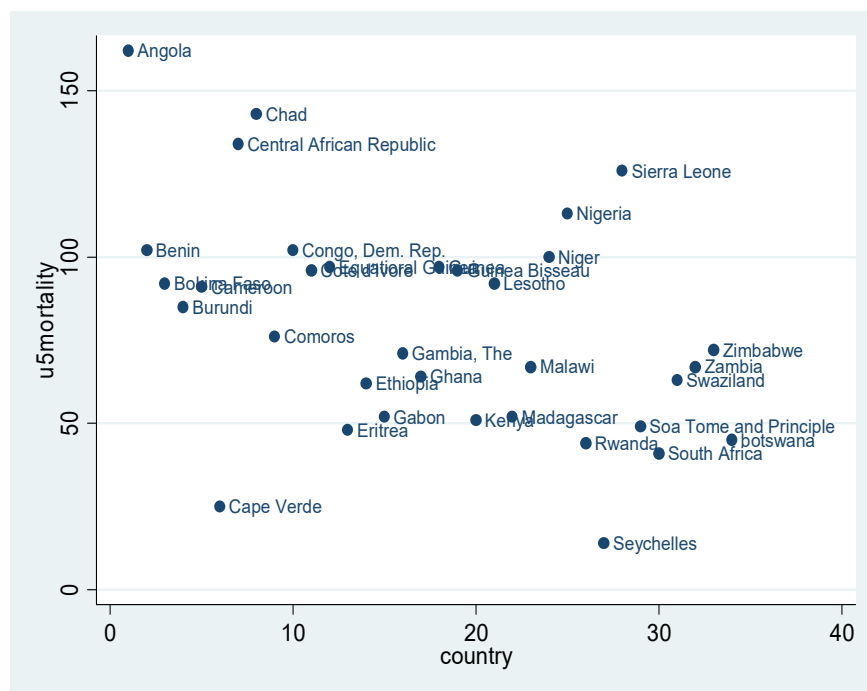


Figure 1.4 Under5 Mortality Rate in Some Sub Saharan African countries

Source: Authors' plot using data from World Bank Development indicator 2016
Thus, the facts and statistics above indicate that the rising rate of unemployment and the lower public health spending in the Nigerian economy needs an immediate attention by the government, policy makers and other stakeholders of the economy to avoid further increase in morbidity and mortality rates and to reduce the high rate of morbidity and mortality that we have in the economy presently.

According to Wagstaff (1986) one of the issues currently under debate concerns the impact of unemployment on health. Involuntary unemployment has been found to result in serious deteriorations in physical and mental health of those who are involved. The rate of unemployment has been found by many scholars to have a positive relationship with health. Studies like Gasper (2009), Halliday (2013), Iyabo (2016), Mork, Sjogren and Svaleryd (2014), Schmitz (2011) discovered that high rate of unemployment causes poor health in the economy. Mork et al (2014) in particular discovered that children whose parents are unemployed are 17 percent more likely to be hospitalized than other children whose parents are working. On the other hand, studies such as; Buchmueller, Grignon and Jusot (2006) and Ruhm (2000) have found that unemployment has a negative relationship with mortality and it is strongest for deaths due to cardiovascular disease and accidents. Furthermore, studies such as Orji and Okechukwu (2015), Orji, Okechukwu and Ogbuabor (2014), Onisanwa (2014) among others have been done in the areas of income and health, health and economic growth, among others, but none of the papers cited above focused specifically on unemployment and health outcomes in Nigeria. In view of these divergent opinions and findings in the literature and the need to unravel the empirical relationship between the two variables, this study therefore investigates the impact of unemployment on health outcomes in Nigeria. The rest of the paper is structured as follows: Section 2 focuses on the literature review, Section 3 is one methodology while section 4 deals with the results and discussion. Section 5 concludes the paper and provides relevant policy recommendations.

2.1 Empirical Literature Review

There are few studies done in this area but many researchers have not yet arrived at an agreement on the relationship that exists between unemployment and health situations across different economies. For example, Wang (2015) studied the short run and long run effects of unemployment rate on the health outcomes of the Chinese population using provincial data for 31 provinces from 1990-2011. Total mortality rates per 1000 people in each province were used as a proxy to measure population health. Findings indicate that unemployment has a positive relationship with mortality in china. Therefore the findings of this study suggest that increased

unemployment will be harmful to population health. Fixed effect model and infinite distributed lag (IDL) model was applied for the analysis, instrumental variable and 2-step GMM estimation technique was applied for the estimation of the models.

Sede and Ohemeng (2015) in their study of socioeconomic determinants of life expectancy in Nigeria found that unemployment has a statistically significant impact on life expectancy in Nigeria. Time series data ranging from 1980- 2011 was used for the study while vector autoregressive (VAR) and vector error correction (VEC) method was used for the analysis. Iyabo (2016) examined the psychological impacts of unemployment and underemployment on the mental health of Nigeria youths and the place of good governance and agricultural revolution as solution. A self-constructed 25 item questionnaire was used to elicit information from the 167 subjects for the study. Findings indicate that unemployment is a stressful life event. The results also reveal that the perceived level of stress due to unemployment among both male and female were not significantly different. The finding of this study is in consonance with the findings of wang (2015) and Sede and Ohemeng (2015). These studies point to the fact that unemployment is detrimental to health.

Furthermore, using panel data regression with random effect model, Brenner (2016) examined the effect of unemployment on heart disease and stroke mortality in the European Union countries. Unemployment rate of 2000-2010 for heart disease and unemployment rate of 2000 -2011 for stroke mortality was used for in the study. The main finding of the study is that increases in the rate of unemployment are related to increased heart disease and stroke mortality in the European Union countries. A study by Dallolio et al (2015) on the socioeconomic factors associated with infant mortality in Italy using data on 20 Italian regions in the year 2006-2008, found that unemployment rate has the strongest correlation with infant mortality rate among the four socioeconomic variables included in the in study, though all the variables were found to be significant. The study used pearson correlation coefficient to measure the correlation between infant mortality rate and four socioeconomic determinants.

Another study on the impact of county unemployment on mortality during the great recession published in 2016 by Ha and Huong, found that unemployment in the United States during the great recession has statistically insignificant impact on mortality. Ordinary Least Square (OLS) and Two Stage Least Square (2SLS) estimation technique was used for the analysis. Their findings indicate that the insignificant relationship holds for males and females, for all age groups, and for almost all categories of mortality excluding cases of mortality caused by Alzheimer's, poisoning, and homicide. The finding of the study in line with the findings of

Schmitz (2011) though the context are different. One thing similar in the two studies is that both studies used exogenous sources of unemployment.

Tekin (2015) studied the relationship between unemployment and health in California using the Ordinary Least Square (OLS) technique. The study was divided into two groups. In the first group, the impact of unemployment on health using county unemployment rate measured at the monthly level derived from Local Area Unemployment Statistics (LAUS) Program of Bureau of Labor Statistics (BLS) was studied. In the second group, the impact of unemployment on health using individual unemployment data from the Behavioral Risk Factor Surveillance System (BRFSS) was studied. The findings indicate that the relationship between health and unemployment measured at the state level is too small to have any meaningful implication. On the other hand, when unemployment was measured at the individual level, his findings indicate that there is a negative impact of individual unemployment on both physical and mental health.

Using data on total mortality rate from the Panel Study of Income Dynamics (PSID), Halliday (2013) studied the relationship between county unemployment rate and mortality risk in the United States. The study employed a logistic (binary) regression on a sample of over 16000 individuals and found that poor local labor market conditions (that is conditions of high rate of unemployment) are associated with higher mortality risk for working-aged men. In particular, the findings of this study indicate that a one percentage point increase in the rate of unemployment increases their mortality hazard by 6%. These findings however are in line with the findings of Gasper (2009), Dallolio (2015), Sede and Ohemeng (2015), Wang (2015) and Brenner (2016) and their studies suggests that high rate of unemployment pose health risks to individuals through reduced income, stress etc.

Summarily, the impact of unemployment on health outcome on the other hand cannot be overlooked in recent times. According to Wagstaff (1986), one of the issues of health determinants currently under debate concerns the impact of unemployment on health. Previous studies linking unemployment and health outcome are very scanty in developing particularly in Nigeria as compared to developed countries. From the studies reviewed only few of these literatures studied the impact of unemployment on health in developing countries and Nigeria in particular. For example, Wang (2015) studied the short run and long run effects of unemployment rate on the health outcomes of the Chinese population. Sede and Ohemeng (2015) studied the effect of socioeconomic determinants of life expectancy in Nigeria. As earlier stated, the rate of unemployment has been found by many scholars to have a positive relationship with health. Studies like Gasper

(2009), Halliday (2013), Iyabo (2016), Mork, Sjøgren and Svaleryd (2014), Schmitz (2011) discovered that high rate of unemployment causes poor health in the economy. On the other hand, studies such as; Buchmueller, Grignon and Jusot (2006) and Ruhm (2000) have found that unemployment has a negative relationship with mortality and it is strongest for deaths due to cardiovascular disease and accidents. In view of this divergent perspectives in the literature, this study will therefore add value to existing literatures on developing countries and Nigeria in particular by empirically investigating the link between unemployment and health outcome in Nigeria.

3. Methodology

3.1 Theoretical Framework

The theoretical framework for this study is based on two strands of theories namely; the Grossman (1972) model of health capital and Wagstaff (1986) theory of demand for health. The main reason for adopting these models is due to their view on health and the use of health production function in explaining health outcomes as well as their view on the importance of measuring other factors that affect our health apart from medical care.

The Grossman (1972) model is basically concerned with how individuals allocate their resources to produce health. The model sees health as a commodity which deteriorates with time and therefore needs investment in both health (health care) and non-health factors (education) in order to improve health. This model follows unconstrained utility maximization and health production function in the analysis of health. In the utility maximization theory, the individual aims to maximize utility subject to given constraints. The model posits that as individual seeks to maximize his health, he does so by investing in himself to produce the health status desired. In the health production theory, the Grossman (1972) model presents the individual as one whose demand for health input is a derived demand not necessarily for consumption but to produce the desired health outcomes. The individual does this by acquiring inputs such as health financing which can be public or private, education, income, food (balanced diet), trained health professional, etc so as to produce the desired health outcomes which can be measured in terms of improved health status such as reduced mortality, improved life expectancy and reduction in morbidity rate.

The health production function can be specified as:

$$H = f(X) \tag{3.1}$$

Where H is a measure of individual health output and X is a vector of individual inputs to the health production function. The elements of the vector of inputs includes: nutrient intake, income, consumption of public goods, education, time devoted to health related activities, health financing which can be public or private and trained health professional.

Wagstaff (1986) in his book “Demand for Health; Theory and Practice” posits that medical care is not the only variable that affects health. There are other important variables that affects health and these variables includes; work environment, income, unemployment, class differences in health, food, heating, housing condition, etc. Wagstaff (1986) noted that involuntary unemployment may result in serious deterioration in the mental and physical health of those who are concerned. The major components or assumptions of the Wagstaff theory is, the indifference map, the budget constraint and the health production function. The health production theory according to Wagstaff (1986) describes the relationship between health inputs and outputs. This model like the Grossman (1972) model of demand for health sees the individual as producing his or her output (good health) by combing health inputs (medical care and other non- health commodities) in other to produce the desired output (good health).

In other to specify a model that is consistent with literature and allow for the identification of the channels through which government expenditure and unemployment affects health outcomes in Nigeria over time, a multiple regression model was specified in the next section. Given the nature of the study, Ordinary Least Square (OLS) was employed as the estimation technique and the reasons for adopting these techniques is stated in section 3.3 of this study. The choice of variables to be used was based on the objective of the study and on the availability of data.

3.2 Model Specification

Following the works of Akpan and Riman (2010), Orji, Nwanosike, Okafor and Umehiobi (2015), Gaspar, et al. (2009) and the theoretical underpinnings comprising Grossman (1972) and Wagstaff (1986), the following models will be specified in other to achieve the objective of the study.

The objective of the study is to determine the extent to which unemployment contributes to health outcomes in Nigeria. Health and unemployment is likely to have a bi-directional relationship (unemployment can lead to ill health and ill health can lead to be probability of being unemployed). In other words there is need to

consider the issue of endogeneity in specifying the model. Hausman test of endogeneity was conducted to ensure that unemployment and health are truly exogenous before using OLS so as to get consistent and efficient estimates of the parameters. Following and modifying the work of Gaspar, et al. (2009), the following model is specified;

$$H = f(\text{UR}, X) \dots \dots \dots 3.1$$

Where H = Health outcome, UR = unemployment rate and X = vector of exogenous variables. In this study, morbidity rate (prevalence of disease in the economy) was used to measure health outcomes. Based on this, this study used prevalence of anemia among children (% of children under 5) in Nigeria to measure morbidity.

Equation 3.1 can be specified econometrically as;

$$\text{PreAM}_t = \beta_0 + \beta_1 \text{UR}_t + \beta_2 \text{MAL}_t + \beta_3 \text{GHEX}_t + \epsilon_t \dots \dots \dots 3.2$$

Where PreAM = prevalence of anemia morbidity in the economy. This is prevalence of anemia among children (% of children under 5). This is the number of cases of anemia among children in a particular population at a given time. Morrone, Nosotti, Piombo, Scardella, Spada, Pitidis (2010), Subhani, Anwar, Khan, Jeelani and Fatima (2015) linked unemployment to be one of the factors contributing to high prevalence of anemia both among pregnant, non-pregnant and other people in the economy.

UR = unemployment rate in the economy. It is the percentage of the active labor force that do not have job but are seriously seeking for job. Brenner (2016), Gaspar, et al (2009), etc found that unemployment leads to deterioration in health and ill health can also lead to increase in unemployment after endogeneity is treated. MAL = malnutrition. Malnutrition is a condition that results from eating a diet in which nutrients are either not enough or are too much such that causes health problems. Martins, et al (2011) also linked malnutrition to poor health outcomes. GHEX = Government health expenditure. This consists of recurrent and capital spending from government budget, external borrowings, grants and health insurance funds to the health sector. Government recurrent health expenditure was used to measure government health expenditure in this study. Anyanwu and Erhijakpor (2007), Novignon, Olakojo and Nonvignon (2012), Makute and O'Hare (2015), found that government health expenditure has a significant impact in reducing mortality and improving life expectancy. β_0 is the intercepts; β_i is the slope coefficient and ϵ_t is the error term.

Taking the natural logarithm of both sides of equation 3.2 and still assuming linearity among the variables gives;

$$\text{PreAM}_t = \beta_0 + \beta_1 \text{UR} + \beta_2 \text{LogMAL}_t + \beta_3 \text{LogGHEX}_t + \varepsilon_{1t} \dots \dots \dots 3.3$$

The variables UR and PreAM are not logged because they are already in percent. As stated above, we suspect the issue of endogeneity in the above specification. The endogeneity comes from the fact that unemployment may be endogenous and therefore likely to be correlated with the error term ε_t . This is because any factor in ε_t (for example, family background) affects health (people born to family where anemia is hereditary are likely to have anemia) and having a chronic anemia disease can increase the probability of those involved being unemployed (to take care of their health). This implies that β_1 above which is supposed to estimate only the effect of unemployment on health may be estimating both the effect of unemployment and ε_{1t} (family background) on health which violates one of the assumptions of OLS that the endogenous variables (unemployment) should be independent of the error term. Therefore Hausman simultaneity test was used to test whether the endogenous variable (unemployment) is in fact correlated with the error term. The test result shows that there is no endogeneity problem, so we applied OLS. The result of the Hausman test is presented in Table 4.1

3.3 Justification of the Model

The choice of the variables and model of this study is based on the objective of the paper. The OLS technique and multiple linear regression models is chosen to achieve the objectives of this study because it has a probability limit that goes to one as the sample size increases. Moreover, OLS estimates have strong statistical properties (BLUE), which means that it is Best Linear Unbiased Estimate (Gudjarati & Porter, 2009). Again, the computational procedure is fairly simple and straight forward when compared to other methods (Koutsoyannis 1997). Many other studies reviewed also utilized this method to estimate the impact of public health spending on health. Some of this study includes; Azinim, Sackey and Keyeke (2013), Zahra, Sara and Arash (2015), Orji, Nwanosike, Okafor and Umesiobi (2015), Okeke (2014), Nwankwo (2012), etc.

3.4 Estimation Procedure

The estimation started by insuring that the variables in their behaviors conform to the assumptions of the classical regression model. As a result, the time series properties of the data will be examined in order to avoid spurious results as a result of the non-stationarity of the data series and to analyze the dynamic structure of the relationship.

3.4.1 Simultaneity Test

According to Gujarati and Porter (2009), the methods of OLS will give consistent and efficient estimator when the endogenous variables or regressors are independent of the error term. If the method is applied where there is endogeneity problem, the estimators obtained will no longer be consistent and efficient (that is, with smaller variance). Therefore Hausman simultaneity test was used to check whether the endogenous variable (unemployment) in model 3.3 is in fact correlated with the error term. This test followed chi-square distribution with k-degrees of freedom where k is the number of endogenous regressors. The null hypothesis is that the variables are exogenous and the rejection criterion is that we reject H0 if the computed $(n)R^2$ is greater than the chi-square distribution at k degrees of freedom. That is reject H0: if $(n)R^2 > \chi^2_{(k)}$ at 5% level of significance. N is the number of observation.

4. Results and discussion

4.1 Presentation of the Unit root test – ADF

The study used the augmented Dickey Fuller technique to test for unit root of the dependent, explanatory and instrumental variables used in the model and the results are presented in Table 4.1 below.

Table 4.1 Unit Root results for all Variables

Variable	Trend or no trend	(ADF _{cal})	(ADF _{tab})	Order of Stationarity	Level of significance
GHEX	Trend	-5.468781	-4.356068	I(1)	1%
UR	Trend	-5.655691	-4.323979	I(1)	1%
PreAM	Trend	-5.848174	-4.323979	I(1)	1%
MAL	Trend	-3.871297	-3.595026	I(0)	5%

Source: Authors' Computation based on E-view output

Table 4.1 shows that PreAMt, UR, GHEXt are stationary at first difference while MAL is stationary at levels. These variables were differenced at first level to ensure stability. The fact that there exists unit root for some of the variables is a necessary condition for co-integration. Therefore, there is need to carry out co-integration test (which is the unit root test of the residuals of each regression). Co-integration is aimed at testing the long –run relationship of the variables, wherein if it is validated then it means there is a problem that needs to be corrected with the error correction model. From the table above, the unit root test of the residual carried out on each regression indicates that there is no co-integration in any of the regression since the

test indicates that the residuals are not stationary at level. This implies that the sufficient condition for an error correction model is not satisfied; therefore we conclude that there exists no long-run relationship amongst the variables and run the regression simply.

4.2 Regression Results of Unemployment and Health Outcomes

To ascertain the extent to which Nigerian unemployment rate contributes to health outcomes in Nigeria; we first of all ran the Hausman test of simultaneity to ensure that unemployment is independent on the error term. The test is necessary due to the nature of the relationship between unemployment and health. The Hausman test is conducted and the results are presented in table 4.2 below.

The Hausman Test of Simultaneity

The null hypothesis is that unemployment is exogenous. If the null-hypothesis of exogeneity is rejected, then the variable initially perceived as endogenous was indeed endogenous and OLS will not be justified but if unemployment is exogenous, OLS will be justified.

Table 4.2 The Hausman Simultaneity Test

Variables	Coefficient	Std.error	t-statiscs	probability
UR	-0.012487	0.002983	-0.602815	0.5521
Residual	0.001406	0.003753	0.374720	0.7110
Constant	0.012487	0.019037	0.655921	0.5179
R ² = 0.46419	N = 30			
(N)R ² = 0.46419	$\chi^2_{(1)} = 3.84146$			

Source: Authors' computation based on eview's output.

The null hypothesis is H₀: the variables are exogenous hence there is no simultaneity problem in the specification. From the results above, the coefficient of the residual is statistically insignificant. Therefore we do not reject the hypothesis of no simultaneity. Alternatively, the Hausman test follows chi-square distribution with degrees of freedom equal to k (k = the number of endogenous regressors). The rejection criterion is that we reject H₀ if the computed (n)R² is greater than the chi-square distribution at k degrees of freedom. That is reject H₀: if $(n)R^2 > \chi^2_{(k)}$ at 5% level of significance. From the results above, we cannot reject the H₀ and therefore we conclude that unemployment rate is exogenous, hence there is no endogeneity problem in the specification. We therefore estimate model using OLS.

The Breusch Pagan-Godfrey Test of Heteroscedasticity

We also tested to be sure that the assumption of homoscedasticity and autocorrelation is not violated before running the regression on the impact of unemployment on the prevalence of disease in the economy which is the objective of this study.

From the result obtained for the model, $n \cdot R^2 = 6.390825$ and $\chi^2_{\text{tab}} = 9.48773$, Therefore we accept the null hypothesis that the error terms are homoscedastic at 5% level of significance.

The Breusch-Godfrey (BG) test for Autocorrelation.

From the result obtained for the model $(n-2) \cdot R^2 = 1.380016 < \chi^2_{\text{tab}} = 5.99147$, Therefore we cannot reject the null hypothesis and we conclude that there is no serial correlation of any other at 5% level of significance.

Therefore having obtained that the assumptions of heteroscedasticity and homoscedasticity is not violated; we ran the regression as specified in section three above. The regression results are presented in table 4.3 below.

Table 4.3 Regression Results of Unemployment and Health Outcomes
Dependent Variable: PreAM (prevalence of anemia morbidity)

Variables	Coefficient	Std.error	t-statiscs	probability
UR	-0.004514	0.003103	-1.454676	0.1582
GHEX	-0.014938	0.001973	-7.570967	0.0000
MAL	0.014449	0.005430	2.661115	0.0134
PreHIV	0.059222	0.011142	5.315356	0.0000
Constant	4.299457	0.025582	168.0667	0.0000
R-square = 0.804677	adjusted R-square = 0.77343			
Durbin Watson = 1.606461	Prob F-statistics = 0.000000			
N = 30				

Source: Authors' computation based on e-view's output.

From the regression result on Table 4.3 above, the overall significance of model one is good as the probability value of the F-statistics is very low (0.0000), and the R^2 is equally high (0.804677) suggesting that 80% variations in the dependent variable (prevalence of anemia morbidity) is being accounted for or is being

explained by the variations in the explanatory variables. The value of the Durbin Watson is (1.606461) which still falls in the zone of indecision; we can therefore not state categorically that there exist strong positive or negative autocorrelation. The fact that it doesn't fall in neither of the extreme auto correlated regions permits us to welcome the results. However the Breusch-Godfrey test of autocorrelation conducted in section 4.4.2 above indicates no autocorrelation of any order.

The objective of this study is to ascertain the extent to which unemployment contributes to poor health outcomes in Nigeria. The coefficient of unemployment rate is negative which implies that unemployment rate is negatively related to morbidity rate. This finding is in line with the findings of Buchmueller, Grignon and Jusot (2006) and Ruhm (2000). According to Buchmueller, Grignon and Jusot (2006), when the level of employment is low in the economy, pollutions and road congestion will be low thereby causing positive externalities that affect both workers and non-workers alike thus reducing the rate of mortality and morbidity in the economy. Ruhm (2000) found that health improves when the economic activity (measured with state unemployment rate) deteriorates temporarily but that this effect disappears in the long run if economic growth is sustained. However, many other studies found a positive relationship with unemployment and health for example, Gasper (2009), Halliday (2013), Brenner (2016), Mork, Sjogren and Svaleryd (2014), Lundin et al (2010). However, the results above show that unemployment rate does not have any significant impact on health outcome (measured with the prevalence of anemia morbidity) in Nigeria since the probability value is 0.8442 which is greater than 0.05. Thus we accept the null hypothesis that unemployment does not contribute to poor health outcomes in Nigeria. This finding therefore conforms to the findings of Ha and Huong (2016) and Tekin (2015) who discovered that state or national unemployment rate does not have any meaningful impact on health outcomes. The studies found instead that individuals who are unemployed have worse health outcomes than those who are employed regardless of what the national unemployment rate is. That is, individual unemployment was found to have a statistically significant impact on health outcomes compared to state or national unemployment rate. This study however did not account for individual level unemployment rate due to availability of data and time factor. That becomes a point of departure for further studies.

Interestingly, the effect of government health expenditure on health outcomes in Nigeria remains the same irrespective of the health outcome measure used. Government health expenditure is found to have a statistically significant impact on the prevalence of anemia morbidity in Nigeria since the probability value is 0.0000 which is less than the threshold 0.050 and 0.010 hence significant at 1% level of

significance. The coefficient of government health expenditure is negative which implies that government health spending is negatively related to the prevalence of anemia morbidity in Nigeria. Hence a one percent increase in government health spending in Nigeria reduces the prevalence of anemia morbidity significantly by 1.4938%. This result conforms to a priori expectation since increase in public health spending is expected to improve public health infrastructure which provides the country with the capacity to prevent disease, promote health and prepare for and respond to both acute (emergency) threat and chronic (ongoing) challenges to health in the economy. Increase in government health spending is also expected to improve public health facilities (like public hospitals, clinics, outpatient care centers and specialized care centers), and increase standards for health workers. All these improvement to health as a result of increase in public health spending should lead to reduction on the prevalence of disease in the economy all other things being equal. This finding is in line with the findings of Akpan and Riman (2012) who found that the high rate of infant mortality and morbidity in Nigeria is due to high incidence of out of pocket health care financing and high income inequality in the country.

Malnutrition (measured with the prevalence of undernourishment in the economy (% of population)) is found to have a statistically significant impact on the prevalence of anemia morbidity in the economy since its probability value is (0.0134) which is less than the threshold 0.050. The coefficient of malnutrition is 0.014449; hence a 1% increase in the percentage of the population that are undernourished increases the prevalence of anemia morbidity in the economy by 1.4449%. This therefore suggests that the government of Nigeria need to make effort to increase the percentage of the population that has access to quality food in the economy so as to reduce the prevalence of the rate of morbidity in the economy and thus improve health outcome.

Prevalence of HIV in the economy has a positive relationship with the prevalence of anemia morbidity in Nigeria and therefore conforms to a priori expectation. The coefficient of HIV prevalence is 0.059222 and is statistically significant at 1% level since its probability value is (0.0000) which is less than the threshold 0.050. This implies that prevalence of HIV in the economy has a statistically significant impact on the prevalence of anemia morbidity in Nigeria. Hence a 1% increase in the number of people living with HIV in Nigeria increases the prevalence of anemia morbidity by 5.9222% or approximately 5%. This therefore suggests that the government of Nigeria need to make effort to reduce the prevalence of HIV in the economy in other to reduce the prevalence of disease in the economy. This finding is in line with the findings of Anyanwu and Erhijakpor (2007).

5. Recommendations and conclusion

5.1. Policy Recommendations

In view of this and other results found in this study, we therefore recommend the following: First, the government should create life-saving jobs and enhance national security for the citizens in order to reduce deaths that occur as a result of employment in certain sectors of the economy. Occupational hazards should be minimized in earnest to safeguard the health of the masses. Second, there is need for an effective National Food and Nutritional Policy in order to improve health and reduce morbidity of the populace. The nutritional policy will help to improve food security at the national, state, community and household levels, significantly and reduce micronutrient deficiency disorders, especially among the vulnerable group. It will also help to increase the knowledge of nutrition among the populace. Nutrition education should also be incorporated into formal and informal trainings. This is important because adequate food and optimal nutritional status are the foundation blocks for the building of healthy life. Third, the campaign against HIV scourge in the country should be beefed up since the study also found that high prevalence of HIV in the economy contributes significantly to negative health outcomes. Thus, government should make good budgetary allocation to fight the scourge of HIV in order to save the lives of the masses. Fourth, there is need to increase spending on health and monitor budgetary allocations to health effectively. This is because being in good health determines every other activity that goes on in the economy. Essentially, health status have impact on not just on population health but also on national economy, households and individuals. Therefore putting health high on the political agenda and implementing the necessary health policies will uplift national productivity (which seems to be the major objective of every economy). It is obvious that healthier people work more and are physically and cognitively stronger. Fifth, there is need to improve public health facilities (like public hospitals, clinics, outpatient care centers and specialized care centers), and increase standards for health workers. Increase in public health spending will also help to achieve a broader set of health system outcomes which include; improvement in population health (both in levels attained and in distribution); enhanced responsiveness of the health system to the legitimate expectations of the population; and fairness in health care financing and financial risk protection (that is to ensure that the poor households do not pay a higher share of their discretionary expenditure on health than the richer households and all households should be protected against catastrophic financial losses related to health). Finally, government and federal ministry of health should ensure efficiency in health care spending and equity in distribution of health care facilities. The poor and the informal sectors of the economy which constitute about 70% of the population should be given the

utmost priority. If health insurance will cover both the informal sector and not only the formal sector of the economy, it will help the country a lot in achieving a broad health coverage.

5.2 Conclusion

Government expenditure has often been considered as one of the most significant fiscal policy instruments alongside taxation and subsidies. Also, one of the issues currently under debate concerns the impact of unemployment on health as involuntary unemployment has been found to result in serious deteriorations in physical and mental health of those who are involved (Wagstaff, 1986). Therefore the primary policy concern that motivated this research was to investigate the impact of public health expenditure and unemployment on health outcomes in Nigeria. The study employs time series data between 1985 and 2014 from World Bank Development Indicator database (2016) and CBN statistical bulletin. The findings indicate that unemployment rate has negative impact on health outcomes in Nigeria. According to Tekin (2015), individuals who are unemployed have worse health outcomes than those who are employed regardless of what the national unemployment rate is. This means that individual unemployment impacts on health outcomes whether at the state or national level. Apart from government health expenditure, the study found that malnourishment is another important determinant of anemia morbidity prevalence in the economy. This implies that the lack of good feeding pattern also contributes to anemia disease in the economy. The study therefore recommends that the government should create decent jobs and enhance job security for the citizens in order to reduce deaths that occur as a result of employment in certain sectors of the economy. Occupational hazards should be minimized in earnest to safeguard the health of the masses. Again, there is need for an effective National Food and Nutritional Policy in other to improve health and reduce morbidity among the populace.

References

- Akpan, E. S. and Riman, H. B. (2012). 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.
- Anyanwu, C and Erhijakpor E. O. (2007). Health expenditure and health outcomes in Africa. *African Development Review*, 21(2), 400-433.
- Azinim, A., Sackey, G. and Keyeke, G. (2013). Relationship between public spending and health status in Ghana. *Journal of Economics and Sustainable Development*, 4(11) 88-99.

- Brenner, M. (2016). The impact of unemployment on heart disease and stroke mortality in the European Union countries. European Commission. Available at www.ec.europa.eu.
- Buchmueller, T., Grignon, M. and Jusot, F. (2006). Unemployment and Mortality in France (1982-2002). An analysis. <http://www.business.unsw.edu.au/>.
- Central Bank of Nigeria (2014). Statistical Bulletin: Government Expenditure. Volume 25 December 2014.
- Gaspar, K. (2009). The relationship between unemployment and health. Unpublished Msc Economics thesis. Department of Economics, Central European University.
- Gerard J. van den Berg, Paul, A, Reinhold, S. (2020) "Economic conditions and the health of newborns: Evidence from comprehensive register data" *Labour Economics Volume 63, 101795*
- Ha, N. and Huong, N. (2016). Unemployment and Mortality: Evidence from the Great Recession. Policy Research Working Paper series 6703.
- Halliday, J. (2013). Unemployment and Mortality: Evidence from the Panel Study of Income Dynamics (PSID). IZA Institute of labor economics. Discussion paper series No. 7157.
- Institute of Work and Health (2009). Unemployment and mental health. Retrieved from <https://www.iwh.on./briefings/unemployment-and-mental-health>.
- Johansson, E.; Bockerman, P; Lundqvist, A. (2020) "Self-reported health versus biomarkers: does unemployment lead to worse health?" *Public Health 179 (2020), 1 2 7-1 3 4*
- Lundin, A. (2011). Unemployment and mortality and morbidity: Epidemiological Studies. Unpublished Phd thesis. Department of public health sciences. Karolinska Institute, Stockholm, Sweden.
- Lundin, A., Lundberg, I., Hallsten, L., Ottosson, J. and Hemmingsson, T. (2010). Unemployment and mortality: A longitudinal prospective study on selection and causation in 49 321 Swedish middle aged men. *Journal of Epidemiology and Community Health, 64 (01) 22-n/a*.
- Makute, I. and O'Hare, B. (2015). Quality of governance, public health spending and health status in sub Saharan Africa. *BMC Public Health. 2015; 15:932*. doi: 10.1186/s12889-015-2287-z. [PMC free article] [PubMed] [Cross Ref].
- Martin, V. J., Toledo, T. M., Grillo, L. P., Franco, P. C., Martins, P. A., Paula, A. G., Santos, D. L., Viera, M. A. and Sawaya, A. L. (2011). *International Journal of Environmental Resources 8(6) 1817-1846*.
- Mork, E., Sjogren, A. and Svaleryd, H. (2014). Parental Unemployment and Child Health Institute for Evaluation of Labor and Education Policy (IFAU) Working Paper Series (8). Sweden.

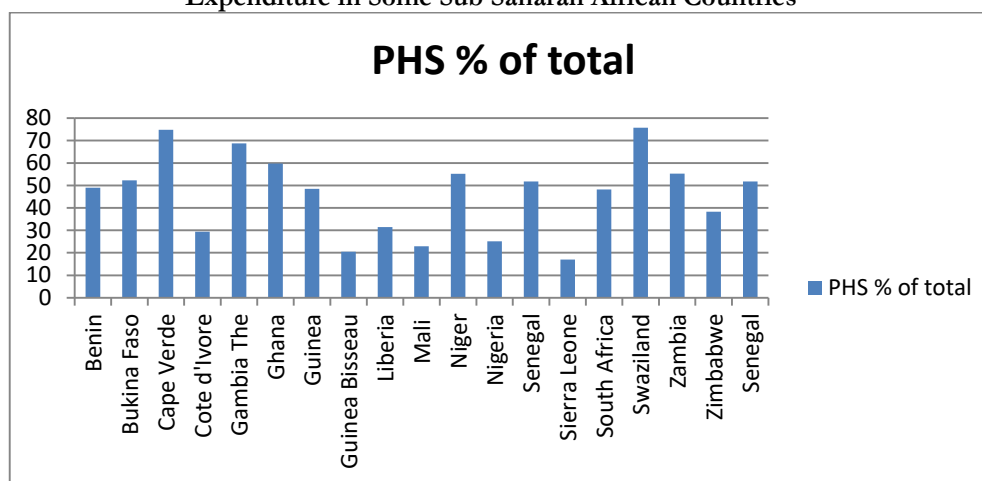
- Morrone, A., Nosotti, L., Piombo, L., Scardella, P., Spada, R. and Pitidis, A. (2010). Iron deficiency anemia prevalence in a population of immigrated women in Italy. *European journal of public health* 22(2) 256-262.
- National Bureau of Statistics (2016). Unemployment and underemployment watch Q1 2016. Retrieved from www.google.com.ng/unemployment+rate+in+nigeria/.
- National Bureau of Statistics (2016). Unemployment/Underemployment Report Quarter 3 2016. Retrieved from www.nigeriastat.gov.ng.
- National Bureau of Statistics (2010). National Manpower Stock and Employment generation Survey. Household and Micro enterprise. Retrieved from www.nigeriastat.gov.ng.
- National Directorate of employment. About National Directorate of Employment (NDE). Retrieved from <https://ndenigeria.wordpress.com/about>.
- Nigerian Department of Health (2004). Revised national health policy (pp 3-13). Nigerian: Nigerian Ministry of health.
- Novignon, J., Olakojo, A. and Nonvignon, J. (2012). Effect of health care expenditure on population health status in Sub Saharan African countries. *Health Economics Review: a SpringerOpen journal* 2(22) 1-8/.
- Nwankwo, E (2012). The effect of public health expenditure on maternal mortality in Nigeria. Unpublished Msc economics thesis. Department of economics, university of Nigeria Nsukka.
- Okeke, C (2014). Impact of public sector spending on health and education spending in Nigeria. Unpublished Msc economics thesis. Department of economics, university of Nigeria Nsukka.
- Oluwatoyin, A., Folasade, B. and Fagbeminiyi, F. (2015). Public Health Expenditure and Health Outcomes in Nigeria. *International Journal of Financial Economics* 4(1), 45-56.
- Orji, A, and Okechukwu E. (2015) Income, Income Distribution and Health Outcomes in Nigeria: Empirical Evidence from National Demographic and Health Surveys. *The Nigerian Journal of Economic and Social Studies* 57(1), March 2015. ISSN. 00290092
- Orji, A., Nwanosike, U., Okafor, C. and Umesiobi, S. (2015). The impact of progressive health Spending on health outcomes in Nigeria: The Case of Malaria. *International Journal of Academic Research in Business and Social Sciences*, 5(12) 1-12
- Orji, A, Okechukwu E., and Ogbuabor, J.E (2014) "Do Income and Income Distribution affect Health Outcomes in Nigeria?" *International Research Journal of Finance and Economics, Issue 125: 46-61.*

- Paul, I. and Benard, B. (2009). The need for work: Jahoda's Latent functions for employment in a representative sample of the German population. *Journal of organizational Behaviour* 31(1) 45-64.
- Ruhm, C. (2000). Are Recessions Good for Your Health? *Quarterly Journal of Economics* 115(2): 617-650.
- Schmitz, H. (2010). The causal effect of unemployment on health: Why are the unemployed in worse health? *Labor Economics (ELSVIER)*, 18 (2011) 71-78.
- Subhani, S., Anwar, S., Khan, A., Jeelani, G. and Fatima, N. (2015). Poverty a Burning Global Issue Leading to Anemia in India. *Journal of finance and economics* 3(3) 61-63.
- UNICEF Nigeria (2015). Girls' Education factsheet. Available at <https://www.unicef.org/wcaro/wcar>.
- UNICEF Nigeria (2013). Maternal and Child Health. An analysis. Retrieved from www.unicef.org/nigeria/children_1926.html.
- United Nations Development Programme (2014). Sustaining Human Progress: Reducing Vulnerabilities and building Resilience. Human Development Report (2014). Retrieved from hdr.undp.org.
- Wagstaff, A. (1986). The demand for health: theory and applications. *Journal of Epidemiology and community health* ,40(1) 1-11.
- WHO (2016). World Health Organization's ranking of the world's health system. World Health Report. <https://www.thepatientfactor.com/Canadian/health-care-information/world-health-organizations-ranking-of-the-worlds-health-systems/>.
- World health statistics (2013). WHO Library Cataloguing-in-Publication Data. Health Status Indicator. Retrieved from www.who.int/gho/publications/world_health_statistics/2015/en
- World health statistics (2015). WHO Library Cataloguing-in-Publication Data. Health Status Indicator. Retrieved from www.who.int/gho/publications/world_health_statistics/2015/en
- World Bank Group (2016). World Development Indicator: Health System. World Bank Report. <https://www.wdi.worldbank.org/table/2.15>.
- World Bank Group (2016). Health expenditure. World Health Organization global health expenditure database 2014. Retrieved from <https://www.databank.worldbank.org/data/reports>.
- World Bank Group (2016). World Development Indicator: unemployment rate. World Bank Report. <https://www.worldbank.org/table/2.5>
- World Health Organization (2016). List of countries by life expectancy. World Health Organization Report. <https://www.who.com/>.
- World Bank Group (2015). Under 5 mortality ratio. World Development Indicator (2015). <https://www.who.com/>.

Zahra, A., Sara, E. and Arash, R. (2015). Impact of governance, public health spending and health outcomes in OPEC countries. *International Journal of Review in Life Sciences*. 5(10), 855-860,

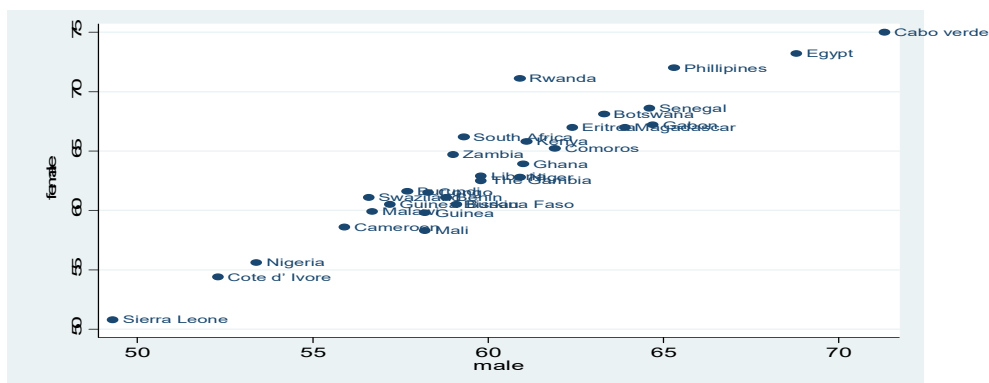
Appendices

Figure 1.1 Public Health Expenditure as a Percentage of Total Health Expenditure in Some Sub Saharan African Countries



Source: Authors' plot using data from World Development Indicators 2016

Figure 1.2 Life Expectancy (Female and Male) in Some Developing Countries



Source: Authors' plot from World Health Organization (2015)