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Health Sector Development in Nigeria: The Implications of the changing gears between Demographic and Epidemiological Transitions

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Abstract

This study examines the developments in the Nigerian health sector over the last five years, using monthly morbidity statistics of patients in General, State Specialist and University College Hospitals of 3 states across two geographical regions of the country. The developments in the health sector were divided by changes in demographic and epidemiological characteristics. Using records of 89071 patients, the results observed the dominance of demographic transition in the health care development. The impacts on the health outcome of reductions in the prevalence of preventable and communicable diseases were observed to be far below the degenerations arising from changes in the population composition. Infant and children under 5 years' morbidity rate were observed to decrease from 26.61% and 35.86% in 2008 to 23.75% and 27.35% in 2012. But these decreases were superseded by the drastic rise in the morbidity incidence among the aged (65 years and above) which more than tripled over the period. The study suggests that rapid health sector development would be more achieved by focusing on preventive as well as on demographic control.

Key words: Health sector development, demographic transition, epidemiological transition, morbidity

JEL Classification Numbers: I15, I19, J11

1. Introduction

Nigeria is at the heart of the latest demographic transition¹ in Sub-Sahara region. The population has more than quadrupled since the political independence in 1960; rising from 42 million at

¹ This is used to refer to an incomplete transition, because much part of Africa has not gone beyond the third transition stage to reduce mortality and fertility rates.

independence through 54 million in 1963 to 88 million in 1991². The figure has since doubled at an average of about every two decades³, with the present figure estimated at over 170 million people. What is more striking about the trend is that the rapid growth momentum is still set to continue even in the face of rising demographic costs⁴. With an estimated fertility rate of 5.49 (in 2011) and annual growth rate of 2.82 percent, the population is expected to double in less than 25 years again. The growing population⁵ implies a change in the age structure of the population which affects the morbidity distribution.

Generally, demographic structures reflect a country's present and past mortality and fertility trend which can be extrapolated to broader health and development dynamics (Leahy, 2006). The age structure of a country provides insight into the potential economic challenges that may arise when the distribution becomes inadvertently skewed. Nigeria's population has been firmly structured within a very youthful age structure, with nearly three-quarters of its population under the age of 30. Youthful age dominance is known to characterize the second and third stages of demographic transitions, and reflects a shift from larger family size and short lives to smaller family size and longer lifespan. Between 1970 and 2010, the share of the young people in the country's population has increased sustainably very fast⁶. However, because of the general low life expectancy⁷ over time, the aged burdens have not grown. In fact, the decline in the share of older adults along the path of the demographic transition was an anomaly that rarely had occurred in any country's development.

The Nigerian demographic transitions have been very characteristic in affecting the epidemiological distribution (for instance, the age structure of patients demanding for health care). The epidemiological transitions have occurred majorly through improvements in medical innovation in disease treatments and controls which had reduction the incidence of disease infections. In Nigeria, health transitions have led to reduction increase in fertility (through saved lives) and reduction in infectious diseases, such as leprosy, diphtheria, measles, gonorrhoea, syphilis, polio, guinea-worm, etc. However, the reduction in the morbidity of malaria, pneumonia (and influenza), HIV/AIDS and typhoid fever, which their combined effect account for over 75% of the youthful deaths have remained a challenge. The growing size of the younger age structure makes reduction of non-communicable diseases even more difficult. In view of the slower epidemiological change, the morbidity burden from the rapid demographic transition becomes a threat to future health sector development.

The rest of this paper is organised as follows. Section 2 highlights the patterns of demographic and epidemiological transitions in Nigeria. Section 3 presents evidence of health transitions based on micro⁸ health records. Section 4 is the conclusion.

2.1. Pattern of Demographic Transition in Nigeria

The general pattern of Nigeria's population shows a very broad-based pyramid, reflecting a large proportion of children and young persons under the age of 15 years (43.9%), and a small portion of the aged⁹ (3%) with a total median age of 17.9 years old (17.5 for male and 18.4 for females respectively). The large dominance of the youthful population arises from the general high fertility rate. Fertility is high because of low motivation to limit births and poor contraceptive use and availability. The high net increments in crude rate more than any other factor accounts for the rapid

² Nigeria held the first and third population census after independence in 1963 and 1991 respectively.

³ Based on the 1991 population census figure

⁴ This is used to refer to the crisis and other social disbenefits that accompany young and youthful population. This Nigeria's situation arises because of the high fertility rate.

⁵ Onyekakeyah (2012) had argued that Nigeria's population grew far less than predicted. He however did not deny the demographic change link.

⁶ Most likely to be a response from the civil war, as each regions strives to consolidate its numerical strength. In addition, the start-up period was marked by a major economic boom (1970-74).

⁷ Life expectancy between 1960 and 2000 averaged at 42.7 years (WHO, 2010).

⁸ Micro, compared to the macro data is used to refer to primary data obtained from the health records of the hospitals. It afforded the opportunity for direct contact and interview with the health care operators and patients. The close contact is an avenue to access on the spot state of the health status.

⁹ This is used to refer to those that are 60 years and above.

growth in population. Until recently, fluctuations in mortality have been less severe. As a result, growths in population have persisted uninterrupted¹⁰.

In terms of the distribution, the demographic pattern of Nigeria has not favoured population reduction. About 50 percent of the population reside in the rural areas which is predominantly lacking in adequate health care facilities. These rural areas are known to exhibit the worst health indices in view of the inaccessibility (and absence) of quality health care in the areas. In most instances, only primary health care services are provided at such level. The demographic burden in the rural area is made worse by high prevalence of extreme poverty, illiteracy, depression and severe under nutrition - all of which work together to exclude the people from attaining higher health status. As common with most rural settlements in Nigeria, fertility in the regions is usually high as procreation and large family size is seen as major achievement and status symbol. The large rural population adds to exacerbate the youthful bulge¹¹ in the country. The bulge thereby worsens the deplorable health status as infant and child diseases incidence increases.

This pattern of population distribution has major implications for the country's development in many areas. The large composition of nearly half of the population as dependents provides policy-makers with the need to design an interventionist action that would lead to development. For instance, proper management of the youthful growth could open up a window of opportunity (demographic dividend) for faster economic growth and human development by providing social and infrastructural services. Knowledge on the population is crucial for planning resource allocation and designing appropriate policies. With an unemployment rate of over 30 percent¹², hardly can the country sustain the enormous drain to productive resources and idleness that is occasioned by the large youthful population. Viewed from the social perspective, youth bulge is related to violence and political instability. Social scientists have noted the 16-30 age range for risk-taking (especially among males)¹³. The frequent crises in Mali, Syria and Egypt, to mention a few can be traced to the age structure of the country's populations. The countries had 66.7%, 55.2% and 50.7% of their populations aged 24 years and below respectively.

2.2. The Epidemiological Profile

Epidemiology is used to refer to the distribution of disease and death, and with their determinants and consequences in population groups (Omran, 1969). In view of the integral component of disease and death in population change, the pattern by which degenerative and man-made diseases displace pandemics of infection as primary causes of morbidity and mortality is important for health sector development. Evidence of epidemiological transition in Nigeria's health sector has been reported over the past one decade (e.g. Gribble and Preston, 1993; Kaufmann et al, 1996; and Nnebue, 2010)

Table-1. Life Expectancy History of Nigeria

Years	Male	Female	Total
1960	37.2	40.3	38.7
1970	40.6	43.7	42.1
1980	43.8	46.9	45.3
1990	46	48.6	47.2
2000	46.1	47.8	46.9
2011	52.3	54.1	53.2

Source: WHO, 2010

¹⁰ The recent interruption is as a result of the renewed death tolls arising from the activities of *boko haram* crisis, epidemics and natural disasters (e.g. floods) which have become rampant in recent years and are repeatedly pushing the mortality levels to high peaks.

¹¹ The youthful bulge (Fuller, 1995), has been argued to increase the tendency for social unrest, war and terrorism.

¹² Used in specific term to refer to graduate unemployment. The National Bureau of Statistics (NBS) had put the 2011 unemployment rate as 23.9%. The recent worsening economic development is believed may have pushed this rate higher.

¹³ See for instance, Fuller (1995).

The Nigerian health sector has been characterized by relatively high infant and maternal mortality rates which is endemically related to the youthful dominance nature of the population and affect life expectancy. Nigeria's life expectancy which was 38.7 on the eve of independence in 1960 barely rose 42.1 in 1970, and had since dragged over the decades. Between 1990 and 2000, the growth deteriorated from 47.2 to 46.9 but has since picked up gradually (see table 1).

Table-2. Nigeria's total deaths by cause: percentage top 50 causes

Disease Type	*Number of Deaths	Percentage (%)	Disease Type	*Number of Deaths	Percentage (%)
Malaria	219,833	12.88	Cervical Cancer	9,659	0.57
HIV/AIDS	213,667	12.52	Liver Cancer	8,901	0.52
Influenza & Pneumonia	213,099	12.49	Tetanus	8,796	0.52
Diarrhoeal diseases	173,878	10.19	Epilepsy	8,520	0.5
Tuberculosis	97,669	5.72	Schistosomiasis	8,476	0.5
Stroke	87,717	5.14	Drownings	7,422	0.43
Coronary Heart Disease	71,732	4.2	Poisonings	7,297	0.43
Birth Trauma	68,213	4	Fires	6,497	0.38
Low Birth Weight	67,212	3.94	Suicide	5,910	0.35
Maternal Conditions	50,867	2.98	Prostate Cancer	5,884	0.34
Diabetes Mellitus	34,528	2.02	Liver Disease	5,442	0.32
Meningitis	33,935	1.99	Lymphomas	5,256	0.31
Pertussis	32,386	1.9	Peptic Ulcer Disease	5,091	0.3
Lung Disease	25,241	1.48	Syphilis	4,484	0.26
Road Traffic Accidents	24,850	1.46	Alzheimers/Dementia	4,224	0.25
Congenital Anomalies	19,116	1.12	Colon-Rectum Cancers	4,054	0.24
Violence	18,422	1.08	Other Neoplasms	3,378	0.2
Kidney Disease	16,892	0.99	Falls	3,373	0.2
Hypertension	14,829	0.87	Skin Disease	2,938	0.17
Other Injuries	14,392	0.84	Leukemia	2,700	0.16
Endocrine Disorders	12,715	0.75	Hepatitis B	2,403	0.14
Malnutrition	12,146	0.71	Oral Cancer	2,374	0.14
Asthma	10,871	0.64	Rheumatic Heart Disease	1,960	0.11
Breast Cancer	10,469	0.61	Drug Use	1,958	0.11
Inflammatory/Heart	10,154	0.6	Upper Respiratory	1,917	0.11

*measured per 100,000 population

Source: WHO, 2011.

In terms of morbidity, five key diseases have been more occurring. The diseases include malaria (12.88%), HIV/AIDS (12.52%), influenza and pneumonia (12.49%), Diarrhoea (10.19%) and

tuberculosis (5.72%). Malaria, in particular poses a major health and developmental problem in Nigeria (Dutta, et al, 2009), as it recorded the lead cause of most patient’s visit to the hospital. It is by far the most causative of the morbidity and mortality incidence in infants and young children. As at 2011, over 20 percent of deaths in children under the age of 5 are caused by malaria. The adult HIV/AIDS prevalence is recorded at 3.6% (2009 estimate); while about 3.3 million people are estimated to be living with HIV (WHO, 2011). In terms of the disease prevalence among the aged, stroke (5.14%) and diabetes mellitus (2.02) are the most prevalent. The prevalence of these diseases, among others is responsible for the poor life expectancy of Nigeria, which is put at 53.2 years (2011 estimate). The maternal mortality rate of 608 per 100,000 births reveals the huge health backwardness in the country when compared with some African countries, such as South Africa and Egypt which has 300 and 66 per 100,000 respectively.

3.1. Morbidity: Evidence from Micro Health Records

The morbidity rate in Nigeria is dominated by largely preventable diseases. For children, these include vaccine preventable diseases (such as polio, diphtheria, whooping cough, tetanus, and measles), malaria, and diarrhoea. However, incidence of degenerative and non-curable diseases, such as stroke, hypertension and HIV/AIDs are also rampant. Table 3 shows the morbidity statistics of 89017 patients’ visit to hospitals over the past five years. The choice of the state specialist hospitals against other health care institutions is because of its wide patronage compared to the other secondary and tertiary institutions in Ondo state. The statistics represent the sum of both the in and out-patients visits to the hospitals. The in-patients refer to those who were admitted on treated within the hospitals, while patients who visit from outside the hospital are referred to as the out-patients.

The table showed a bottom-heavy demographic trend. The younger population (less than 15 years) were observed to account for 62.5%, 66.6%, 59.1%, 59.3% and 51% of the total patient’s visit to the hospital over the period. Using 8 leading diseases as a case study, the incidence of malaria among the under 15 years accounted for over 55% of the sickness during the five-year period. Malaria cases account for more than the sum of all the reasons for the patients’ visit to the hospitals. In view of the free medical treatment for children of under five years in most south western states, up to 50% of the adult individuals are believed to carry the parasite without manifesting the symptom (asymptomatic malaria), or do not visit the hospitals for treatment. Mortality rate from malaria is higher in children between the ages of 6 months and 5 years, while children below 6 months tends to enjoy a passive immunity acquired from the mother, coupled with the fact that the fetal hemoglobin still in the baby after birth does not support the parasite growth. Malaria immunity is usually developed in the children after about five years as a result of repeated attacks of malaria. More women suffered hypertension than their men counterpart across the years. Age range 45 and 64 years is the peak morbidity age group. There is no significant difference between evidence from micro and macro data

Table-3. Yearly Total Patient Morbidity Returns (2008-2012)

Age Group (Years)/ Disease (Sex)	< 1		1 -5		6 – 14		15 -18		19 - 44		45 – 64		65 and Above		Total		Aggregate 2008 Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
*Malaria Fever	2454	2185	3372	2979	780	796	178	309	466	1589	221	678	164	189	7635	8725	16360
Typhoid Fever	1	0	3	1	6	5	0	0	7	10	2	0	2	1	21	17	38
Cholera	10	3	0	0	0	0	0	0	0	1	0	1	0	1	10	6	16
HIV/AIDS	1	3	1	1	0	0	0	0	13	19	3	3	0	0	18	26	44
Diarrhoea	75	38	45	40	5	7	0	0	4	8	0	6	2	2	131	101	232
Pneumonia	25	20	30	18	5	4	5	1	12	9	8	8	19	6	104	66	170
Tuberculosis	0	0	0	0	1	2	0	2	19	13	3	4	5	3	28	24	52
Hypertension	0	0	0	0	0	0	0	0	25	135	122	556	137	210	284	901	1185
Total	2566	2249	3451	3039	797	814	183	312	546	1784	359	1256	329	412	8231	9866	18097

% per Group	14.1 8	12.4 3	19.0 7	16.79	4.40	4.50	1.01	1.72	3.02	9.86	1.98	6.94	1.82	2.28	45.48	54.52	100.00
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2009

Age Group (Years)/ Disease (Sex)	< 1		1 - 5		6 - 14		15 - 18		19 - 44		45 - 64		65 and Above		Total		Aggregate
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Both
Malaria Fever	2643	2527	477 4	3766	757	795	132	265	450	1529	259	692	177	207	9192	9781	18973
Typhoid Fever	19	23	62	44	31	37	18	6	7	30	14	57	37	55	188	252	440
Cholera	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1
HIV/AIDS	0	1	0	0	1	1	0	3	4	6	6	4	1	0	12	15	27
Diarrhoea	45	28	37	32	2	0	0	0	1	6	1	0	1	2	87	68	155
Pneumonia	31	15	14	18	2	2	3	4	16	3	4	5	3	6	73	53	126
Tuberculosis	0	0	0	0	0	0	0	1	4	2	3	3	4	2	11	8	19
Hypertension	0	0	0	0	0	0	3	2	26	181	115	655	247	160	391	998	1389
Total	2738	2594	488 7	3860	793	835	157	281	508	1757	402	1416	470	432	9955	1117 5	21130
% per category	12.9 6	12.2 8	23.1 3	18.27	3.75	3.95	0.74	1.33	2.40	8.32	1.90	6.70	2.22	2.04	47.11	52.89	100.00

2010

Age Group (Years)/ Disease (Sex)	< 1		1 - 5		6 - 14		15 - 18		19 - 44		45 - 64		65 and Above		Total		Aggregate
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Both
Malaria Fever	1700	1606	293 5	2439	530	502	120	169	440	1217	146	522	159	190	6030	6645	12675
Typhoid Fever	1	0	2	44	60	56	12	11	18	18	10	9	5	7	108	145	253
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HIV/AIDS	0	1	0	0	0	0	0	0	2	8	1	1	0	0	3	10	13
Diarrhea	8	8	3	6	0	0	0	0	1	8	1	0	2	0	15	22	37
Pneumonia	13	10	13	6	8	2	2	2	4	9	3	7	6	9	49	45	94
Tuberculosis	0	0	1	1	0	0	1	0	4	4	4	5	2	6	12	16	28
Hypertension	0	0	0	0	0	0	1	0	39	203	145	675	290	427	475	1305	1780
Total	1722	1625	295 4	2496	598	560	136	182	508	1467	310	1219	464	639	6692	8188	14880
% per Group	11.5 7	10.9 2	19.8 5	16.77	4.02	3.76	0.91	1.22	3.41	9.86	2.08	8.19	3.12	4.29	44.97	55.03	100.00

2011

Age Group (Years)/ Disease (Sex)	< 1		1 - 5		6 - 14		15 - 18		19 - 44		45 - 64		65 and Above		Total		Aggregate
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Both
Malaria Fever	1931	1511	265 9	2490	451	418	90	132	464	1112	158	561	117	353	5870	6577	12447
Typhoid Fever	40	37	53	42	92	79	27	24	40	57	17	25	14	22	283	286	569
Cholera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
HIV/AIDS	21	0	1	0	0	1	0	0	1	6	0	2	1	0	24	9	33
Diarrhea	8	5	14	10	1	0	0	0	0	2	1	3	0	0	24	20	44

Pneumonia	25	9	8	5	7	7	0	1	5	7	9	6	10	5	64	40	104
Tuberculosis	0	0	0	0	0	1	0	1	37	137	236	816	395	553	668	1508	2176
Hypertension	0	0	0	0	0	0	0	1	17	69	121	325	195	342	333	737	1070
Total			273														
	2025	1562	5	2547	551	506	117	159	564	1390	542	1738	732	1275	7266	9177	16443
% per Group	12.3		16.6														
	2	9.50	3	15.49	3.35	3.08	0.71	0.97	3.43	8.45	3.30	10.57	4.45	7.75	44.19	55.81	100.00

2012

Age Group (Years)/ Disease (Sex)	< 1		1 - 5		6 - 14		15 - 18		19 - 44		45 - 64		65 and Above		Total		Aggregate	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Both	
Malaria Fever	2337	1980	2601	2386	546	510	109	144	491	1460	247	788	238	353	6569.	0	7621	14190
Typhoid Fever	14	11	25	17	16	38	13	21	84	114	27	45	13	22	192	268	460	
Cholera	0	0	0	0	0	0	0	1	0	0	1	0	0	0	1	1	2	
HIV/AIDS	0	0	0	0	0	0	0	0	1	14	2	3	1	0	4	17	21	
Diarrhea	22	8	13	9	1	1	0	0	1	5	0	2	4	0	41	25	66	
Pneumonia	15	13	7	7	5	1	1	1	14	4	2	6	5	5	49	37	86	
Tuberculosis	0	0	0	0	1	0	0	1	16	4	2	1	4	553	23	559	582	
Hypertension	0	0	0	0	0	0	0	8	54	265	294	976	464	1053	812	2302	3114	
Total												182						
	2388	2012	2646	2419	569	550	123	176	661	1866	575	1	729	1986	7691	10830	18521	
% per Group	12.8	10.8	14.2							10.0		9.8		10.7				
	9	6	9	13.06	3.07	2.97	0.66	0.95	3.57	8	3.10	3	3.94	2	41.53	58.47	100	

*includes those who had malaria in pregnancy

Source: Hospital Health Records

Demographic transitions arise because the average health status is affected by the changes in the population structure and distribution. Each group of the population are observed to have distinct diseases pattern that are peculiar to them. Thus, changes in the age, sex and fertility pattern have implication for the overall health status of the country. The large amount of resources used to provide feeding and clothing as well as for the education and health care of young people implies a great reduction to the level of savings, investment and capital formation that would be attained in the country. Considering the high rate of unemployment (23.9 percent¹⁴), the implication of the economic burden could be more damaging than imagined. Traditionally, health care constitutes a core need for man. As a result, demand is usually more of necessity when it arises. Sustaining the current rapid demographic transition in view of its implication for health and economic development will be at a greater cost to Nigeria.

3.2. Demographic or Epidemiological Overthrow: Evidence from Micro Data

The general evidence from the micro data showed an inverse relationship between epidemiology and demographic characteristics. In the main, econometric estimation for the threshold of dominance is complicated because of endogeneity problem among the fertility, demography and epidemiological variables. Following Conley et al., 2007, we attempt to improve estimation by disaggregating the specific relationship among each variable. Based on the identified diseases above, the correlation coefficients between the patients' epidemiology and demographic characteristics showed a steady decline, from -0.622 in 2008 to -0.229 in 2012. By taking the mid-point of each age group against the total morbidity for each age category, the incidence of diseases was observed to decrease as the patients' ages rises. However, on the epidemiological note as a whole, the concentration of the

¹⁴ Nigerian Population Commission, 2012

diseases in the younger ages while dominant across the years declined over time. When each of the years is considered independently, morbidity incidence was observed to be higher for the younger population than among the adults. For the degenerative and non-curable diseases such as hypertension and HIV/AIDs which affects more of the adults, the disease incidence were not as concentrated in the adult groups as malaria and other curable diseases to the infants and the very young. Malaria, pneumonia and diarrhoea incidence levelled on the average (see table 4).

Table-4. Morbidity Incidence as percentage of Yearly Total Visits

Disease Type/ Years	2008	2009	2010	2011	2012
Malaria	85.96	85.99	78.21	70.91	72.11
Typhoid Fever	0.19	1.92	1.46	3.06	2.23
HIV/AIDS	1.48	0.82	1.27	1.26	1.05
Diarrhoea	2.18	1.19	1.37	1.24	0.80
Pneumonia	0.83	0.55	0.54	0.56	0.42
Hypertension	8.37	8.97	15.83	10.78	19.52
Aggregate Visits	100.00	100.00	100.00	100.00	100.00

Source: Hospitals' Health Records

While the incidence of HIV/AIDS and typhoid fever incidence however increased across the age group, hypertension - a disease of the adult old became more occurring into the young age groups, worsen the morbidity gained from reduction on the other diseases (see table 4).

On the whole, the general concentration and growth in morbidity burden of diseases among the younger population outweighed the marginal reduction in communicable diseases – an evidence of demographic dominance. In view of the growth in degenerative diseases into the younger age group, the morbidity burden of additional entrant infected outweighs any imaginable demographic dividend (see Ross, 2004). This is even as government can weakly manage the youthful growth.

4. Conclusion

Health transitions in Nigeria are dominated by demographic changes. The demographic change crowds off the slowly growing epidemiological transition. The impacts on the health outcome of reductions in the prevalence of preventable and communicable diseases were observed to be far below the degeneration arising from changes in the population composition. Considering the high morbidity incidence among the under 5 age category, a youthful population poses additional challenge for economic and health sector development, even as it increases the demand for maternal and infant health care services. Against this background of the demographic and epidemiological changes lies the development in the Nigerian health sector. Health care development is enhanced when incidence and distribution of disease patterns are diminished. The demographic burdens of the youthful population add up to drain on the resources of the state and form a dangerously unstable element within the society.

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