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Health in a time of austerity and uncertainties

Nigeria in 2016 officially slipped into recession after months of speculation. From initial debates, around 'recession being just a word', Nigerians have come to grapple with the reality.

While recession is marked by a fall in GDP, a rise in unemployment and increased fiscal pressure on the government, the health impacts are huge. As it stands, it appears the present government has not given much consideration to this in its Social Protection Policy and mitigation plans.

As the global economic recession gripped the world in 2007, the World Health Organization in its 2009 Report on 'The Financial Crisis and Global Health' cautioned that 'it should not come as a surprise that we continue to see more stresses, suicides and mental disorders'; 'the poor and vulnerable will be the first to suffer'; and 'defending health budgets' will become more difficult.

More importantly, the evidence showed that that economic crisis led to a deterioration in public health marked by an increase in rates of mental health disorders, suicides, and epidemics. Recent media reports allude to an increasing rate of suicide among Nigerians since the recession. It calls for a deliberate and strategic efforts by government to provide psychosocial support to Nigerians through public health education on the potential effects of recession on their health and coping skills.

Health budgets are one of the victims of government's fiscal tightening in times of economic crisis. From a high of 6% budget allocation in 2012, the health budget as a percentage of the total government's budget fell to 5.8% in 2015, and plunged further down to 4.23% in 2016. In stark terms the budget is N659billion short of the 15% commitment made by African Heads of State in Abuja in 2001. Save for the advocacy efforts by the Minister of Health, and health budget advocates, some key maternal and child health interventions such as the Midwives Service Scheme, contraceptives/family planning as well as integrated maternal newborn and child health services would have received no allocations.

The recession notwithstanding, the imperative of protecting and ring-fencing government's spending on health can't be over-emphasised. The country needs to raise domestic funds to finance the health-related sustainable development goals, especially universal health coverage (UHC) which includes universal financial risk protection of the population from catastrophic spending on health services, which further impoverishes already poor and vulnerable households. Starting from 2016, Nigeria needs to commit N29billion to fund its immunisation programmes and needs to raise about N63billion by 2020 upon final graduation from GAVI support which starts in 2017. Between 2017 and 2018, Nigeria needs to provide \$181million out of the \$264million needed to for immunisation of children to be jointly funded by Nigeria and GAVI. This is in addition to the funding needed to rebuild the fragile health system in the North East, and response to the wild polio virus which is on a resurgence, and against the backdrop of meeting the critical health needs of over two million internally-displaced Nigerians, amongst whom are hundreds of thousands of malnourished children. This calls for huge financial investments from the government and development partners.

Ahead of Buhari's submission of the draft 2017 budget to the National Assembly in the weeks ahead, it is important that stakeholders in the health sector be vigilant to ensure that critical health interventions are provided for in the budget; including a ring-fencing of at

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least 1% of the Consolidated Revenue of the Federal Government for the establishment of the Basic Health Care Provision to finance the provision of a basic minimum package of healthcare services to ALL Nigerians as stipulated in the 2014 National Health Act. Rather than reduce budget allocations to the health sector, the government should put in place strong public finance management measures to improve fiscal discipline and efficient use of public resources to deliver results. A situation where the Federal Ministry of Health and its agencies rank lowest in the Fiscal Responsibility Index among other MDAs is not acceptable. Civil Society and the Media need to pay closer attention to the health budget for increased transparency and accountability through budget tracking and monitoring of projects in the sector.

In dealing with the health impact of the current

economic recession, the Ministry of Health should consider setting up a Health and Financial Crisis Monitor similar to the one set-up during the economic recession in Europe by the Observatory of Health Systems and Policies which generated and used evidence to inform policy makers and stakeholders about the impact of the economic crisis on health and health systems in Europe. With such evidence, advocates can fight to protect public spending and other investments in the health sector, without which critical health services for saving lives would not be possible. The 2016 National Health Policy currently being developed by the Federal Ministry of Health should articulate strategies for providing financial risk protection of the citizens in this austere times!

Felix Abrahams Obi

Medic magic

Medic West Africa came and went in mid-October with its usual smooth efficiency and scale. Despite the backdrop of recession, it was as well attended as ever, with over 3600 attendees, five accredited conferences, and some 280 exhibiting companies representing 32 different countries.

This year the meeting was officially opened on Day One by a number of Health Commissioners led by Dr Jide Idris from Lagos State, and was visited on day two by the Hon Federal Minister of Health, Dr. Isaac Adewole who toured the event before being guest of honour at a special dinner in the evening.

It is a far cry from the very first Medic which took place at the same venue in October 1986. Organised by the FSG Communications Ltd, the publisher of Africa Health, it had 15 exhibitors and attracted 550 visitors.

And the event this year presented a new landmark. Informa Lifesciences bought an interest in the event five years ago, and completed the full takeover following the end of the show this year.

'We wish Informa well for the future,' commented FSG's MD Bryan Pearson. 'They have brought scale, impetus and a new level of professionalism to the event, and I'm sure they will keep adding further facets year on year. Yes, there is a slight tinge of sadness at not being formally involved in the future in something that has been such a central part of our lives over the last 30 years, but there is also something warm inside around thinking about not having to deal with the million and one details that events of this kind also bring. There is a time when it is good to move on!'



Are genetically modified foods healthy?

Shima Gyoh bravely enters the GM debating chamber, concluding that we have much to gain by embracing it

When I was setting up my yam farm, I sought to buy yam seeds from farmers reputed to produce the best yams. Long before that, the government agricultural station near our village used to import big, beefy 'Ndama' bulls from the UK and interbreed them with local bony but disease-resistant village cows to produce animals that combined the better beef production of the imported animal and the resistance to local diseases of the village cows. Selective breeding has enabled man to produce cats and dogs with such unbelievably different shapes, sizes and coats that it is sometimes difficult to imagine they belong to the same species, but they do and retain the ability to cross breed indefinitely.

Rice grows in waterlogged clay soil, and to get it to survive on drier upland loam, it has to be grown generation after generation of increasingly drier land over many years. It might eventually acquire drought tolerance, but its yield is likely to decrease in size and quality as we notice in crops when the rains fail. The adaptation process that would breed true is unlikely to be completed within the lifespan of one person.

So far we have discussed the traditional genetic modification (GM) by selective breeding. However, in the last twenty years, advances in scientific technology have made it possible to identify, for example, the gene that confers drought tolerance on a plant, isolate and insert it into the paddy rice plant. The recipient paddy plant will immediately acquire drought tolerance and grow on the drier uplands without losing any of its qualities. Similarly, anti-freeze gene has enabled potatoes to survive in temperatures too cold for ordinary potatoes. The essence of genetically modifying organisms is to confer, accurately and immediately, desirable properties on them. The process can be used to produce plants that resist herbicides so that you can selectively kill weeds without killing your crops as well. Others receive genes that enable them produce insecticidal proteins that kill insect larvae, making them immune from insect attacks. The technique can also be used to solve medical and nutritional problems. Blindness from Vitamin A deficiency can be eliminated from a population by genetically modifying its staple food crops like yams, sweet potato, rice and cassava to produce the vitamin.

Genetic modification is a powerful tool that can help humankind in its many challenges, feeding the world's growing population, combating deficiency diseases in

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low income countries, increasing the availability of arable land and much more. Reduction of the need for pesticides and insecticides saves the environment from further pollution.

Yet there is a powerful lobby against it, mostly based on emotion, often resembling religious fanaticism. Objectors allege, without any scientific evidence, that the consumption of GM products constitutes a major factor in the increase in cancer, obesity and the decrease in fertility in modern society. Arbitrary lines are drawn between the 'natural' and the 'unnatural', forgetting that the existence of modern man is heavily interlaced with scientific inventions not so easily classified. They have powerful lobbies and have caused many countries, even in the developed world to ban GM foods. However, it is now impossible, to exist anywhere without consuming some form of GM product. Nevertheless, the feelings of such people should be respected by labelling GM foods.

It is not that genetic modification has no drawbacks. GM insect-resistant corn is produced by inserting into it the pesticide-producing gene from *Bacillus thuringiensis*; it produces a crystalline protein that kills insects that infest corn plants, but it can do collateral damage by killing other unintended targets like butterflies. Herbicide resistant genes can theoretically cross-pollinate and produce super-weeds resistant to herbicides. Susceptible human beings can more easily develop allergies to GM foods. Moreover, many of the methods of GM modification have not been tested over many generations, and it is impossible to be sure of their long term safety.

All food eaten is digested and absorbed as sugars, carbohydrates and lipids. No one has yet observed that genes from food escape into the body and affect the genome of the consumer, or that digestion of GM modified food produces abnormal compounds that cause disease. Apart from a slight increase in allergies and the intimidating name of 'genetic engineering', there isn't anything to fear in GM foods.

My fear is the manipulation of large commercial companies that have already taken out patents on their GM crops. They could insert a 'self-destructive gene' into the plants, so that the fertility of the seeds lasts for only one planting season, compelling farmers to regularly return to purchase fresh seeds. Such arrangement would be inconvenient and expensive, and farmers in the developing world might not be able to cope. However, this unwelcome possibility can be controlled by government regulations. Developing countries have much to gain from this highly promising technology.

Prof. Isaac Adewole: one year after wearing the cap, and getting the hands dirty

Felix Abrahams Obi surveys the progress and the pitfalls of the Federal Minister's tenure to date

The appointment of Prof. Isaac Adewole as the Honourable Minister of Health in November, 2015 was received as cheery news by stakeholders within the Nigerian health sector, considering his impressive records as former Provost of the College of Medicine at University College Hospital Ibadan and as former Vice Chancellor of the University of Ibadan. At the inaugural Annual Primary Health Care (PHC) Lecture hosted by the National Primary Health Care Development Agency (NPHCDA) which held in Abuja on December, 8th 2015, the Minister was unequivocal in his resolve to strengthen. The foundation of the health system by making the PHC system in the country functional. According to him, previous efforts by successive governments at strengthening tertiary care were akin to building a roof over a building that rests on shallow and weak foundation. He was right!

Prof. Adewole in defining his vision, agreed that Nigeria had made limited progress in delivery of key services such as routine immunisation against childhood diseases, antenatal care and skilled birth attendance for pregnant women and the provision of modern contraceptives among others. Due to the poor provision of key services, Nigeria's health sector has performed far worse than its peers in Africa like Ghana, Egypt, South Africa, in terms of maternal mortality ratio, infant and Under-5 mortality rates, immunisation coverage, among others. Despite the poor health outcomes, the country's annual budget allocation to the health sector had dropped from a high of 6% in 2012 to 4.23% in 2016. In addition to the poor funding, the health sector was ranked last in the Fiscal Responsibility Index with 39% among all the Federal Ministries, while scoring 21% in budget comprehensiveness and transparency while its budget credibility index was a dismal 36% although it scored 69% in policy-based budgeting.

Against the backdrop of a weak and non-resilient health system, Prof. Adewole hit the ground running, and did not delay in sharing his vision for the health sector. Seeing health as a basic human right, he set out 'to ensure that ALL Nigerians, especially the poorest, have access to basic quality healthcare, that mothers deliver their babies, and that as many Nigerian children as possible live past the age of five, and that Nigerians do not suffer financial hardship as a result of seeking healthcare'. To achieve these goals, the Minister identified four priority levers- increasing the fiscal

space, pursuing the Universal Health Coverage (UHC) agenda, improving stewardship and performance in the sector, and finally, leveraging strategic partnerships.

To improve the fiscal space and attract more investment into the health sector, the Minister intends to change the perception that health is an unproductive and inefficient sector, through strategic planning and policy based budgeting, strengthening transparency and accountability, and enhancing budget execution and streamlining procurement processes through the use of technology. Overall, his vision is to demonstrate that health is not just a social sector but a net contributor to the Nigerian economy. New strategies to increase investments included the establishment of the Basic Health Care Provision Fund, special taxes like tobacco and alcohol taxes, telecoms levies, PPPs, use of tax breaks to woo investors and strategically harnessing philanthropic initiatives through trust funds, matching grants and social impact bonds.

One year after his appointment as Minister, it would be interesting to look back at the key achievements as well as challenges that Prof. Adewole must confront to achieve his dream of 'Better Health for All Nigerians'.

PHC revitalisation project cancelled midstream

On the 18th July 2016, Prof. Adewole launched the 100-Day Better Health for All Nigerians project as part of government's Rapid Results Initiative (RRI). The aim was to fast-track his vision of One PHC centre per Ward through the revitalisation of 10000 PHC centres across the country within the next two years to provide access to quality healthcare to about 100 million Nigerians. At the end of the 100 days which coincides with end of October 2016, it was expected that 110 PHCs across the country would have been revitalised and made functional within 100 days; with each senatorial zone in Nigeria benefiting.

Although other components of the RRI such as flag-off of the One-PHC-Per-Ward in Jere LGA in Borno State and free vesico-vagina fistula (VVF) surgeries in October, Nigerians received a rude shock late in September when Prof. Adewole announced that the suspension of the project on the advice of the Minister of Finance, Mrs. Kemi Adeosun. She had argued that the States and local Government areas (LGAs) may not be able to meet with their contributions. Apparently, the Minister of Health did not consult widely with key stakeholders especially the State Governors and Chairmen or Caretakers before announcing his plans, bearing in mind the complex political economy of providing healthcare within a federal system where the provision of PHC services

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Prof. Isaac Adewole touring the recent Medic West Africa Exhibition in Lagos, Nigeria

are within the purview of LGAs and by extension, the State Governments which maintain joint accounts with LGAs. To confirm the suspension of the RRI, the official twitter account of Better Health for All Nigerians (@BetterHealthNGR) which was set up in July 2016 has been deactivated. It would help to get regular updates on key deliverables of the project through the Federal Ministry of Health's official website (<http://health.gov.ng/>) and the Minister's twitter account (@Fmohnigeria).

Had there been a consensus, buy-in and political commitment by the States and LGAs to the PHC agenda, Mrs. Kemi Adeosun may not have expressed those concerns, considering that President Buhari desires to improve the health of Nigerians. This is against the backdrop of a recent report by the International Centre for Investigative Reporting (ICIR)¹ which indicates that the Federal Government in the last two years literally wasted over two billion Naira in contracts awarded for the construction of dozens of PHCs across the country which are not in use. In moving his vision of PHC Revitalisation, Prof. Adewole needs a very strong political and financial commitment from the states and LGAs, and he can leverage on the \$500 credit from the World Bank for the Saving One Million Lives Programme for Results initiative to achieve his dream of having one functional PHC per Ward a reality. So far, each of the 36 states in Nigeria has received a grant of \$1.5million from the Federal Ministry of Health.

Adoption of a new National Health Policy

One key achievement by Prof. Adewole within the last one year is the successful development of a new National Health Policy which replaces the 2004 National Health Policy. The 2016 National Health Policy (2016) which has the theme, 'Promoting the Health of Nigerians to Accelerate Socioeconomic Development' captures Nigeria's goal of achieving UHC. In developing the 2016 National Health Policy, Prof. Adewole relied on the experience and wisdom of an erstwhile Minister

of Health, Prof. Eytayo Lambo who led the process of revising the 1988 National Health Policy. The Federal Ministry of Health is working with stakeholders in the health sector to develop the National Strategic Health Development Plan II for the implementation of the 10 priority areas captured in the 2016 National Health Policy.

Need to fast-track implementation of 2014 National Health Act

Although the awareness among

Nigerians remains abysmally low, the 2014 National Health Act (NHAct) remains a landmark legislation that has the potential of strengthening the healthcare delivery system and reversing the poor health outcomes if its key provisions are implemented efficiently. For instance, the NHAct guarantees ALL Nigerians, the right of access to a basic minimum package of healthcare services, to be paid for through the Basic Health Care Provision Fund (BHCPF) which is to be financed by at least 1% of the Consolidated Revenue of the Federal Government. At a health policy dialogue organised by the Health Reform Foundation of Nigeria in January 2016, Prof. Adewole had announced to the joy of Nigerians that President Buhari had promised to publicly launch the official gazette copy of NHAct as well as the establishment of the BHCPF. President Buhari has yet to fulfil these promises to Nigerians, and for reasons not disclosed to Nigerians, the BHCPF which is a statutory deduction was not included in the 2016 fiscal year budget despite an outcry by health advocates and experts. With the recent approval of the Guidelines for the Disbursement, Management and Monitoring of the BHCPF by the National Council on Health, it is hoped that the Fund will be included in the 2017 Appropriation Act to guarantee its establishment.

Other key provisions of NHAct have not received as much attention as the BHCPF hence critical milestones have been missed. For instance, the Act stipulates that 24 months after the Presidential assent, all health establishments in Nigeria must be issued a Certificate of Standards. As it stands, this key provision of the NHAct has been violated in principle as no health establishment in Nigeria has been issued the Certificate of Standards. In addition, all the statutory committees created by the NHAct have yet to be constituted, among others. Till date, the Federal Ministry of Health has yet to develop information materials aimed at educating Nigerians on the NHAct, and has depended hugely on Non-Government Organisations

(NGOs) within the health sector to create awareness and sensitise Nigerians on the key provisions of the NHAct. Since Prof. Adewole's appointment in November 2015, he has yet to convene the meeting of the multi-stakeholder national Technical Working Group for the operationalisation of the NHAct. Consequently, some critical steps and milestones for the implementation of the NHAct have been missed. Worried by the slow implementation of the NHAct, members of Nigerian Medical Association and Health Sector Reform Coalition of NGOs organised a protest march to Aso Villa on 26th October 2016 to press for the implementation of the National Health Act. If the BHC PF is not included in the 2017 annual budget, Nigerians would have been denied their right of access to quality healthcare services by the government.

Hands to the plow; digging the trenches and pressing forward

Prof. Adewole is to be commended for his energy and passion for improving the health sector, which he has so far displayed in the way he has led the response to tackle the resurgence of wild polio virus in Borno State and the health needs of persons displaced by the insurgency in the North East, in addition to articulating the country's roadmap for achieving and financing UHC for all Nigerians. Since circumstances beyond his immediate control may appear to have aborted his vision of revitalising primary health care in Nigeria, it is imperative that he trudges on with this laudable vision. What's needed is a collective will by both the federal,

state and LGAs to strengthen this weak foundation of our health system, otherwise we may not realise the goal of achieving UHC in the coming years.

According to the 2016 World Health Statistics, the average life expectancy at birth of the global population in 2015 was estimated to be 71.4 years and overall Life expectancy increased by five years between 2000 and 2015, the fastest increase since the 1960s. More interestingly, the African continent recorded the greatest increase with life expectancy increasing by 9.4 years to 60 years unlike the decline in the 1990 due to deaths caused by the AIDS epidemic in Africa, and in Eastern Europe. Although Nigeria is not one of the bottom five countries like Sierra Leone with the lowest life expectancy of 50.1 years, Nigeria's life expectancy at birth ratio of 54. Five years is still one of the lowest. For Nigerian citizens to live to their full potential, and contribute to sustainable economic growth, their health needs must be given some priority. With the appointment of the new CEOs for National Primary Health Care Development Agency, National Health Insurance Scheme, and the Nigerian Centre for Disease Control, he has a well-trained and experienced team to help deliver on his dream of improving health outcomes by strengthening the health system to become more resilient and responsive to the health needs of Nigerians.

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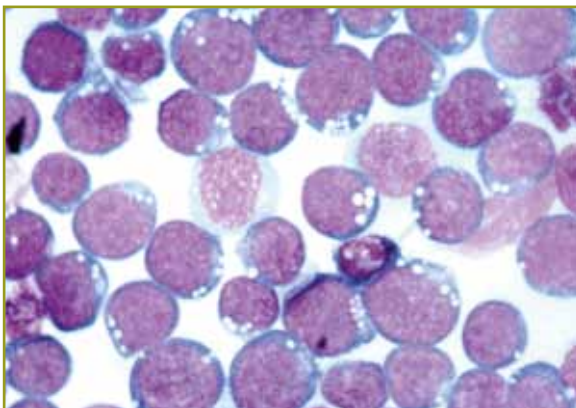
Human viruses of oncologic importance in Nigeria

Abstract

Viruses and cancer are often discussed separately in Nigeria's medical circles except for Kaposi sarcoma which has been strongly associated with the human immunodeficiency virus (HIV). While the pathophysiology of the co-occurrence and co-morbidity of HIV and Kaposi sarcoma could be regarded as an indication of the need to locally expand the scope of study that links virology and oncology. This review observes the increasing level of awareness and local research interests in the co-occurrence of human papilloma virus and cervical cancer, HIV and Kaposi sarcoma; but paucity of published research works on the roles of Epstein-Barr virus in Hodgkin's and Burkitt's lymphoma, herpes simplex virus and cervical cancer, and cytomegalovirus and breast cancer. This review brings the underrepresentation of the roles of viruses in cancers, and vice versa, into sharp perspective with potential impacts on prevention, treatment, management and other viral and cancer disease protocols.

Introduction

Globally, viruses are associated with the development of around 15% of cancers¹ and this association is based on



Epstein-Barr Virus (EBV). Stained with Hematoxylin and eosin (HE), is of the EBV. Unknown photographer [Public domain], via Wikimedia Commons. Source: National Cancer Institute

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the development of cancer in only a small proportion of individuals infected with cancer-linked viruses, usually many years after initial infection. Science has affirmed that cancer develops when cells begin to divide uncontrollably because the cell cycle machinery that regulates cell division has stopped working properly making it possible for cancer cells to invade other tissues – local and distant ones.

As simple as it may sound, cancer development is a complex process involving a series of genetic changes that disrupt the cell cycle machinery, interfering with cellular functions such as cell growth. Affirming a clinically important connection between a specific virus and a certain cancer is difficult due to the long delay between infection and tumor development. The delay is brought about by the complex genetic changes that are needed for cancer to develop.

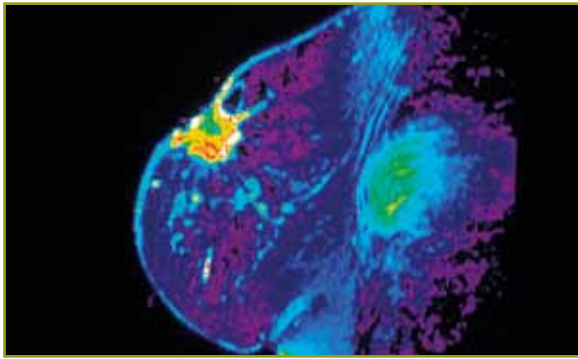
Viruses on the other hand have played – and continue to play – critically important roles in cancer diagnosis and research. Some viruses help in targeting cancers while others can be genetically modified to target cancer cells inside which they multiply rapidly, leading to cell death and tumour shrinkage, others can be used to indirectly shrink tumours.

Herpes simplex virus

The clinical condition caused by this virus is widely described as herpes and it usually occurs as oral and genital herpes presenting as cold sores around the mouth, genitals, buttocks or anus. Even though there are various types of the virus, the type 2 is of significant public health importance in Nigeria as extensively reported in various studies including one that reported a prevalence of 77.8%.²

Herpes simplex virus type 2 infection is lifelong with manifestation in a small proportion of those infected. Herpes simplex virus type 2 has recently been found to have synergistic effect with human immunodeficiency virus.³ This becomes a major issue of concern among Nigerians and other Africans living with the virus since HSV spreads through direct contact and a large number of people have no symptoms while others develop sores near the area where the virus has entered the body. Even though they turn into blisters, become itchy and painful, and get subsequently healed, in a significant number of cases, the virus is not diagnosed.

Herpes caused by HSV in the genital area reportedly⁴



MRI of Breast. Color-enhancement show magnetic resonance image (MRI) of individual breast. By Unknown photographer [Public domain], via Wikimedia Commons. Source: Dr. Steven Harnes, Baylor University Medical Center, Dallas Texas

increases the risk of cervical cancer by acting as an accomplice to another common virus that commonly causes this cancer. HSV-2 was detected in about 50% of women with invasive cervical cancer which is nearly twice as often as in women without any signs of cancer.

Epstein Barr virus

Adelukosa and colleagues' 2009 study at Nigeria's Obafemi Awolowo University Teaching Hospital of a Nigerian population connected Epstein Barr virus (EBV) to Hodgkin's lymphoma.⁵ Being one of the most common human viruses makes EBV of significant oncological importance. It has also been associated with Burkitt lymphoma, gastric cancer, nasopharyngeal carcinoma, and conditions associated with HIV.

As the first virus to be directly associated with human cancer, the virus has two distinct life cycles in the human host, a lytic form of infection that produces new infectious virions, and a latent form of infection that allows the virus to persist in a dormant state for the lifetime of the host. The virus has evolved a life cycle that mimics the natural differentiation pathway of antigen-activated B cells, giving the virus access to its site of latent infection, the resting memory B cell.

Adelukosa et al reported mixed cellularity as the most common subtype associated with EBV positivity and concluded that the virus has roles to play in the aetiology of Hodgkins lymphoma in Nigeria.

Cytomegalovirus and breast cancer

A study conducted in northern Nigeria strongly associated CMV to breast cancer.⁶ This association was based on the exhibition of diverse phenotypes and distinct physio-pathological signatures, clinical courses, and therapeutic possibilities. Another school of thought opined that the virus targets a variety of cell types *in vivo* and the list includes macrophages, epithelial cells, endothelial cells, fibroblasts, stromal cells, neuronal cells, smooth muscle cells, and hepatocytes.

The virus is detectable in breast milk after delivery hence it could spread to adjacent mammary epithelial cells. Antigens and DNA of the virus have been detected in tissue biopsies of female Nigerian patients with breast cancers, while the elevation in serum level of the virus' IgG antibody levels has been detected in tissue biopsies of breast cancers.

HIV and Kaposi sarcoma

This is probably the most popular and extensively studied virus-associated carcinoma. Kaposi sarcoma is essentially a vascular lesion of low-grade malignant potential that presents most frequently with skin lesions. It is the most common AIDS-associated malignancy, and human herpes virus type 8 (HHV8) plays a significant role in its aetiopathogenesis.

A 14-year retrospective clinicopathological study published earlier this year revealed that within the period under review, Kaposi sarcoma in Lagos followed the same epidemiologic trend as other centers in Nigeria, with an increasing incidence in this era of HIV/AIDS.⁷

Conclusion

On the overall, studies in Nigeria and various parts of the world have shown that both DNA and RNA viruses are capable of causing cancer in humans. While Epstein-Barr virus, human papilloma virus, hepatitis B virus, and human herpes virus-8 were the DNA viruses that were considered to be capable of causing the development of human cancers in 2006, the list continues to expand.

For the RNA viruses, human T lymphotropic virus type 1 and hepatitis C virus are leading others in this group to be actively capable of causing cancers. In the light of these developments, it has become evident that the virology and oncology units of hospitals in research institutions in Nigeria and other African countries can no longer be considered to be different divisions, they are now interlinked.

Currently, the scientific basis of the association of various viruses and cancers are still not well understood nor studied in Nigeria suggesting the need for more studies into the co-occurrence of several viruses and cancers. But beyond studies, there is an urgent need to introduce some forms of assessments into diagnosis management and control of viral diseases in order to rule out malignancies. This development suggests that early diagnosis of viral infections will go a long way in ensuring that such viral diseases do not eventually contribute actively or passively to tumorigenesis.

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