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**16/MHS03/026**

**INTRODUCTION TO HISTOPATHOLOGY**

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ASSIGNMENT

* WRITE ON CANCERS EPIDEMIOLOGY IN AFRICA GENERALLY, AND NIGERIA IN PARTICULAR.
* CRITICALLY EXAMINE THE INVOLVEMENT OF ANGIOGENIC GENES IN THE DEVELOPMENT AND PROGRESSION OF OSTEOSARCOMAS.

THE EPIDEMIOLOGY OF CANCER IN AFRICA

Cancer is an increasing problem in Africa because of aging and growth of the population as well as increased prevalence of risk factors associated with economic transition (including smoking, alcohol, obesity, physical inactivity, and reproductive behaviors), and of certain infectious agents of importance in cancer etiology. Despite this growing burden, cancer continues to receive a relatively low public health priority in Africa, largely because of limited resources and other pressing public health problems, including communicable diseases such as Acquired Immune Deficiency Syndrome (AIDS)/Human Immunodeficiency Virus (HIV) infection, malaria, and tuberculosis. Another factor may be a general lack of awareness among policy makers, the general public, and international private or public health agencies, concerning the magnitude of the current and future cancer burden on the continent and its economic impact.

THE SPREAD OF CANCER IN AFRICA

Africa provides several contrasts with other world regions. Among women, this is the only region where cervical cancer is equivalent to breast cancer in terms of incidence (each constitutes approximately a quarter of the total burden) and is the most common cause of cancer death in women (23.2% of the total). The incidence and mortality rates for cervical cancer are 34.8 and 22.5 per 100 000 respectively, the highest of any world region. Among men, prostate and liver cancers are the most common forms of incident cancer and causes of cancer death. Although the leading role of prostate cancer in the cancer incidence pattern in men is shared with most other world regions, this regions also has mortality rates comparable to incidence rates. Cervical and breast cancers in women and prostate and liver cancers in men are the only cancers with sex-specific incidence or mortality rates of more than 10 per 100 000, but the high rates of Kaposi Sarcoma is the third most common cancer in men and represents 9.2% incidence rate of 7.2% of all cancer diagnoses, with an incidence rate of 7.2 per 100 000. This reflects the very high regional level of HIV infection and associated cancer sequelae before the advent of highly active antiretroviral therapy.

THE CONTROL OF CANCER IN AFRICA

Several African countries have made strides in addressing the prevention of non-communicable diseases (NCDs) like cancer. This is evidenced by the Brazzaville Declaration on NCD Prevention and Control in the WHO African Region adopted in 2011, which member countries signed to affirm their political willingness to put in place strategies and resources to control NCDs.

Today, two-thirds of African countries have national cancer control plans (NCCPs) compared to only 46% in 2013 which help them identify, prioritise and implement the most effective actions.Yet, there is still work to be done with regard to prevention measures and the implementation of strong healthcare systems which are able to effectively deal with non-communicable diseases. The region is predicted to have a greater than 85% increase in cancer burden by 2030. Approaches to minimise the burden of cancer in Africa in the past few years have had little success because of low awareness of the cancer burden and a poor understanding of the potential for cancer prevention. Success will not be easy, and will need partnerships and bridges to be built across countries, economies, and professions. A strategic approach to cancer control in Africa is needed to build on what works there and what is unique to the region. It should ideally be situated within strong, robust, and sustainable health-care systems that offer quality health care to all people, irrespective of their social or economic standing. However, to achieve this will need new leadership, critical thinking, investment, and understanding.

EPIDEMIOLOGY OF CANCER IN NIGERIA

Cancer is a public health problem worldwide affecting all categories of persons. It is the second common cause of death in developed countries and among the three leading causes of death in developing countries. Parkin et al reported that in indigenous Africans, 650,000 people of estimated 965million are diagnosed of cancer annually and lifetime risk of dying from cancer in African women is 2 times higher than in developed countries.

The burden of cancer in Nigeria is unknown mainly because of lack of statistics or under-reporting. This is not peculiar to Nigeria but most parts of Africa. In a study of cancer registry literature update from all over the world, only 1% of the literature emanated from Africa compared to 34% and 42% from Europe and Asia respectively 3. This is partly due to inaccurate population statistics which makes age specific incidence rates impossible or if available inaccurate. Large proportion of the population still never seek orthodox medical care and so are not recorded. Cancer is a leading cause of death worldwide, accounting for 7.6 million deaths (about 13% of all deaths) in 2008, and is projected to continue rising, with an estimate of 13.1 million deaths in 2030. Worldwide, cancer deaths are more than the percentage of deaths caused by HIV/AIDS, tuberculosis, and malaria put together. It is the second leading cause of death in developed countries and is among the three leading causes of death for adults in developing countries.

From Ibadan cancer registry, the first such review in the same population reported that cancers of the reticuloendothelial system topped the list while the second review observed that liver cancer was commonest among males and cervical cancer was commonest among females. In a retrospective study carried out in 2010 in the center of this study by Anorlu et al., between 2002 and 2007, of the total of 2200 patients admitted into the gynecology ward, 104 deaths were recorded and 83 (88.3%) of these were attributable to cancer. Cervical cancer, though being preventable and potentially curable, was the leading cause of death. This is followed by ovarian and endometrial cancer. In a similar study carried out in Enugu by Anya et al. in 2006 [11], the leading cause of the 79 deaths out of the 2033 gynaecological admissions was cancer, mostly cervical, followed by choriocarcinoma, septic abortion, and ovarian cancer.

The cancer mortality pattern is quite different in Africa when compared to other parts of the world. This may be explained by the difference in the climate, diet, genetic factors, and so on. Cancers causing viral infections such as HBV/HCV, EBV, and HPV are responsible for up to 20% of cancer deaths in low- and middle-income countries. There is lack or no efficient public policy on cancer issues across sub-Saharan African countries where infectious diseases like malaria and HIV/AIDS are the major public health concerns. In Nigeria, about 10,000 cancer deaths are recorded annually while 250,000 new cases are recorded yearly. The report of World Health Organization (WHO) reflects the alarming shortage of functional cancer control plans in sub-Saharan countries despite the enormity of socioeconomic havocs it poses to the countries. Among the 17% of African countries that have sufficiently funded cancer control program none are within sub-Sahara region. The data available on cancer mortality are rudimentary and grossly inadequate in Nigeria. Extensive literature research showed little or no information about the overall deaths attributable to cancer in Nigeria. Studies that encompass all cancers are rare. Most studies done on cancer mortality are based on specific cancers. Although, as informative as such studies are, they cannot sufficiently reveal the enormity of cancer havoc in Africa.

ANGIOGENIC GENES ROLE IN THE PROGRESSION OF OSTEOSARCOMA

Osteosarcoma is a primary bone malignancy with a particularly high incidence rate in children and adolescents relative to other age groups. The etiology of this often aggressive cancer is currently unknown, because complicated structural and numeric genomic rearrangements in cancer cells preclude understanding of tumour development.

Angiogenesis is the process of new blood vessel development, which is critical in both physiological development and pathological processes, such as tumor progression, wound healing, and cardiovascular, inflammatory, ischemic, and infectious diseases. In response to hypoxia, tumor tissues produce and release angiogenic growth factors, such as vasculo-endothelial growth factor, the acidic and basic fibroblast growth factors, and the platelet-derived endothelial cell growth factor to recruit new blood vessels by angiogenesis and vasculogenesis. It is now widely accepted that both mutations of oncogenes and tumor suppressor genes lead to the switch into an angiogenic tumor. The activation of endothelial cells by angiogenic factors leads to the production of proteolytic enzymes, which degrade the extracellular matrix. The degradation of the underlying basement membrane enables endothelial cells to proliferate and migrate to the surrounding tissue to form new vessels. These new vessels provide cancer cells with oxygen and nutrition and play an important role in cancer cell survival and metastasis. Thus, antiangiogenic therapies might be an interesting approach in OS therapeutics.

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