



Exploring the Globalization, Stress and Cancer- Relationship. A Selected Focus on Sub-Saharan Africa

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Abstract

A conceptual framework/model (Livingston & Hopwood., 2012) was used as a guide in this paper to explore the connection between the inherent forces associated with globalization and their contribution to stressful experiences, which in turn have the potential to further contribute to and/or exacerbate chronic diseases in general and cancer in particular in countries located in Sub-Saharan Africa (SSA). The focus of the paper was on selected contributing factors (e.g., stress, poverty, health-protective



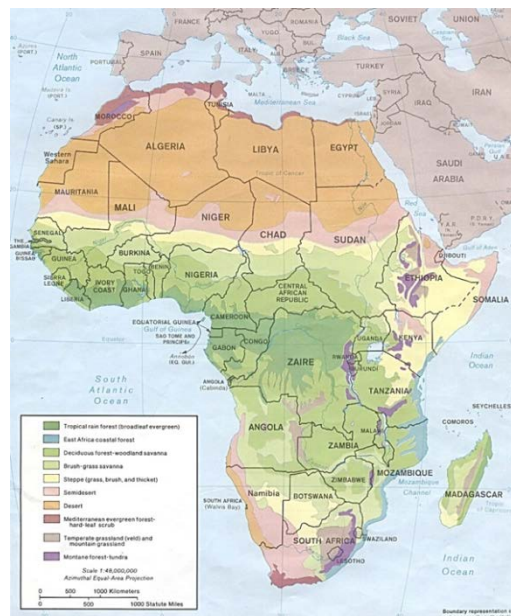
behaviors to the constellation of diseases called cancer (i.e., various sites) within the countries that comprise SSA.

Globalization, which can be defined as a process in which regions are becoming more interconnected, as a result of the increasing movements of goods, people, capital and ideas, has both positive and negative impacts on health (Unwin & Alberti, 2007). The focus of this paper was on the negative effects of globalization, operating mainly through stressful experiences that contribute, over time, to the etiologic importance and the exacerbating impact on cancer in SSA. Sub-Saharan Africa is in the middle of one of the most rapid demographic and epidemiologic transitions in world history. Based on globalization, and from a health perspective, it has been reported that urbanization in SSA is strongly associated with increased levels of other possible co-morbid conditions (i.e., with cancer), such as obesity, diabetes and cardiovascular disease (Young et al., 2010). Health education and related strategies are suggested to alleviate the outcome of cancer in the peoples of Sub-Saharan Africa.

Introduction

Most of Sub-Saharan Africa (see Figure 1) is currently undergoing rapid demographic, epidemiologic and socioeconomic transformation. Persistent high rates of communicable diseases with escalating incidence and prevalence of non-communicable diseases (e.g., cancer) has been termed “double burden of disease.” The scenario signals an impending crisis for the healthcare systems and economies of Africa (Omejua & Chukwudebe, 2010). WHO projects in the next 10 years Africa will experience the largest increase in death rates from cardiovascular, cancer, respiratory diseases and diabetes (WHO, 2005).

Many African health care systems are underfunded. Most health care systems prioritize available resources for communicable versus non-communicable diseases (even





though the latter is fast-growing). Sub-Saharan Africa (SSA) is in the middle of one of the most rapid demographic and epidemiologic transitions in world history. All of the SSA countries are experiencing a multifaceted array of problems including: increased life expectancy, poverty, increasing urbanization, Westernization of lifestyle, globalization and, in some cases, the disruption of the social fabric (WHO, 2005; Motala et al., 2009).

In countries like Nigeria, Ghana and South Africa, the prevalence of chronic diseases is increasing, while the threat of communicable and poverty-related diseases (malaria, infant mortality, cholera, malnutrition) still exists (Bonita et al., 2007).

The double burden of communicable and chronic non-communicable diseases, or NCDs, have a long-term public health impact as it undermines healthcare systems (Yach et al., 2004).

The forces of globalization have produced many changes in the world. These forces have contributed to cultural and ethnic conflicts, political changes, and changes in health standards and conditions (De Vogli, 2004). Nowhere are these health changes (e.g., infectious and chronic diseases) more prevalent than in the lives of people living in the relatively poor countries of SSA. Using a derived conceptual model, the main focus of this presentation was to underscore the impact globalization has made, mainly through westernization, urbanization and, subsequently, stress, over time, on the contribution to different sites of cancer in people living primarily in SSA.

Globalization, Sub-Saharan Countries and Health

Although globalization has been defined differently over time, for purposes of this presentation it was defined as follows” “A process of greater integration within the world economy through movements of goods and services, capital, technology, and (to a lesser extent) labor, which lead increasingly to economic decisions being influenced by global conditions.” (Jenkins, 2004, p. 1) The modernization of cultures has resulted in the standard of living on many SSA countries in urban cities, resembling those of many Western countries, with related epidemiologic changes (Kenge et al., 2005).

Africa bears a significant proportion of the global burden of chronic diseases, along with poor countries of Asia and Latin America (Aikins et al., 2010). The World

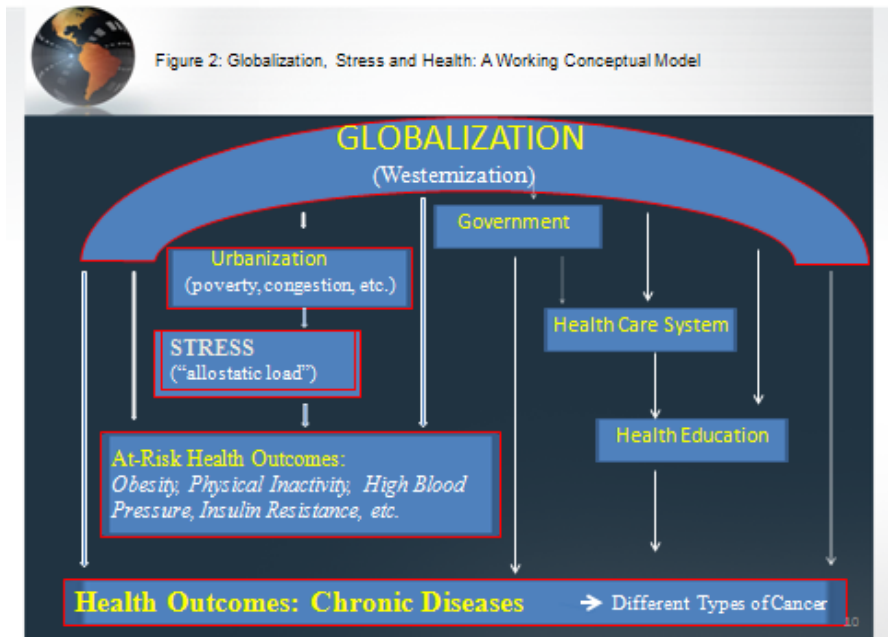


Health Organization (WHO) projects that over the next ten years the African continent will experience the largest increase in death rates from cardiovascular disease, cancer, respiratory disease and diabetes (BeLue et al., 2009). Africa's chronic disease burden is attributed to multifaceted factors including increased life expectancy, changing lifestyle practices, poverty, urbanization and globalization (BeLue et al., 2009). Many African health systems are under-funded and under-resourced and struggle to cope with the cumulative burden of infectious and chronic diseases. An estimated 80 percent of regional health budgets have been allocated to communicable diseases for some time now (BeLue et al., 2009).

A conceptual framework/model (Livingston & Hopwood., 2012) was used as a guide in this paper to explore the connection between the inherent forces associated with globalization and their contribution to stressful experiences, which in turn have the potential to

further contribute to and/or exacerbate chronic diseases in general and cancer in particular in countries located in SSA. Figure 2 illustrates the overarching and complex relationship to selected health outcomes, such as different types of cancers. This complex relationship occurs through a variety of conditions and experiences, such as urbanization stress, at-risk health outcomes, the resources of the government in SSA, their health care delivery systems and the prevailing systems dispensing health education.

In 2001, the World Health Organization (WHO) Commission on Macroeconomics and Health turned much conventional wisdom on its head by demonstrating that health is not only a benefit of development, but is also indispensable to development (COMH,



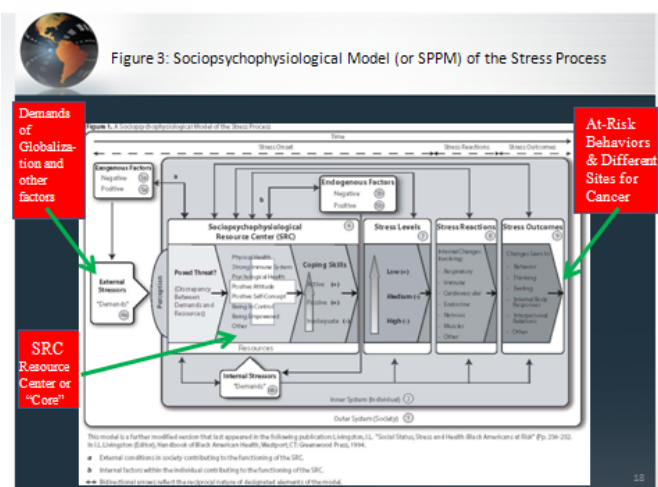


2001). Illness leads to “medical poverty traps,” creating a vicious cycle of poor nutrition, foregone education, and still more illness – all of which undermine the economic growth that is necessary, although not sufficient, for widespread improvements in the social determinants of health (SDH) (Dahlgren & Whitehead, 2007). Of future interests to the Commission is how the economic and geopolitical dynamics of a changing international environment (“globalization”) support and undermine health, or how these dynamics can be channeled to improve population health (Labonte & Schrecker, 2007).

Urbanization is a key process of globalization in SSA (see Figure 2). It is estimated that by the year 2020 the total urban population in SSA will double, so that 487 million individual will be living in urban areas (UN- HABITAT, 2004). Urbanization in SSA, as in other less developed parts of the world, is strongly associated with increased levels of obesity, diabetes and cardiovascular disease (CVD). Lower levels of physical activity and an increasing calorie-rich diet are key drivers of these increases in chronic disease rates and obesity. The production of processed foods has high profit margins and transnational food corporations are among the largest sources of foreign direct investment in many countries of SSA. The global availability and marketing of cheap vegetable oils and fats have led to increasing fat consumption in less developed countries, such as those in SSA. Rural-urban comparisons of obesity-driven type 2 diabetes in SSA find a 2- to 5-fold higher prevalence in urban areas (Young et al., 2010).

Views on Stress Using a Conceptual Sociopsychophysiological Model (or SPPM)

Stress was defined in an interactive manner for this paper. As seen in Figure 3 in the SPPM, stress is illustrated and defined as the discrepancy between demands or stressors resulting from globalization, westernization and cultural changes (e.g., vulnerability, sickness, societal poverty, drought) and the resource capabilities (e.g., resiliency, financial adequacies, positive view of self) of the individual





(Livingston & Hopwood, 2012). As seen in Figure 3, there is a sequential pathway of stress from onset, reactions and outcomes. At the core of the SPPM is the strength and resiliency the individual's Sociopsychophysiological Resource Center (or SRC). Essentially, this is where stress and resiliency are cultivated and maintained in face of unrelenting demands or stressors. For more explanation of the SPPM, see Livingston & Hopwood, 2012.

The potential cumulative impact of stress, or the allostatic load, on Sub-Saharan Africans can be devastating. Based on Livingston (2006), stressors, which give rise to stress are defined in five categories. Over time, based on the life experiences of people living in SSA, these five types of stressors (personality, private-life, psychosocial, organizational and environmental – see Figure 4 for examples of these stressors) can lead to the cumulative and more dangerous “allostatic” stress load, the latter of which places people in SSA to experience chronic, non-communicable life-threatening diseases, such as different types of cancers. See Figure 4.

Allostasis is the extension of the concept of homeostasis and represents the adaptation process of the complex physiological system to physical, psychosocial and environmental challenges or stress.

Allostatic load is the long-term result of failed adaptation or allostasis, resulting in pathology and chronic illness (Logan & Barksdale, 2008).



Figure 4: Potential Areas of Stress, or Stressors, for People in Sub-Saharan Africa





Cancer in SSA and the Stress-Cancer Relationship

Known medically as malignant neoplasia, cancer is a broad group of diseases involving unregulated cell growth cells divided and grow uncontrollably, forming malignant tumors, which may invade nearby parts of the body. Cancer develops when the body’s normal control mechanism stops working [because in part by stress]. (Informed Health Online, 2014). For general information, the various forms and treatments for cancer are seen in Table 1.



Table 1: Categories and Treatments For Cancer

Categories:

1. **Carcinomas** begin in the skin or tissues that line the internal organs.
2. **Sarcomas** develop in the bone, cartilage, fat, muscle or other connective tissues.
3. **Leukemia** begins in the blood and bone marrow.
4. **Lymphomas** start in the immune system.
5. **Central nervous system** cancers develop in the brain and spinal cord.

Treatments:

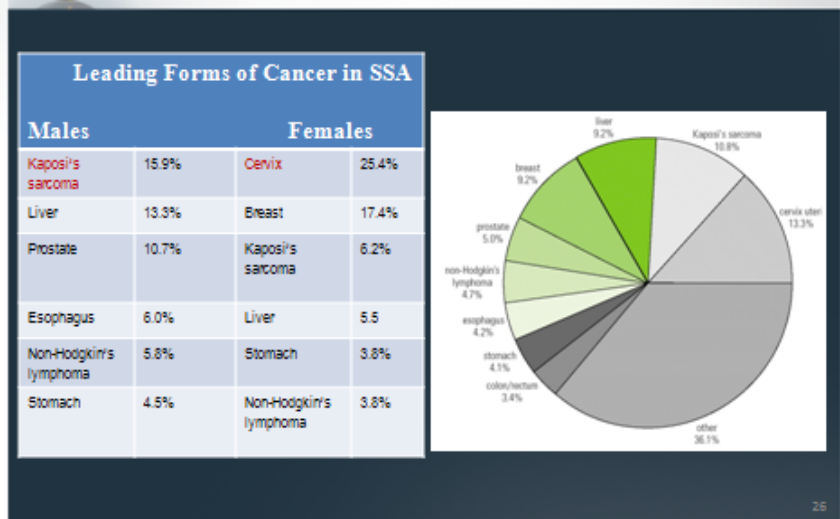
1. **Surgery:** directly removing the tumor
2. **Chemotherapy:** using chemicals to kill the cancer cells
3. **Radiation Therapy:** using X-rays to kill cancer cells
4. **Other** (e.g., holistic, psycho-behavioral...)

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Cancer is an emerging public health problem in Africa (see Table 2). According to the International Agency for Research on Cancer (IARC), about 715,000 new cancer cases and 542,000 cancer deaths occurred in 2008 in Africa (Ferlay et al., 2010). These numbers are projected to nearly double (1.28 million new cancer cases and 970,000 cancer deaths) by 2030 simply due to the aging and growth of the population (Ferlay et a., 2008), with the potential to be even higher because of the adoption of behaviors and lifestyles associated with economic



Table 2: Major Cancer Types in Sub-Saharan Africa, Both Sexes, All Ages (Ferlay et al., 2004)



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development, such as smoking, unhealthy diet, and physical inactivity, which were



mentioned earlier associated with other chronic diseases.. Despite the growing burden, cancer continues to receive low public health priority in Africa, largely because of limited resources and other public health problems (WHO, 2008).

Controlling Cancer and the Stress-Cancer Relationship in Sub-Saharan Africa

As seen in the working conceptual model of the paper (see Figure 2), while globalization can have a direct effect on health risk factors, and eventually the constellation of diseases that produce cancer, it is also reasoned that these relationships include the intervening factor of stress. It is reasoned that the “demands,” or stressors resulting in part from globalization once translated as “stress,” initiates, over time, a series of changes within the body. Stress engages the central nervous system and activates the behavioral and physiological response patterns, such as the “defense” and “defeat” reactions, which have been beneficial for the survival of the individual but may become maladaptive when stress is chronic (McEwan, 1998). The concept of “allostasis,” i.e., adaptation to physiological states and the environment, and “allostatic load” are helpful in understanding how responses to stress may become maladaptive and damaging (McEwan, 1998) for people in SSA.

Inflammatory pathways activated by stress have been implicated in the development of tumors, metastasis of tumors, and resistance to chemotherapy (Sarvenazzand, 2006). A recent study in the Journal of Clinical Investigation reported that activation of a master gene called ATF3, that is important for helping cells adapt to stress, may be involved in helping breast, and possibly other forms of cancer, spread to other parts of the body (metastasis) (Wolford et al., 2013). Psychological stress may be involved in the causation of breast cancer aggressiveness (Rauscher, 2011).Based on laboratory evidence, ATF3 is activated by cancer cells, cancer treatment, a high fat diet, and chronic behavioral stress (Paddock, 2013). “All of this (information) is still very preliminary, and years from being translated into a possible drug intervention to control ATF3, but one thing seems increasingly clear: stress and cancer go hand in hand” (Hamel, 2014).

Although cancer is a very serious and multifaceted disease condition, the government and people of SSA can reduce its risks significantly by: a) adjusting and “screening” for genetic predispositions (e.g., in breast and prostate cancers in women



and men, respectively); b) better controlling the environmental pollutants (toxic air, pesticides); and c) better managing lifestyle factors, such as managing stress, through national and local health promotion and health education strategies.

Since the 1990s, there have been a resurgence of interest in cancer incidence in Africa, and data from cancer registries from SSA have been published from West Africa in Gambia (Bah et al. 2001), Mali (Bayo et al. 1990), Guinea (Koulibaly et al. 1997), and Côte d'Ivoire (Echimane et al. 2000). Data from East Africa are available from cancer registries in Kampala, Uganda (Gondos et al. 2005), and from Southern Africa from the Zimbabwe Cancer Registry in Harare (Chokunonga et al. 2000), and the Malawi Cancer Registry in Blantyre (Banda et al. 2001). Cancer registration in economically underdeveloped populations, such as all the countries of SSA, is a difficult undertaking for a variety of reasons (Parkin et al. 2003). The major challenge is to ensure that all new cases of cancer are identified; therefore, it is essential to have more accurate registries.

Conclusion

Sustained improvements and changes in the at-risk populations of SSA need to occur at both the macro and micro levels. Greater acknowledgement is needed at all levels, especially at the governmental and policy levels, that globalization has a complex influence on health in general with a particular focus on the risk factors associated with the cancer (e.g., stress). See earlier working conceptual model (Figure 2). In the case of stress, the use of a conceptual model (see earlier SPPM in Figure 3) to address and guide appropriate health education and other appropriate intervention strategies has to be fully utilized. Additionally, and in a complementary manner, an increased understanding and appreciation have to be made of the potentially serious and destructive nature of cumulative stress, as represented in the “allostatic load.” As discussed the allostatic load implies the cumulative and toxic nature of stress that has the potential to disrupt the functioning of the immune (and other systems). Therefore based on these realities, targeted health and stress-related intervention, health education and other strategies must be used at both the macro and micro levels, especially in those more urbanized and “Westernized” countries in SSA. Additionally,



the SPPM, presented in Figure 3, can be used as a guide for any region specific and sensitive health education and/or interventions (e.g., involving cancer awareness and stress awareness and stress management) that are planned in urban and other at-risk communities in Sub-Saharan Africa..

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