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Lifestyle Changes and the Risk of Colorectal Cancer among Immigrants in the United Kingdom: Reflections and Lessons for Sub-Saharan Africa

[1]Ejughemre JU, [1]Ibekwe RU ,[2]Oyibo PG,

[1]Department of Community Medicine, Delta State University Teaching Hospital
P.M.B 07, Oghara, Delta State.

[2]Department of Community Medicine, College of Health Science, Delta State University,
P.M.B 01, Abraka, Delta State

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ABSTRACT

Colorectal cancer (CRC) is a public health challenge in developed countries and an emerging public health problem in developing countries. There is the established association between lifestyle and colorectal cancer globally. Scientific observations have shown low prevalence of this cancer in sub-Saharan Africa, Middle East, South Asia and the Caribbean. This is not so for Australasia, North America and Western Europe where the prevalence of colorectal cancer is high. Evidence have shown that migrant populations from low risk regions to countries in North America, Europe and Australasia have an increased risk of colorectal cancer (CRC) in their newly found environment as a result of lifestyle transitions as well as these populations contributing to the burden of the disease and public health challenges in their immigrant countries. More so over the past few decades, large transitions have occurred in lifestyle in the countries of origin of these migrants and these transitions reflect in epidemiological outcomes such as; changes in average stature, body composition and observed changes in disease patterns such that these developing countries that were saddled with burdens of communicable disease (CDs) are gradually acquiring non-communicable disease (NCDs) in high proportions particularly; diabetes, cancers etc; hence the double burden of disease. Importantly, as globalization and the proliferation of "Westernized" life style continues, it is becoming increasingly common to observe in these developing countries a battle with century old issues of CDs in addition to emerging health epidemics such as cancers. It is based on this that this paper through a review of literature, discusses the risk of CRC among migrants in the UK, its' impact on the health systems and lessons for sub-Saharan Africa.

Correspondence to:

Ufuoma John Ejughemre
Department of Community Medicine
Delta State University Teaching Hospital
P.M.B 07, Oghara, Delta State.
E-mail: *ufuoma.ejughemre@delsuth.com.ng*
Tel: +2348037827179

INTRODUCTION

Over the years the incidence of colorectal cancer (CRC) has reportedly been low in regions of the world such as in sub-Saharan Africa, South Asia and the Caribbean.[1] However, evidence have shown that when populations from these regions migrate to regions where there is high risk of developing CRC (such as North America, Europe and Australia), a higher incidence of CRC is observed among these immigrant populations compared to those in their native countries.[2,3] Several hypotheses have been postulated as reasons for these findings, one of which is credited to Denis Burkitt, who observed the low risk of CRC among native Africans when compared to Africans in the United States. [4] He reported that life style changes, particularly dietary patterns were the major contributing factor for these variations. [4]

In addition to the hypothesis by Denis Burkitt 4 and subsequent scientific evidence to support this, there are a number of possible confounders-such as physical activity, smoking and alcohol consumption, which could also be associated with the risk of developing the disease even among migrants in these high risk countries. The increased risk of CRC amongst migrant populations in the UK is a reflection of the future disease burden for low risk regions such as sub-Saharan Africa (SSA) with the current rapid lifestyle changes and 'westernization' being experienced. [5-8] The public health importance of CRC in SSA has therefore become important and it is critical to review these factors with a view to influencing relevant policy formulation.

Patterns of Immigration and Settlement in the UK

The importance of the patterns of immigration and settlement in the UK comes to bear. This is because of the heterogeneity of migrants and interpretation of studies on lifestyle changes and health in the UK particularly among migrants and ethnic minorities. Migrant studies [9,10] as well as anecdotal reports provide robust evidence on the patterns of immigration to the UK and how the environment influenced large scale transition in the lifestyle and dietary habits of these population with resultant health outcomes similar to those of the natives. The late 19th century showed marked influx of migrants to the UK, with populations from neighbouring Ireland, South Asia, China, Caribbean and Africa.[10] Some of them migrated as refugee, asylum seekers or workers and settled in and around cities like London and Liverpool. There were some shared as well as disparate traditions including dietary habits. These populations converged on lifestyle habits of their host country- the UK- with resultant epidemiological changes among these migrants: which included increased incidence of cardiovascular diseases, obesity and cancers. [11] These epidemiological trends have inadvertently added to the burden of disease in the UK.[10]

Disease Burden

CRC is a disease with global significance particularly in the developed world. According to International Agency on Cancer Research, there is global increase in the prevalence of the disease with most figures arising from North America, Australia, New Zealand and Western Europe.[1] It is estimated that globally every 3.5 minutes someone is diagnosed with CRC, every 9 minutes, someone dies from it, and every 5 seconds, someone who should be screened for it is not. [12] In the UK, estimates of the disease showed that in 2009, there were over 41,000 new cases of the disease.[13,14] Although there are some published statistics on the prevalence of CRC among migrants and ethnic minorities such as those arising from screening exercises,[15] it is however difficult to give exact estimates. Findings from research studies have also shown that there is an increase in the incidence of CRC from less than 5 per 100,000 to greater than 9 per 100,000 among populations who migrated to the UK when compared to findings in the countries of their origin within a period of 20 years from longitudinal studies among first generation migrants in the UK. [16,17]

Lifestyle Factors

Quite a number of factors have being associated with CRC; these include modifiable or environmental factors such as diets, exercise, physical activity etc as well as non-modifiable factors such as genetic makeup. [18,19] Some authors [20,21] believe that environmental factors particularly diets play the major role in contributing to CRC, others [22,23] argue that although dietary factors are important, they cannot take effect without a genetic interplay.

Interestingly, a few others [24] have also suggested that the aetiology of CRC is multi-factorial.

Diets and Nutrients

This is an area that has been extensively researched in the epidemiology of CRC. There is evidence of dietary risk factors arising from studies of migrants and their offspring.[2,3] Migration and ecological studies has supplied appreciable evidence, for instance black Americans have incidence of the disease that is comparable to those of the Caucasians compared to the native Africans.[4,9] In many instances migrants from low risk to high risk countries have an increased incidence towards the population of their host countries.[4,25] A classical example was among the offspring of Japanese migrants to Hawaii were the risk for CRC increased compared to that of populations in their country of origin.[4] The increased incidence even seems to surpass those of the white populations in the United States and was found to be three to four times higher compared to the Japanese in Japan. [26] It is generally accepted that diets and dietary habits constitute well over 80% of the risk factors associated with CRC. [9] Some authors believe that in the absence of this, the risk of CRC is almost negligible and there is no publication contrary to this.[27] It cannot be undermined that the UK is a country where there is high consumption of food rich in red meat, animal fat, sugars and refined dietary products. These increase the risk of developing the disease and may often inversely correlate with the consumption of dietary fibre, which supposedly is known to be protective. [28-30] In contrast to what prevails in the UK and other countries of the western world, the typical African diet consists of carbohydrate-based meal, rich in fibre and with little protein. However, when these native Africans, migrate to the UK, there is a rapid transition in their dietary habits as they are more disposed to consuming the 'westernized' diets which predisposes them to high intake of red meat, animal fat and little high fibre containing diet. [31] Although, many still try to retain their traditional diets by purchasing food from local 'African', or 'Indian' shops, for economic reasons they often purchase the high risk diets which in most instances usually cheaper and more readily available.

Furthermore, there are problems with the method and style of preparation of the meat. Meat heated at high temperatures contains a class of carcinogens known as heterocyclic amines (HCAs).[32-34] These substances are produced when meat is heated above 1800C for long periods, and grilled or barbecued meats contain the highest amount of HCAs due to smoke formed from the pyrolysis of fatty juices that drip down onto the heat source. [34] It is possible that this may have a role in dietary and lifestyle contributions to the increased risk CRC among these populations in the UK, but there may be counter arguments that local Africans consume some form of roasted meats popularly known as "suya" such as in Nigeria. However meat intake from this source forms a small part of the diets of these individuals, consequently the exposure to HCAs is minimal and not as high as is seen among UK migrants.

Spices such as Garlic and Onions have also been shown to reduce the risk of CRC.[35,36] Epidemiological studies have shown low incidence of CRC in Africa especially in areas where these spices and other hot and very spicy foods are consumed in abundance.[37] More evidence has shown that in some West Africans countries particularly Nigeria where hot and spicy stews with a base of ground tomatoes, red chilli pepper and onions are consumed in abundance, the incidence of this disease is low.[38] This may be due to certain phytonutrients which they contain.[35] Garlic and onions contain daillyl sulphide which has an antioxidant properties, they also contain flavonoids

which suppress rapid cell division which is a common feature of cancer formation [39] This may well explain why Africans in Africa still have lower rates of cancer especially CRC than their counterparts in the UK. [40]

Body Weight and Physical Activity

It was often thought that increased caloric intake and reduced physical activity was a sign of economic development and modernization as this often leads to obesity which is a common ailment in the UK. [41] There is evidence of the association between increased body size and CRC. [42-44] In fact, individuals who indulge in a lot of physical activities have a lower risk of developing the disease. [45] In most instances , individuals in many of these low risk countries with poor economic indices precludes the luxury of overindulgence in food and ensures that individuals rather indulge in continuous physical activities from manual labour, farming and or self-employment. In these countries starvation always results from idleness. Ironically, this may decrease the risk of CRC in developing countries because increased body size and lack of physical activity is not as prevalent in many of these countries as in the UK [46] which makes it easy for migrants to become obese and have increased risk for CRC. [8]

The Built Environment

The built environment also referred to as the 'obesogenic environment' is that environment within the home or workplace that promotes physical inactivity, weight gain, and is not conducive for weight loss hence potentiating the risk for CRC.[44,45] Reports from the European Environment Agency[47], reveals that over 75% of the European population (including immigrants) now live in urban areas and this has resulted in increased consumption of energy, resources, transport and land. These increase the risk for obesity, cardiovascular diseases and cancers. [43] This is typical of the UK and in contrast to what prevails in many rural and semi-urban communities in SSA where there is the absence of basic infrastructures and amenities, as well as the absence of 'obesogenic environment'. The obvious is physical activity, sweating and increased "unplanned" exercises by populations in the SSA region. On the contrary, these populations of interest get quickly 'acclimatized' to obesogenic environment on migration to the UK, thus increasing the risk for the disease.

Alcohol and Smoking

Consumption of alcohol has being linked to increased risk of CRC. [48] Although, the association between cigarette smoking and the risk of CRC is still controversial. An issue with smoking is that it is associated with physical inactivity, greater consumption of alcohol and lower consumption of fruits, vegetables and dietary fibres [49]. These are known to increase the risk of CRC.[43,48,49] Cigarette smoking has also being linked with the formation and growth of adenomatous polyps. The larger polyps are particularly associated with long-term smoking and these large adenomatous polyps are recognized precursor lesions of CRC.[50] Adult migrants have increased access to alcohol and cigarettes when compared to populations in their home countries and this appears to be true for first generation migrants. This is so most of the time because of increased socioeconomic status and increased access to leisure and wealth in the UK and as a result these migrants consume these substances sometimes at earlier ages than their counterparts in their home countries.[51]

Genetic Factors

Evidence based research has shown that there is a genetic association with the risk of CRC. [52,53] This may contribute by increasing the risk by up to 1.5 times particularly in homozygous allelic individuals.[52] Some authors believe that this may be a major contributing factor for the observed incidence of CRC in low risk population and in developing countries. [54-56] However, it cannot override the protective role diets play in developing countries or the vice-versa in the UK and other countries with high incidence. For instance, evidence have shown that US-born Japanese of the second generation migrants had significant rates of CRC that were 40-60% higher than among US-born Whites.[2] It could possibly be that the Japanese population carried a higher genetic predisposition to CRC that may likely manifest in a combination of conditions such as dietary changes, physical inactivity, alcohol and cigarette smoking and the built environment. These associated factors prevail in the UK and the reverse in SSA and other low risk regions. It could then be said that these populations- that are genetically predisposed have high genetically determined ability to rapidly acetylate pro-carcinogens to active forms and cause cancers but only in an environment that provides the opportunity for the high consumption of diets such as red and processed meat, processed and refined foods in abundance. [34] While the UK is such an environment with high risk factors, it could be argued that it does provide such conditions for homozygous allelic ethnic minorities to develop CRC.

Reflections and Lessons for Sub-Saharan Africa

Evidence has shown that there is higher risk of developing CRC in the UK than in SSA and other developing countries. [13,16,17] What is critical is the reflections and lessons that can be drawn from these. Currently, overwhelming reports reveals that there is a nutritional transition in many developing countries of which there is now decreased consumption of healthy diets rich in fibres and vegetables and increasing consumption of unhealthy ones rich in sugars and refined foods. [8,36] Individuals, possibly for economic reasons or for convenience are increasingly adopting dietary cultures similar to what African migrant populations face in the UK and other high risk countries. Diets high in saturated fat, refined sugar and processed foods that are low in fibre are often termed 'Western Diet' are now in abundance in many settings in the region. [8,36,57] Also there are reports of marked shifts in the structure of the food system in many of these low risk countries with increase in processed, affordable and effectively marketable food than ever before as is obtainable in the UK and other high risk countries.[5,6,8,36,57] These issues now come to bear, the sad fact is that the near future will result in an increase the incidence and prevalence of CRC and other NCDs. The import of this is that although, communicable diseases still continue to be important causes of disease burden in many of these developing countries including the SSA region, non-communicable diseases such CRC particularly, diabetes and cardiovascular diseases are now contributing significantly to chronic public health conditions.[58] This shifting health trends indicate that leading infectious diseases diarrhoea, HIV/AIDS, tuberculosis, and malaria will become less of a problem, as non-communicable diseases will become more important causes of disease burden in the region over the next 20 years. [59]

Additionally, the burden of CRC health challenge in the UK is being tackled adequately. Estimates by the Department of Health (UK) [60] showed that approximately £1.1 billion is spent annually in managing the disease in England alone with 26.1% as expenses on diagnosis excluding treatment and

palliative care costs. An average of £13,000 is the cost of care for one patient per annum and with a survival rate of up to five years post diagnosis cost may be up to £65,000 minimum for care of a patient. 60,61 These funds come directly from social insurance schemes and little or none comes out of pocket funding or user fees. [61] However, unlike what is obtainable in the UK, is the projection for costs of treatment and the deleterious effects on individual productivity as diseases of life style will take catastrophic tolls on the economic life of individuals, families, and societies in many settings in the region. Health systems and healthcare delivery still face the challenge of inadequate and equitable financing in many settings in SSA. According to the of 2010 health financing score card by the African Public Health Alliance, [62] only six African countries spend at least 15% of their national budget on health: namely; Rwanda, Botswana, Niger, Malawi, Zambia, and Burkina Faso. Thirty two out of fifty-three African Union member states spend less than WHO recommended US $40 per person.[62] This underscores the future of countries in SSA where little attention has been given to NCDs and in particular CRC as an issue of public health concern. More so, with inadequate resources, poorly funded health systems characterised by general lack of expertise to address the burden of CDs as well as social constraints such as economic and gender inequalities within these countries often amplify the risk of poor public health outcomes, the disease burden for SSA is exacerbated by the rising rates of NCDs- with increasing incidence of CRC thereof.

Conclusion

Recognizing that life style changes affects virtually every public health problem, paradigms of the rapid unfolding epidemiologic transition in SSA, uncontrolled epidemic of non-communicable diseases not only among migrants in the UK but globally are now issues of critical concern. This calls for more public advocacy and legislations aimed at preventing NCDs particularly CRC from becoming a major public health problem in the near future in SSA. More so, health planning and services as well as financing schemes should be implemented in the region to improve health care delivery and secure the future of the health of the public.

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