

The Obesity Epidemic and Cancer in Africa

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Overweight and obesity have increased since the 1980s. It reached 37% for men and 38% for women in 2013. The situation worsened for children and adolescents in developed countries. Recent reports showed that African and other developing nations are not immune from the devastating obesity epidemic.

Many studies revealed a relevant strong relationship between obesity and cancers such as esophageal, postmenopausal breast, colorectal and endometrial cancers. Obesity-related cancers have increased exceptionally in adolescents and young adults but decreased in more advanced ages.

Currently, cancer care services in Africa are still limited despite the rising demand; therefore, access to them is relatively difficult for many cancer patients with low income. Considering the fact that some cancers may be preventable, we reviewed articles about obesity and cancer to highlight the magnitude of the problem and raise awareness among African leadership on the importance of cancer prevention measures targeting obesity.

Keywords: Obesity, Cancer, Prevention, Africa

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The obesity epidemic

The number of obese children and adolescents (aged 5 to 19 years) in the World has increased ten times in the past 40 years, according to a newly published study by Imperial College London and the World Health Organization (WHO)¹.

If the situation remains unchanged, the World will have more obese children and adolescents than underweight in less than 5 years. The study that was published in the Lancet a month ago, scrutinized weight and height measurements from about 130 million individuals of more than five years (31.5 million people aged 5 to 19 and 97.4 million aged 20 and older), the greatest known number of individuals included in a study. More than 1000 researchers played part in this famous study that stared at body mass index (BMI) and how obesity has evolved worldwide from 1975 to 2016. Within this period, obesity rates in the world's children and adolescents rose from less than 1% for both sex to 14% in 2016¹.

Obesity in children which decelerates in developed countries is rising in developing countries as an impact of unhealthy food marketing and lack of preventive policies¹.

Obesity and cancer

The idea that obesity may cause cancer started in early 1930s after observing that over nutrition is frequent in cancer patients. It was postulated that excessive food intake may be the origin of malignancy². In 1997, the

World Cancer Research Fund / American Institute for Cancer Research published a first report on evidence between diet and cancer causal relationship³.

In 2002, the International Agency for Research on Cancer (IARC) published a report on the evaluation of cancer-preventive strategies, emphasizing on weight control and physical exercises⁴. Later, the WHO published another report focusing not only on nutrition and prevention of chronic diseases but also investigated the association of diet with cancer by evaluating causal relationship. There was strong evidence that obesity increases risk of colorectal cancer, postmenopausal breast cancer, endometrial cancer, renal cell carcinoma and adenocarcinoma of the esophagus. In addition, in 2003, another study reported that obesity was vigorously associated with cancer mortality and morbidity in men and women^{5,6}.

Obesity in Africa

Obesity has also increased in African children, adolescents as well as adult people. Table 1 summarizes the age standardized obesity in some African Countries in 2013⁷. North African countries occupied the first place for the age patterns of obesity in 2013. The Age related obesity was different between men and women and between developing countries themselves. For African countries, women are more obese than men older than 25 old years. The highest level of obesity was observed at about age 55 years for women with 14.4% (13.5–15.5) rate, and about 45 years for men with 8.1% (7.5–8.80) rate⁷.

Table 1. Age standardized obesity in some African Countries in 2013

Country	Males		Females	
	<20 years	≥ 20 years	<20 years	≥20 years
Cameroon	4.8% (3.9–5.8)	8.5% (7.5–9.5)	3.6% (2.9–4.5)	20.1% (18.2-22)
Central African Rep.	6.2% (5–7.6)	13.2% (11.8–14.7)	3.1% (2.4–4)	3.3% (2.9–13.9)
Egypt	71.2% (68.9–73.7)	39.5% (34.7–44.3)	39.5% (34.7-44.3)	48.4% (46.1-50.9)
Libya	14.5% (12–17)	30.2% (27.6–32.9)	22.1% (18.1-26.4)	57.2% (54-60.4)
Mauritius	5.4% (4.4–6.6)	7.4% (6.5–8.3)	6.6% (5.3–8.3)	18.4% (16.4-20.5)
Rwanda	4.2% (3.4–5.1)	2.4% (2.1–2.9)	3.4% (2.6–4.2)	3.4% (3–3.8)
South Africa	7% (6–8.2)	13.5% (12.6–14.5)	9.6% (8.5–10)	42.0% (40.6-43.3)

The above mentioned findings correlate with the previously published data on obesity in Africa. Sub-Saharan Africa was also affected by the emerging obesity epidemic despite unstoppable malnutrition in many countries⁸. Obesity rates in females were observed in Sub-Saharan countries particularly in urban settings⁹⁻¹³. It doubled in urban West African population in the past 10 years^{14,15}. In addition, more than a half of South African women and nearly 30 % of men were overweight or obese in the past 17 years¹⁶.

The obesity increase in Africa is attributed to high calorie food intake, changes in diet composition especially fast foods consumption which are cheap and abundant, decreased physical exercises, sedentary life, and possible changes in the intestinal microbiome. Reducing unhealthy food marketing, strengthening surveillance, good public health practice and awareness increase may be valuable⁷.

Cancer care defect in Africa

The newly published preliminary analysis of colorectal cancer in South African urban settings revealed that colorectal cancer had a tendency to occur at the younger age at presentation in black South African people, the frequently encountered tumor location was the left colon and rectum. This confirmed the data published previously showing a difference in age at presentation and site of tumor according to ethnicity. Risk factors such as smoking and obesity remain significantly worrisome even in lower and middle income countries¹⁷.

Another published article retrospectively studied the risk factors of breast cancer in Bangui questioned overweight and obesity among the breast cancer behavior risk factors in the Central African Republic women living the capital¹⁸.

An Egyptian published study on BMI and breast cancer in Upper Egypt concluded that overweight and obesity were strongly associated with the later stages of breast cancer at diagnosis (stage III, IV). This may be related to lack of screening awareness of obese women. Additionally, the increased fats in obese women may have affected early breast cancer detection. Obese and overweight women with breast cancer in this study were more often older, with a significant p-value (p=0.002), which confirmed that excessive adipose tissue in postmenopausal women may raise the production of endogenous estrogen due to elevated production and activity of enzymes aromatase and 17 β -hydroxysteroid dehydrogenase. Moreover, a decrease in the sex

hormone-binding globulin due to obesity results in elevated formation of estrogen and testosterone which may accentuate the cellular proliferation and inhibit apoptosis in the breast¹⁹.

The African population cancer survival rate is far worse than the one of developed countries. For instance, the 5-year survival rate of breast cancer women in Europe is 82%, while it is 46% in Uganda, 39% in Algeria, and 12% in Gambia Available data revealed causes of cancer management defect in Africa and proposed some solutions to the shoddy outcomes. However, there is lack of clear targets and time frame work towards the needed success²⁰. The WHO-Brazzaville Declaration on Non-communicable Diseases Prevention and Control in Africa recommended to raise awareness among Governments concerning non-communicable diseases such as cancers. The declaration also emphasized on prevention, health system strengthening, budget provision and data generation²¹.

Among other problems revealed, there was lack of sufficient operational policies and cancer control plans which look after cancer control strategies, monitor cancer magnitude and provide cancer statistics and their country distribution²²⁻²⁵.

The updated GLOBOCAN report revealed that more than 850,000 new malignances were diagnosed in Africa 15 years ago and within the same period 600,000 cancer related deaths occurred. And it was predicted that in 2020 the number of new cancers will be doubled²⁴.

The most common cancers in Africa were breast cancer and cervical cancer in females and prostate cancer in males. Other common malignancies are lung, liver, colorectal, esophageal, non-Hodgkin's lymphoma, Kaposi sarcoma and other skin cancers. The annual crude cancer incidence in Africa was 79/100,000 people²⁵.

Cancer care facilities in Africa are still limited, but through collaboration with the Organization for Research and Training in Cancer (AORTIC), up to 102 cancer centers were established. They provide clinical oncology, radiation oncology, medical oncology, pediatric oncology, palliative care and other organ specific oncologic services. Among the working centers almost a half of them is located in South Africa and Egypt. The defective surgical oncology services makes the problem more complicated and massive doctor's emigration to Europe is incriminated²⁶.

Most of African countries don't have radiation therapy services which are considered to cure up to 40% of cancer patients. In developing, counties due to the

defective surgical oncology services, radiation could treat up to 70% of new patients on palliative basis²⁷. It was revealed that only 277 external beam radiation therapy machines were available in Africa 7 years ago and 60 % of them are located in Egypt and South Africa, at the same time 700 additional machines were needed to cover the gap. Unfortunately, for the time being a large number of newly presenting cancer patients in Africa do not have chance to access the health services adequately. Chemotherapy services that are available in Sub-Saharan Africa covers only the half of the demand .They were revealed to be generic and very expensive for many poor families²⁸.

Pathology services and other diagnostic tool remain challenging. There are no available data about these important services in Africa. However, it was revealed that the number of pathologists in Africa is less than 10% the one of developed countries^{29,30}.

Recent data for cancer prevention revealed that most of frequent malignancies in Africa are, predominantly, preventable. For instance, cervical cancer prevention is possible by human papilloma virus (HPV) vaccination, liver can be prevented by Hepatitis C prevention and Burkitt's lymphoma risk can be reduced by malaria eradication. In addition, the risk of Kapsi sarcoma and by prevented by HIV control and the risk of skin cancers by reducing sun light exposure. Unfortunately, the review revealed that the preventive measures in many African countries are still inadequate³¹. Add to these, the potential impact of obesity control on cancer prevention.

Conclusion

Cancer prevention pledges the most auspicious channel of minimizing cancer burden in many developing countries. To achieve that, we need to fight against known modifiable risk factors, such as obesity. If untrammled, the obesity epidemic in Africa will significantly increase health and economic consequences, especially for those most vulnerable, poor people and the young generations. Implementation of potent mechanisms to address this epidemic is a worry of urgency on the African continent.

REFERENCES

1. NCD Risk Factor Collaboration (NCD-RisC). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128.9 million children, adolescents, and adults. *Lancet*. 2017; 390(10113): 2627-2642.
2. Simopoulos AP. Obesity and carcinogenesis: historical perspective. *Am J Clin Nutr*. 1987; 45(1 Suppl): 271-276.
3. Glade MJ. Food, nutrition, and the prevention of cancer: a global perspective. American Institute for Cancer Research/World Cancer Research Fund, American Institute for Cancer Research, 1997. *Nutrition*. 1999; 15(6): 523-526.
4. Vainio H, Bianchini F (eds). International Agency for Research on Cancer (IARC) Handbooks of Cancer Prevention (Vol. 6). Weight Control and Physical Activity. Lyon: IARC Press, 2002.
5. Joint WHO/FAO Expert Consultation. Diet, nutrition and the prevention of chronic diseases. WHO Technical Report Series 916. Geneva: World Health Organization, 2003.
6. Calle EE, Rodriguez C, Walker-Thurmond K, Thun MJ. Overweight, obesity, and mortality from cancer in a prospectively studied cohort of US adults. *N Engl J Med*. 2003; 348(17): 1625-1638.
7. Ng M, Fleming T, Robinson M, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet*. 2014; 384(9945): 766-781.
8. Lopez AD, Mathers CD, Ezzati M (eds). Global burden of disease and risk factors. New York: Oxford University Press, 2006.
9. Rothman KJ. BMI-related errors in the measurement of obesity. *Int J Obes (Lond)*. 2008; 32 (Suppl 3):S56-59.
10. Abubakari AR, Lauder W, Agyemang C, Jones M, Kirk A, Bhopal RS. Prevalence and time trends in obesity among adult West African populations: a meta-analysis. *Obes Rev*. 2008; 9(4):297-311.
11. Akarolo-Anthony SN, Odubore FO, Yilme S, et al. Pattern of dietary carbohydrate intake among urbanized adult Nigerians. *Int J Food Sci Nutr*. 2013; 64(3): 292-299.
12. Kimani-Murage EW, Muthuri SK, Oti SO, Mutua MK, van de Vijver S, Kyobutungi C. Evidence of a Double Burden of Malnutrition in Urban Poor Settings in Nairobi, Kenya. *PLoS One*. 2015; 10(6): e0129943.
13. Kruger HS, Puoane T, Senekal M, van der Merwe MT. Obesity in South Africa: challenges for government and health professionals. *Public Health Nutr*. 2005; 8(5): 491-500.
14. Scott A, Ejikeme CS, Clotey EN, Thomas JG. Obesity in sub-Saharan Africa: development of an ecological theoretical framework. *Health Promot Int*. 2013; 28(1): 4-16.
15. Devanathan R, Esterhuizen TM, Govender RD. Overweight and obesity amongst black women in Durban, KwaZulu-Natal: a 'disease' of perception in an area of high HIV prevalence. *Afr J Prm Health Care Fam Med*. 2013; 5(1), Art. #450.
16. RENZAHO, A. M.N., Challenges of negotiating obesity-related findings with African migrants in Australia: Lessons learnt from the African Migrant Capacity Building and Performance Appraisal Project. *Nutrition & Dietetics*, 2009, 66: 145–150. doi:10.1111/j.1747-0080.2009.01358.x
17. Prodehl LM, Bebington B, Fabian J, Singh E, Ruff P. Colorectal cancer in a south Africa urban setting - a preliminary analysis. *S Afr J Surg*. 2017 Jun; 55(2):58.
18. Balekouzou A, Yin P, Afewerky HK, et al. Behavioral risk factors of breast cancer in Bangui of Central African Republic: A retrospective case-control study. *PLoS One*. 2017 Feb 8;12(2): 0171154.
19. Abeer F. Amin et al, 2016. BMI and breast cancer in upper Egypt. *Al Azhar Assiut Medical Journal* 2016, 14:33-6.
20. Youlden DR, Cramb SM, Dunn NA, et al: The descriptive epidemiology of female breast cancer: An international comparison of screening, incidence, survival and mortality. *Cancer Epidemiol* 2012, 36:237-248,
21. WHO Africa : Uniting against NCDs: The time to act is now. The Brazzaville declaration on noncommunicable diseases prevention and control in the WHO African Region. http://www.who.int/nmh/events/2011/ncds_brazzaville_declaration.pdf

22. Stefan DC, Elzawawy AM, Khaled HM, et al: Developing cancer control plans in Africa: Examples from five countries. *Lancet Oncol* 2013, 14:189-195.
23. J.M. D'Angou, 2013 survey. *J Glob Oncol.* 2015 Oct; 1(1): 30–36. doi: 10.1200/JGO.2015.000406
24. Parkin M et al. Cancer incidence and mortality worldwide: sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer.* 2015 Mar 1;136(5):E359-86. doi: 10.1002/ijc.29210.
25. Daniela Cristina Stefan et al , 2015. *Cancer Care in Africa: An Overview of Resources* .South African Medical Research Council, Cape Town, South Africa. *JGO – Journal of Global Oncology.* 2015; 1(1).
26. Gyorki DE, Muyco A, Kushner AL, et al: Cancer surgery in low-income countries: An unmet need. *Arch Surg* 2012,147:1135-1140
27. International Atomic Energy Agency: IAEA human health series, no.14: Planning national radiotherapy services: A practical tool. Vienna 2010. <http://www.iaea.org/Publications/index.html>
28. Abdel-Wahab M, Bourque JM, Pynda Y, et al: Status of radiotherapy resources in Africa: An International Atomic Energy Agency analysis. *Lancet Oncol* 2013, 14:168-175
29. Adesina A, Chumba D, Nelson AM, et al: Improvement of pathology in sub-Saharan Africa. *Lancet Oncol* 2013, 14: 152-157
30. African Pathologists' Summit Working Groups: Proceedings of the African Pathologists Summit: March 22-23; Dakar, Senegal: A summary. *Arch Pathol Lab Med* 2013;139:126-132, 2015
31. Busolo DS, Woodgate RL: Cancer prevention in Africa: A review of the literature. *Glob Health Promot* 2015, 22:31-39.