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Challenges and opportunities to tackle the rising prevalence of diet-related non-communicable diseases in Africa

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Africa is experiencing a sharp rise in non-communicable diseases (NCD) related to rapid globalisation and urbanisation leading to shifts in dietary and lifestyle patterns characterised by increased energy intake and physical inactivity. However, unlike more resource-endowed regions, Africa has a double burden of disease: NCD co-exist with infectious diseases including lower respiratory tract infections, HIV/AIDS and diarrhoeal diseases. The African economy is also relatively weaker, making it difficult to cope with this burden. It is postulated that NCD will soon overtake infectious diseases as the number one cause of death in the African region. The recognition of NCD as diseases and obesity as a related risk factor is weak in Africa, compounded by stigma associated with wasting in HIV/AIDS and obesity being perceived as a sign of wealth, achievement and care. There is also a dearth of data on overweight and obesity in the region and little knowledge that infant feeding practices, such as breast-feeding, are linked to reduced risk of NCD in both children and mothers. While complex multi-sectoral approaches to address this NCD menace are needed, Africa may benefit from taking simple initial steps to address NCD risk factors including: (1) behaviour change communication to challenge perceptions on NCD; (2) promoting and protecting breast-feeding; (3) formulating policies and regulations limiting wide availability of unhealthy foods; (4) mainstream nutrition education in school curricula and (5) collection of accurate data based on indicators that can reflect the double burden of disease and malnutrition; and fostering multi-sectoral actions against NCD.

Non-communicable diseases: Africa: Body composition: Double burden of malnutrition

All countries worldwide face a growing burden of non-communicable diseases (NCD) which account for one-half of the overall burden of disease^(1–4). In low and middle-income countries, there is a sharp rise in NCD in the backdrop of an existing heavy burden of both infectious diseases and undernutrition. According to 2016 data the risks of dying from NCD were highest in low and middle-income countries, especially in sub-Saharan

Africa, and, for men, in central Asia and eastern Europe⁽⁴⁾. Overweight and obesity are important risk factors of diet-related NCD such as CVD and some cancers. The phenomenon of the double burden of malnutrition refers to the co-existence of multiple forms of malnutrition (undernutrition or micronutrient deficiencies, and overweight and obesity) at individual, household, national, regional and global levels and at different

Abbreviation: NCD, non-communicable disease.

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points in the life course^(5–7). There is adequate evidence that poor diet quality^(8–10) and physical inactivity^(11–13) are the primary drivers of the ever-rising burden of diet-related NCD. Diet quality may affect NCD independent of body weight or obesity⁽⁸⁾. Factors including exposure to environmental pollutants and microbial toxins may play a role, but the mechanisms linking these to NCD are yet to be fully understood to enable targeted action^(14–18). Countries are responding at varying paces to the NCD menace by putting in place policy frameworks that address some of its key driving factors including, school-based nutrition education, taxation on cigarettes, alcohol and sugar-sweetened beverages, laws to enable mandatory reformulation of food products, and regulations on marketing and advertising of food products to children^(8,9,19,20).

Africa is grappling with a double burden of disease: NCD co-exist with infectious diseases including lower respiratory tract infections, HIV/AIDS and diarrhoeal diseases^(10,21,22) with limited capacity to cope with and a weak policy landscape^(21,22). A recent expert meeting, while calling for urgent action to address the double burden of malnutrition, underscored the critical role that nutritional status plays in the health and wellbeing of individuals⁽²³⁾. The present paper discusses the growing threat of NCD in Africa, the existing policy landscape and challenges and opportunities for action to respond timely and effectively. A few areas that can be used as springboards to simultaneously address multiple disease and malnutrition burdens taking into account the myriad contextual challenges that the continent faces are suggested.

The double burdens of disease and malnutrition in Africa

Africa is experiencing a sharp rise in NCD related to rapid globalisation and urbanisation^(10,23–26). According to 2018 WHO data, 41.8 % of Africans now live in urban areas and 29.8 % of the population is aged between 30 and 70 years⁽²⁴⁾. Improved prevention and treatment of infectious diseases means that relatively more Africans are living longer than before^(27–35). All these factors have led to shifts in dietary and lifestyle patterns^(26,32) with a sharp increase in energy intake and physical inactivity. The African diet, like elsewhere in the world, has shifted from largely fibrous to more refined, energy-dense foods coupled with increased consumption of alcohol and sweetened beverages^(33–35). However, unlike more resource-endowed regions, Africa has a double burden of disease: NCD co-exist with infectious diseases including lower respiratory tract infections, HIV/AIDS and diarrhoeal diseases⁽¹⁾. Africa also has a double burden of malnutrition where stunting, wasting and overweight and obesity co-exist, especially among children and women^(6,23,34–40). According to WHO malnutrition report for the African region, most countries have high stunting rates of more than 30 %, and the rates are rising. Thirty out of the forty-seven countries have wasting rates greater than 5 %⁽³⁶⁾. Poor intrauterine growth leading to low birth

weight, and iron deficiency anaemia among mothers and children are still rampant and are exacerbated by the co-existence of infections including malaria, HIV/AIDS, tuberculosis and others^(1,6,23,27,36). Twenty-six African countries have low birth weight rates more than 10 %⁽³⁶⁾. The African economy is also relatively weaker than elsewhere, making it difficult to cope with this burden and financing is still heavily tilted towards addressing infectious diseases^(28,29,31,40). It is postulated that NCD, specifically, IHD and stroke, will soon overtake infectious diseases as the number one cause of death in the African region^(4,23,30,31). NCD account for 37.1 % of all deaths with the probability of dying from at least one of four major NCD estimated to be 20.5 %⁽²³⁾. Diet-related risk factors are among key drivers of the NCD pandemic in Africa^(8–10,31,32). The double burdens of disease and malnutrition ravaging Africa will certainly undermine the grand march towards Agenda 2063 if nothing is done urgently. So where does Africa begin? The best point is to use existing challenges and convert them into opportunities for action. A few key actions that may have wide impact are considered.

Confront the misconceptions about NCD: it has been done before for HIV

The recognition of NCD as diseases and obesity as a related risk factor is poor in Africa, compounded by stigma associated with wasting in HIV/AIDS. Despite rising knowledge on obesity as risk factor for NCD, it is still largely perceived as a sign of wealth, achievement and marital harmony^(41–44). Healthcare workers have no better perceptions on overweight and obesity⁽⁴⁴⁾ and this may compromise care provision to affected populations. Cultural perceptions on body size and shape are as important as other factors including globalisation, urbanisation, occupations and built environment, and must be considered in strategies to address NCD⁽⁴⁵⁾. Well-designed behaviour change communication strategies that are culture sensitive, are needed to challenge these misconceptions and to mitigate stigma associated with NCD.

Promote and protect appropriate infant and young child feeding practices: a healthy child is a healthy adult in waiting

There is strong evidence that breast-feeding, if well practiced, has a potential to have double duty impact; enhancing intelligence^(46–48) and preventing child mortality, and protecting both mother and child from the risk of NCD^(46–50). Although almost all sub-Saharan African infants are breastfed, challenges remain in the low rates of timely initiation of breast-feeding within the first half hour of delivery and exclusive breast-feeding for the first 6 months of life^(26,51). Only a third of African countries have already attained the 50 % exclusive breast-feeding target⁽²⁶⁾. Children who are exclusively breastfed according to WHO recommendations gain more fat-free



mass⁽⁵²⁾ and are therefore more likely to have lower risk of overweight and obesity later in life⁽⁴⁷⁾. HIV infection remains a problem to the extent that HIV-infected lactating mothers may not have easy access or adequately adhere to antiretroviral therapy⁽⁵²⁾. Inappropriate infant and young child feeding practices are associated with retarded growth, which increases the risk of later overweight and obesity⁽⁵³⁾.

Do not make policies for the shelf, implement them: where need be, formulate new ones to enable action

Despite some progress, Africa has not kept pace with meeting international commitments in addressing NCD, including the WHO led NCD Global action plan 2013–2020⁽⁵⁴⁾. According to Global Nutrition Report 2017 Africa, like most continents, is not on course to meet global nutrition targets including that of halting the rise in obesity and diabetes by 2025⁽⁵⁵⁾.

Policy formulation and implementation are limited by insufficient political commitment, resource allocation and a dearth of local data for policy making and outcome monitoring^(56,57). Multi-sectoral action against NCD is also weak due to disjointed coordination, and lack of adequate capacity building and resource mobilisation^(56,58). Involvement of sectors such as trade, academia, media, civil society and agriculture⁽²³⁾ can bring much needed leverage to fight the problem comprehensively. Better regional coordination in NCD-related legislation is needed to foster synergy⁽⁵⁹⁾.

Ensure an environment and foods devoid of contaminants and microbial toxins

Environmental contaminants and microbial toxins have a potential not only to drive undernutrition, but also the risk of obesity and related NCD. Endocrine disrupting compounds such polychlorinated biphenyls, pesticides and mycotoxins may impact child growth and health via modified action of growth hormone, adiposity, DNA methylation and protein synthesis⁽¹⁷⁾. Endocrine disruptors negatively impact on hormonal processes associated with growth from *in utero* and have potential to programme the fetus for later disease^(60–63). A recent expert consultation on endocrine disruptors in Africa⁽⁶⁵⁾ called for urgent action to address this problem and highlighted gaps in resource allocation for research and weak policy implementation. Mycotoxins are fungal secondary metabolites that are linked to adverse health outcomes in both human subjects and livestock^(64–67). Aflatoxins, a class of mycotoxins produced by *Aspergillus flavus*, have received the attention of researchers in Africa and beyond. Contamination of food by aflatoxins leads to losses in human health, agriculture and trade⁽⁶⁶⁾. Aflatoxins, especially aflatoxins B1, have been linked to cancers of the liver⁽⁶⁸⁾ and gallbladder⁽⁶⁹⁾, acute toxicity^(70,71), retarded growth in infants^(72,73) and immune function disruption^(68,74). Although research has heavily focused on aflatoxin, similar adverse effects on child growth have been

observed with other mycotoxins such as Fumonisin⁽⁷⁵⁾ suggesting potential synergy if multiple toxins co-exist.

Develop capacity to collect non-communicable disease-sensitive data for evidence-based policy formulation and action

There is also a dearth of data on overweight and obesity in the continent⁽³⁴⁾ and little knowledge that infant feeding practices, such as breast-feeding, are linked to reduced risk of NCD in both children and mothers. Policy formulation and design of interventions to tackle NCD depends on the availability of appropriate data. In terms of diet-related risk factors (food intake and physical activity), adiposity is the most sensitive indicator of the risk of obesity and related NCD. Being obese heightens the risk of death from major NCD: metabolic syndrome, diabetes, CVD and some cancers^(76–78). For example, strong correlations have been demonstrated between high BMI and increased risk of hypertension⁽⁷⁹⁾ and diabetes⁽⁸⁰⁾. While BMI is a useful screening tool that allows for categorising individuals as overweight or obese, it does not measure adiposity, the most important component of metabolic load⁽⁸¹⁾. Individuals with the same BMI may not necessarily have the same amount and distribution of body fat^(82,83). Knowledge of the amount of body fat, how it is distributed throughout the body and the composition of lean mass is important^(81,84,85). Techniques to measure body composition include bioelectrical impedance, dual-energy X-ray absorptiometry, densitometry including air displacement plethysmography and isotope dilution techniques⁽⁸⁶⁾. Isotope dilution including deuterium oxide and doubly labelled water techniques are based on the estimation of total body water^(87,88). Isotope dilution has been used as a reference method to validate other methods of body composition assessment^(89,90).

Where does Africa go from here?

While complex multi-sectoral approaches to address this NCD menace are needed, Africa may benefit from taking simple initial steps to address NCD risk factors. As Lloyd-Williams and colleagues⁽⁹¹⁾ rightly argue, there is a plethora of policies and interventions proposed but trying to do them all at the same time may be counterproductive. Africa may benefit from the law of the vital few^(92,93) and start only with what is doable and most impactful. Actions that enable simultaneous addressing of both infectious and NCD will be most desirable⁽²⁷⁾. Such actions may include: (1) Promote behaviour change communication to challenge perceptions on NCD. Such approaches can be based on lessons learnt from tackling infectious diseases such as HIV and tuberculosis. Health-care systems already in place to respond to these infections can be used as platforms to for dedicated response to NCD⁽⁹⁴⁾; (2) Formulate and implement policies and regulations limiting wide availability of unhealthy foods while promoting healthy lifestyle; (3) Mainstream nutrition education in school curricula.

Holistic school-based interventions that involve parents and the community may be most effective^(95–97) and may simultaneously address food insecurity in a double duty format; (4) Implement policies to regulate food and environmental contaminants; (5) Collection of accurate data based on indicators that can reflect the double burdens of disease and malnutrition. Body composition is influenced by multiple adverse exposures; body fat accumulation and distribution are key predictors of the risk of obesity and related NCD^(17,81). Including accurate body fat and lean mass measurement in NCD surveillance may add value on interpretation of risk and design of interventions.

Conclusion

There is much to be done to tackle NCD but initiating all actions at the same time may not be ideal especially in a context where resources are limited. Multi-faceted actions that enable simultaneous addressing of both infectious diseases and NCD, and malnutrition in all its forms will be most desirable. Lessons learnt in the fight of infectious diseases such as HIV will be important in the fight against the double burden of malnutrition and diet-related NCD.

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Conflict of Interest

The author is an employee of the International Atomic Energy Agency.

Authorship

The author had sole responsibility for all aspects of preparation of this paper.

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