

Can we exploit and adapt indigenous knowledge and ethno-botanicals for a healthy living in the face of emerging diseases like Ebola in Africa

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To cite this article:

Kenneth Anchang Yongabi, Laura. DeLuca, Keto Mshigeni, Suki K. K. Mwendwa Alex Dudley, Francisca Nambu Njuakom. Can We Exploit and Adapt Indigenous Knowledge and Ethno -Botanicals for a Healthy Living in the Face of Emerging Diseases Like Ebola in Africa.

American Journal of Clinical and Experimental Medicine. Special Issue: Clinical Innovations, Developments in the Diagnosis, Management and Prevention of Ebola Disease (Marburg fever) and Hemorrhagic Fevers. Vol. 3, No. 1-1, 2015, pp. 24-28.

doi: 10.11648/j.ajcem.s.2015030101.15

Abstract: In this essay, we attempted to catalogue and describe African indigenous knowledge, in contributing to sustainable health development in Sub Saharan Africa. In the face of poverty and threats of diseases such as ebola. We also describe how biotechnology can enhance cultural mechanism for improved health care. A snap shot of certain cultural habits that promote disease dissemination that would have to be modified is described. This report is basically a descriptive essay and partly based on a survey and collection of indigenous practices in Cameroon, and some cultures across countries in SSA. Some of the traditional knowledge relevant to disease transmission and control may form basis for experimentation, validation, development and application of appropriate medical biotechnologies for cheap, low tech disease control strategies and healthy living through a number of ethnobotanicals medicines, such as *Occimum basilicum* popularly called holy basil and in Kom language known as afuaih toh by many ethnicities of the Tikar in Ghana, Uganda, Gabon, parts of Kenya and Tanzania, Equitorial Guinea, Ethiopia, and Madagascar, who believe that the aromatic smell it emits dispels not only evil spirits but certain diseases such as HIV, Ebola and disease vectors. Such indigenous knowledge and science, with simple skills and familiarity, applied as an innovative approach to hygiene, medical challenges and disease control. Understand the practices, and see how to introduce interventions (incremental interventions), with existing indigenous knowledge enhanced with present science and technology, which you see can be applied to resolving present and possible outbreaks like Ebola. Generally called Macepo, tribes in Bukuru in northern Nigeria often used it to preserve dead bodies in remote villages where neither hospital nor morgue exist for days pending burial. Could scientific attention validate the use of African indigenous knowledge in Ebola prevention or future emerging diseases so that Africans can carry out safe burials within the context of their culture without risk of disease spread? We noted the believe amongst most ethnic groups regarding the use of *Occimum basilicum*, and leaf powder of some indigenous plants as a preservative for corpse or crops and insect repellent. This could serve as excellent platforms for mitigation and control of outbreaks such as Ebola.

Keywords: Indigenous Knowledge, Medicinal Plants, Traditional Ecological Knowledge (TEK) Food Security, Biotechnology, Disease Control, Sustainable Development

1. Introduction

There is a huge wealth of indigenous knowledge that can be exploited for improved healthcare in Africa. This knowledge exists in the various cultures of the several tribes in Africa that remain largely unclassified and unformatted. From antiquity, prior the advent of colonialism, Africans generally lived in communities with shared values. Indigenous knowledge about food and medicine were generally known in their various dialects as handed down by their ancestors. In this paper, we like to look at this traditional knowledge base and relevance with respect to: traditional knowledge of the disease, knowledge of transmission in their culture, treatment systems used by the various traditions as well as traditional practices that promote disease transmission. This could provide useful insights that could trigger clinical innovations toward diagnosis, treatment and prevention diseases such as the Ebola.

In modern day diagnosis, treatment and prevention of diseases, traditional knowledge of disease has sparingly been used in certain circumstances. For example, it is common to see flyers and leaflets being translated in various dialects in most African countries carrying messages such as the importance of immunization, oral rehydration techniques in case of cholera etc. One would hardly know if these communities in Africa fully know what these diseases are, historically, from their culture. That is if the names of these diseases really exist in their cultures without any equivalent translation. Sometimes, it can be difficult to obtain a direct translation of these diseases say cholera in any of these languages or say the direct meaning of Ebola virus in any of the native languages in Liberia, Guinea and Sierra Leone. It is imperative to study the exact and precise meaning of all infectious diseases in the various languages across Africa. Sometimes, the equivalent meaning of a disease in any of the local languages in Africa may point to or paint an indirect meaning as to how the disease is treated, managed or transmitted or prevented. Public health experts and epidemiologists would need to explore this strategy in order to better understand disease transmission dynamics, persistence and possible sporadic outbreak in certain communities. There is a need to revisit infectious diseases within the context of the culture, habits, antiques, lyrics, myths and rituals of the African people. If properly catalogued and formatted across Africa could carry useful tips on modeling and predicting sudden outbreaks and emerging and re-emerging diseases such as the Ebola outbreaks. A classical examples being used today in public health is venereal diseases. The word venereal is from Greek mythology. Venus being considered goddess of love is deontological and translates directly as diseases acquired through sexual intercourse. Just imagine the influence this has had on western systematic in medical bacteriology. From this historical meaning we can infer that this disease can be prevented by avoiding sexual intercourse. Yet, we use this daily without any thoughts as to its origin. Is it possible that to develop an African glossary for infectious diseases in

Africa? One would wonder what an initial Ebola hemorrhagic fever in Zaire in the 1976 would have been called in the local dialect, if we knew; it may have had connotations as to its etiology, transmission and/or clinical manifestations. Since the first diagnosis was confirmed in Belgium in the laboratory where Peter Piot worked, the anthropology and the cultural context in which this disease manifested was not considered. Yet, a more devastating outbreak faces Africa 38 years down the line. Another classical example concerns the origin of the name of the bacteria *E. coli*. Of course, the Italian scientist Escherichia first discovered the gut bacteria in the colon and so the name was Escherichia, after him and then the place where the bacteria colonizes; the colon. Are African Medical scientists having an indigenous name for *E. coli*? Yet, Africa has a lyric, music, dancing style that is truly reminiscent of their environment and history. In the evolution of problems or challenges in African music or lyrics etc, it would not be too hard to chart a sustain solution.

Perhaps, if we approach the history and meaning or equivalent of these diseases from each culture, we might find clues for simple and sustainable medical interventions. An African health literacy scheme is essential if, healthcare is to be improved exponentially in the foreseeable future. Too often, the African medics or elite are applying disproportionate solutions to the continents healthcare problems.

2. The danger of African Culture and Traditional Practices to the Spread of Infectious Diseases

Africans are generally display affection. This they do with real fraternal intentions in accordance with their values and norms as laid down by their forefathers and ancestors. For instance, Africans have a culture of shaking hands too often with little regard to hand-washing. This culture breeds poor hygiene and sanitation but to change this attitude isn't enough to promote the sales of hand sanitizers. The hypothesis we will not proof in this work is if these local knowledge can be investigated as disinfectants and antiseptics that can prevent human to human viral transmission of infections as seen with Ebola infected corpses. Even with the declaration and efforts of the MDG of achieving basic water and sanitation, this attitude nor drastic improvement of hygiene and sanitation has not been significantly achieved. Yet, the actors of MDG forgot or were ignorant of the underlying African anthropology of hand shaking in Africa in order to build in suitable intervention. Today, the consequences cultural practices entered the global health spotlight during attempt to spread information on Ebola transmission in Liberia, Guinea and Sierra Leone, particularly. In many African cultures, funeral rites are obligatory. There is a certain reverence for the dead especially in some cultures where the widows or the bereaved touch the corpse in certain rights, as well as

cleaning and dressing the corpse. All these are points of disease transmission especially within the context of the current Ebola outbreak. Getting Africans to adhere or reverse this and other cultural habits seems inevitable but could be very culturally disappointing and requires a lot of sensitization. The current challenge with the current approach is that, this should not be focused on Ebola only. There is need to review traditional practices and the risk of transmission of infectious diseases not only with Ebola but as part of an anthropological or cultural preparedness plan for mitigating future disease outbreaks as mentioned by Yongabi in 2014 (www.catuc.org/conferenceonebola.html, www.leffortcamerounais.com/.../catuc-bamenda-holds-ebola-sensitisation) In Cameroon as in most of the African countries, such as the Kom people, the ritualistic obligate of goat and fowl slaughtering is a critical step to pacify both the living and the dead. Generally, the goat is grilled and served with palm oil, salt and corn fufu for all partakers to feed on. Yongabi (2002) questions the total sterilization process. He hypothesizes the possibility of transmission of cryptosporidium oocysts and other parasitic zoonotic diarrhea and dysentery based infections amongst the Kom people.

Hunting in some of the tribes in Africa is also a ritual. For instance in Kom, there are certain times of the year set aside in the traditional calendarium for hunting bushmeat for the king of kom. Normally, the males of the clan go out and fetch bushmeat of which their catches are then taken to Laikom-the Kom palace for the king to feed on. This is exercise is mandatory but may not have considered the disease risk involved. There have been requests recently for most traditional practices and habits to be reviewed within the current threats of Ebola outbreak. In as much as these traditional norms are likely to be reviewed, the requesters so far in our view have been too imposing rather than an epistemic framework on the historical facts of this practice as well as the *rason d'être* of the practice. The people need to make adjustment willingly through a profound understanding of the need, if only imposed; they may do the opposite behind the scenes. Such a study could reveal why this is obligatory and if there are likely substitutes devoid of any compromise to the traditional norms. With such a finding, perhaps, appropriate substitutes to traditional hunt for bush meat may be gotten and the hunting day could be used to grill synthetic meat analogues that have been generated through biotechnology with the same tastes for the king. Such profound epistemic studies may reveal if the ancestors would love the synthetic meat grilled at the palace in lieu of hunting. It is only through a thorough research into the anthropology of these traditional practice should the world know if the king is interested in the taste of the bushmeat or is simply the loyal act of hunting? The present stop or ban on traditional burials and banned on bushmeat consumption across Africa is very timely and necessary in the face of this outbreak but it is not seen as a sustained solution to abating the spread of infectious diseases in Africa. In the interim, this act is salutary, but questions as to whether there can be total compliance without an alternative meat source remain.

Moreover, a follow up study on the traditional habits with the people of this community at the centre of understanding and the creation of adaptative changes over time is grossly lacking.

3. Traditional Practices and the Containment of Infectious Diseases Such as Ebola

Historically, some elders in some villages in Cameroon and in Nigeria argue that the tools they used for hunting bush meat usually is coated with some extracts of plants that are poisonous and sterlant for the purpose of sterilizing against infection. They claim that the long standing practice has been done since time immemorial and been effective in reducing infections. On the one hand as scientists, we cannot, totally, accept this claim but on the other hand we cannot dismiss them completely. The current global approach to containment of the Ebola virus is really inadequate and likely unsustainable unless cultural and historical knowledge is explored, validated and integrated into the current global intervention strategies. These have infrequently caught the attention of the health expert or the highly educated. Africans are largely agrarians and some travel long distances through forests to fetch food and make a living. We cannot envision a global health precautionary plan that can realistically address how these farmers would continue to carry out their farming. For example, while at their farms, traditionally, they will pitch a leafy hurt under a tree, most likely, a tree that previously had an animal rub its fur on it and leaving patches of microbial spores. Sometimes, they fetch water from a running brook in the forests where other animals have excreted into or drunk, leaving them with high risk of acquiring of some waterborne zoonotic diseases. Sometimes they eat a ripe banana from the tree where birds and bats have previously eaten or left their saliva. Sometimes they eat a plum fruit or a mango fruit in which monkeys or squirrels may have also eaten. In addition, it is habitual to catch a bush meat while cutting the bush and generally they would roast in situ and start eating on the farm. With this farm cum cultural habits, it's very, unlikely, that the current strategy of intervention can curb the spread and emergence of infectious diseases in Africa in the foreseeable future. However, there are potentially unwitting health-protecting manners in which the rural people prepare bush meat in the farms by grilling with traditional herbs such as the black pepper (*piper nigrum*) and red pepper (*capsicum anuum*) in kom (in kom dialect: Fesus a local dialect in Cameroon) land as well as many tribes in the north west region of Cameroon where they was ground to powder and spread on the meat in which studies have shown to contain antimicrobial properties. The need to review the entire hunting process and preparation of protocols for farming systems is critical. African traditional agricultural methods vis-à-vis risk of emerging infectious diseases needs to be studied. Traditional Africans have used plants and indigenous knowledge to kill disease vectors e.g

Decoctions of *piper nigrum* have been used to kill and prevent cowpea weevils (*Callosobruchus macalatus*) and also preventing mycotoxin producing fungi on beans. Other plants found in all the tribes from the people of Gambar in the Bauchi State of Ngeria, mostly, the sayawa tribes of the Tafawa Balewa Local Government of Bauchi State in Northern Nigeria to the people of north west region of Cameroon for pests and animal control and disease control on crops were Cypress (*Cupressus sempervirens*), Garlic (*Allium sativum*) and Tamarind (*Tamarindus indica*) and

similar uses across tribes in many Sub Saharan countries. There are some of these animals that are potential vectors of infectious diseases. Due to the traditional links and cultural attachment, these tribal people have with these botanicals we have a new glossary which we have referred in this study as – anthropo-botanicals-. African tribes have a rich heritage of indigenous knowledge that can be applied to boost food production but seem to have been abandoned in lieu of mostly unsustainable modernity.

Table 1. Traditional medicinal plants that can be used to sterilize meat during grilling and also consumed as Phytoprophylaxis

Plant/herb used by some tribes	Ethnofolklore use
Occimum gratissimum Aspilina Africana	Extracts for hand washing on the farms, currently being used by local women to preserve food, crops etc Use in Jos plateau state to preserve corpses
Jatropha curcas	The latex is a good anticoagulants, used by local people to sterilize fresh wound in lieu of iodine

(Source: generated by K. A. Yongabi, 2010).

Disease-causing microorganisms such as bacteria and fungi and viruses deposit on the crops and more so some of the wild animals predate on these crops and feed on the fruits. It is also likely that some of these infectious agents are transmitted from the crops to humans a concept we can temporally called phytosis as opposed to zoonosis. The Koch postulate may have to be used in the future to validate this. Africans use rudimentary tools in agriculture and hands are used during weeding and soil tilling and movement, yet animals would have pass through these. It is common place to have bruises and wounds on the farms and run the risk of many diseases transmission. The need to study all these and build on the local first aid traditional knowledge in the control of infections are really crucial. A follow up studies are required to catalogue useful traditional knowledge in the control of emerging diseases threat such as Ebola. The scientific validation of using phytodisinfectants, phytosterilant on the spot on farms as well as phytoprophylaxis can be technologies to build on for sustainable disease mitigation control and containment. The conclusion is drawn that there is a need to match African indigenous knowledge and anthropology, enhance it scientifically for improved and sustainable pest control and diseases of crops in Africa. The gem cannot be polished without friction nor man perfected without trial

Health care sustainability can be obtained together with health and living standards in Africa, if appropriate health care technologies are applied according to climatic region and local society This approach we advocate promises a brighter future for the world especially developing countries, but the technologies have to be built on indigenous knowledge, and skills made simpler so as to empower the commoner. The systematic input of science to indigenous knowledge is what we need in order to add value to medicinal plants and control ebola and future outbreaks, in as much as we have to wait long to synthesize these products-

which still comes out expensive for the commoner. A closer look at the local resources and planning technologies and development around that is pivotal to the survival agriculture health care and food security in Africa and of course solving Africa's problems. The world's health care providers would need carve out new integrated hospitals with an integrative diagnosis and prescription of drugs that are appropriate in the context of an "african sick person"

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