





## THE NEED TO IMPLEMENT *ONE HEALTH* APPROACH IN CONTROLLING VECTOR-BORNE DISEASES IN NIGERIA

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**Keywords:** One Health, vector-borne diseases, public, Nigeria, human.

**Introduction.** The primary goal of this article is to raise attentiveness about the critical need for vector-borne disease control in Nigeria in relation to One Health, as well as to examine existing understanding on this subject matter, which is quickly befitting as a valuable resource for public health policymakers and specialists across the country. Globally, there has been an increase in the number of vectors, which has resulted in an increase in vector-borne diseases. Thousands of individuals die every year as a consequence of vector-borne diseases, and there is an urgent need to manage these vectors.

**Material and methods.** The present research used PubMed, ResearchGate, WHO and other online databases with the following keywords "Climate change in Nigeria", "Public health in Nigeria", "Vector-borne Diseases", "Nigeria population" and "One Health in Nigeria".

**Results.** We observed that there has not been an implementation of the One Health approach against Vector-borne diseases in Nigeria.

**Conclusions.** The One Health strategy has the potential to address this issue. One Health is the concept that the health of human is intertwined with that of animals and our collective environment. Malaria is a vector-borne disease that is one of Nigeria's biggest health issues. However, land use changes such as deforestation, mining, and other activities have increased in Nigeria, while climate changes have increased internationally.

**Cuvinte cheie:** One Health, boli transmise prin vectori, public, Nigeria, om.

### NECESITATEA DE IMPLEMENTARE A ABORDĂRII *ONE HEALTH* ÎN CONTROLUL BOLILOR TRANSMISE DE VECTORI ÎN NIGERIA

**Introducere.** One Health este conceptul potrivit căruia sănătatea umană este interconectată cu cea a animalelor și a mediului. Scopul principal al acestui articol este de a spori atenția cu privire la nevoia critică de control al bolilor transmise de vectori în Nigeria, în legătură cu abordarea One Health, precum și de a examina înțelegerea acestui subiect, care trebuie să devină, în scurt timp, o resursă valoroasă pentru factorii de decizie din domeniul sănătății publice și a specialiștilor din întreaga țară. La nivel global, creșterea numărului de vectori, a favorizat o creștere a bolilor transmise de aceștia. Mii de persoane mor în fiecare an ca urmare a bolilor transmise de vectori și este imperios de a gestiona acești vectori.

**Material și metode.** Pentru realizarea studiului au fost explorate bazele de date online PubMed, ResearchGate, OMS, aplicând cuvintele cheie: „schimbarea climatică în Nigeria”, „sănătate publică în Nigeria”, „boli transmise prin vectori”, „populația din Nigeria” și „One Health in Nigeria”.

**Rezultate.** S-a observat inexistența implementării abordării One Health împotriva bolilor transmise de vectori în Nigeria, strategia One Health având potențialul de a aborda problema în cauză.

**Concluzii.** Malaria este o boală transmisă de vectori, care este una dintre cele mai mari probleme de sănătate din Nigeria. Cu toate acestea, în timp ce schimbările climatice au crescut la nivel internațional, schimbările în utilizarea terenurilor, cum ar fi defrișările, minieritul și alte activități au crescut și în Nigeria.

**INTRODUCTION**

Malaria, arboviruses, Lyme diseases, leishmaniasis, and other vector-borne diseases (VBDs) have become a key public health distress around the world. This is because of rapid climate change, as well as further non-climatic elements such as expansion, land-use change, habitat invasion, and human relocation, which partake in the increment of the dispersal of intrusive vector species and the development of new disease-causing organisms in the human populace (1, 2), altering the geographical distribution of vectors, and amplifying the spread of diseases. VBDs are thought to account for more than 17% of the universal disease burden, with more than 700,000 deaths detailed each year around the world (3).

The World Health Organization (WHO), the World Organization for Animal Health (OIE), and the United Nations Food and Agriculture Organization (FAO) launched the "One World, One Health" initiative in 2008, with the expression "One Health" being proposed as a notion to validate the close-knit of animal, man and environmental health (4). It now embraces the link between man, animal, and environmental wellbeing in a multi-disciplinary methodology denoted by a multifaceted biotic and societal structure that comprises numerous actors and procedures, as well as their connections over time at the native, nationwide, and international levels (5).

Population health and quality of life are both dependent on an ecologically balanced environment. Great contingents are susceptible to endemic communicable and parasitic infections because of an absence of basic hygiene combined with rain, overflows, municipal garbage, and a high population concentration (6).

In most developed countries, implementing One Health has been simple because all twelve pillars of the global health security agenda are present; however, in developing countries (such as Nigeria) and low-resource settings, achieving the goals of One Health is a major challenge, as there is little or no knowledge about zoonoses due to limiting factors such as a lack of trained medical professionals and surveillance systems (7).

It is essential for Nigeria's human and commercial growth to adopt universal public health priorities. In Nigeria, the Federal Ministry of Health, formed in 1954, is responsible of the entirety of health-related matters (8).

*The purpose* of this paper is to raise consciousness on the need of One Health implementation.

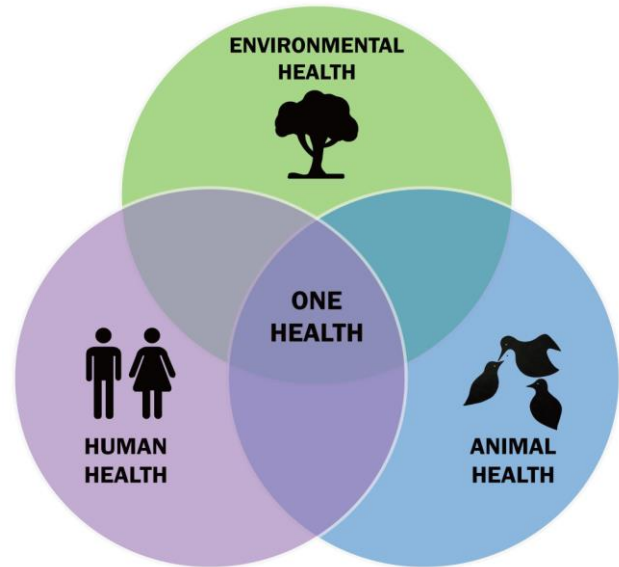


Figure 1. One Health Triad (9).

**MATERIAL AND METHODS**

For this paper, a literature search to identify articles reporting One Health Initiative in Nigeria was conducted.

*Period*

The present study reviewed the relevant literature between the year 2008 and 2022 (with only one exception). 2008, was the year that the World Health Organization in conjunction with other organizations launched the "One World, One Health" initiative. This paper was written in 2022.

*The search strategy and selection criteria*

Relevant publications, 38 in total, were searched in electronic databases including PubMed, ResearchGate, WHO, CDC, Semantics scholar and other online databases (table 1). The following keywords were used "Climate change in Nigeria", "Public health in Nigeria", "Vector-borne Diseases", "Nigeria population" and "One Health in Nigeria".

**RESULTS**

Out of the 38 publications reviewed, only 13 pertain to the One Health approach in Nigeria. Out of the 13, only two directly mention the need to implement One Health approach in Nigeria, while

only one stated that action has been taken on the subject matter (tab. 2).

A nationwide One Health strategic plan was launched in Nigeria, integrating the security of human, animal, and environmental health. The Federal Ministry of Health, the Federal Ministry of Agriculture and Rural Development, and the Federal Ministry of Environment collaboratively prepared the strategy, which was issued as a One Health strategic plan. It affirms Nigeria's resolve to intensify cross-sectoral cooperation for health security (10).

According to research made in 2019 by Oguniola and Yaya, climate change in Nigeria is causing temperatures to rise. The degree of temperature change or volatility affects the spread of vector-borne diseases, such as malaria. The temperatures that support the development of malaria parasites are at their optimum and greatest levels (11, 12, 13). If there are no effective initiatives created to address these disorders, Nigerians will continue to be exposed needlessly to these diseases that otherwise can be prevented.

The World Health Statistics for 2011 show that Nigeria has a malaria fatality rate of 146 per 100,000 people. It also revealed that there were more recorded cases of malaria in 2009 than there were in 2008 (2,834,174 cases vs. 4,295,689 cases) (14). The implementation of One Health will significantly slow the spread of diseases that are transmitted by vectors.

Nigeria's lack of health infrastructure means that fighting the threat of communicable illnesses will be challenging (15). According to the 2000 world ranking, Nigeria is placed as 187 out of 191 countries evaluated, the Nigerian health sector being in a poor condition (16). Therefore, One Health is required in order to address the issue of communicable illnesses in Nigeria as the CDC was not established to do so on its own.

Iserere EE, et al. (2015) go into great length about the importance of disease surveillance in Nigeria. Ifeanyi M. Nsofor (2022) reaffirms Nigeria's demand for One Health.

Table 1. Online Databases Used For the Study.

Databases	Number of papers reviewed
PubMed	9
ResearchGate	4
WHO	4
CDC	2
NCDC	1
Semantics Scholar	10
Others	8
<b>Total</b>	<b>38</b>

Table 2. The trend of One Health in Nigeria.

Year of publication	Action taken	References
2008 - 2018	None	(8), (17), (19), (21), (22), (23), (26), (27), (28), (33)
2019	Launched	(10)
2021	Reiteration	(7)
2022	Reiteration	(18)

## DISCUSSIONS

With a populace of around 191,000,000 people and a gross domestic product of \$375.75 billion in 2017, Nigeria is Africa's most populous country (19). With an unemployment rate of 13.4%, Nigeria is classified as a low and middle income nation. Nigeria's population is growing at a rate of 2.43

percent, with a birth rate of 36.9 per 1,000 people (20).

The temperature rising, variable rainfall, increasing sea levels and overflowing, drought and desertification, land dreadful conditions, more common excessive weather occasions, impacted

fresh water resources, and damaged biodiversity are all signs that Nigeria's climate is altering (21, 22, 23), which could lead to an increase in disease vectors.

Ecosystem change encompasses climatic change, ecological change, and their interrelationships, and is thought to be linked to a slew of new diseases (24). The link between healthiness, farming, and ecological units give the "One health" concept a wide opening as illustrated in Figure 1 above.

The ecosystems in and nearby the inter-tropical convergence region, specifically, are thought to be the most vulnerable to climate change. They are thought to be linked to the emergence of a number of new diseases, particularly vector-borne diseases. Though there is an indication that climate change is aggregating the prevalence of vector-borne diseases and may add to the pathogens' virulence, there have been few researches in Nigeria on the association between vector-borne diseases and climate change (25).

Balthazard-Accou K. et al (2021) conducted a study that found evidence of climate change in the Southwestern part of Nigeria by analyzing temperature and rainfall trends in the area.

According to Ogunsola OE (2019), global warming, which is caused by an increase in temperature as a result of climatic changes, may have an impact on many ecological systems in this part of Nigeria. Many communicable diseases, including vector-borne diseases carried by blood-feeding arthropods like Zika, Dengue fever, Malaria, and Chikungunya, are caused by climate change.

Changes in land-use and cover reflect decisions made in natural resource strategy and development. It has real-world ramifications for non-urban livelihoods, environmental health, and the ecosystems and biodiversity it sustains (28).

Universally, zoonotic illnesses are a strain on poor countries' healthcare structures, such as Nigeria's. According to the US Centers for Disease Control and Prevention, zoonoses account for 60% of infectious diseases and 75% of new or emerging infectious diseases (29). The transmission of zoonotic illnesses could be aided by highly infectious human-human encounters (30).

In developing countries like Nigeria, the human-animal-environment interaction of disease spread poses a significant threat to the popular

tion's welfare, leading to an increase in the appearance of illnesses that are difficult to treat (31).

This strategy aims to control global public health challenges that are involvedly interrelated and inter-reliant on the expanding human populace, their activities on the environs, and their interactions with faunae. According to Zinsstaga J. (2011), the growing human population has resulted in fast urbanization, increased livestock output, globalization, and intensive environmental exploitation.

Malaria remains one of Nigeria's foremost source of death. It is accountable for virtually 25% of ages below five mortality, 30% of juvenile mortality, and 11% of maternal death. Insufficient plans to address Nigeria's numerous health concerns have ensued in slight change in our health standing (33). Only a good disease monitoring system, in which suspected and confirmed arbovirus infections are frequently reported to the health authority, allows for a quick response.

VBDs exacerbate the poverty cycle by restricting efficiency and the capability to generate foodstuff or earn enough money to buy food or medicinal care. VBDs are well suited to the 'one health' paradigm for addressing communicable infections because of the effect of human undertakings on disease occurrence and the unswerving and incidental impact on human health and livelihoods. Foremost risk reasons for geographical advancement to fresh places include amplified human movement, population development, occupation, and climate change. Sub-Saharan Africa, which bears a large portion of the global disease burden, has a population growth percentage of roughly 2.6% per year, which is greater than the current global average of 1.2 percent (34).

While One Health is supposedly – and possibly economically – appealing, it will require substantial political drive and state capability to overwhelm prevailing institutional and financial obstacles to its execution, especially in developing nations where multiple health and expansion significances contend for consideration and programmatic funding. If One Health is to be seen as something other than an "effort to grab funding on the tail-end of the avian influenza bonanza" (35), current examples must be identified and critically analyzed.

Disease surveillance is the ongoing monitoring of (36). the manifestation of diseases and health-concerned happenings in order to provide timely action for disease management. VBD surveillance consists of observing the infection, the disease-causing organisms, the disease-transmitters, and environment (including climate) in order for the established order to make well-versed judgments about whether or not to interfere, depending on the circumstances (36).

Surveillance systems, in general, deliver actionable information via a feedback mechanism that

incorporates observing and involvement operations. Surveillance feedback systems are widely used in the medical field. European countries, for instance, are receiving signals that the measles rate is rising while vaccine coverage is declining (37).

However, the public can be rescued from the threat of these prevalent diseases if adequate preventative and curb methods can be introduced by stakeholders appertained to, as has been done in the US (38) and as described in this paper.

#### **ADVANTAGES of an effectively implemented One Health approach for zoonotic diseases.**

1. Quicker and more effective response to zoonotic disease outbreaks and emergencies.
2. All divisions have access to the data they require.
3. Decisions are built on precise and pooled scenario evaluations.
4. Accountability to one another and to decision-makers guarantees that all sectors take action.
5. All sectors may agree on, approve, and implement regulations, policies, and recommendations.
6. Everyone in the partnership is aware of their individual roles and responsibilities.
7. Technical, human, and financial resources are employed efficiently and fairly.
8. Infrastructure, capacity, and data gaps are identified and addressed.
9. Funding, policy, and program advocacy is more effective (4).

#### **CONCLUSIONS**

1. Disease surveillance, educated medical professionals, government funding for research, policy-making, and extension initiatives are all critical needs in the country.
2. In order to save lives in Nigeria, entomologists, epidemiologists, public health workers, veterinary and medical doctors, and other health care experts need to work together on VBDs.
3. As this review article reveals, there is still a need for more research.

#### **CONFLICT OF INTERESTS**

None.

#### **ETHICAL APPROVAL**

Not applicable.

#### **ACKNOWLEDGEMENTS**

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