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Protocol of the scoping review on Vector-borne zoonoses of domestic fauna in Central Africa

This protocol used the Preferred Reporting Items for Systematic review and Meta-Analysis protocols (PRISMA –P) as a guideline (Moher et al., 2015). The PRISMA-P was developed specifically for systematic reviews therefore, certain components had to be adapted for this scoping review.

ADMINISTRATIVE INFORMATION

Title

A scoping review on vector-borne zoonoses of domestic fauna in central Africa

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Contributions (1)

CONTRIBUTION	AUTHORS
Concept idea	All
Drafting protocol	TK, VN
Defining eligibility criteria	TK, OI, MS, VN
Search strategy	TK, OI, MS, VN
Search verification	MS, MM
Title and abstract screening	TK, OI, VN
Full-text screening	TK, OI, VN
Data extraction	TK, OI, VN, MS, MM
Data analysis and synthesis of results	TK, OI, VN, MS, MM
Drafting paper	TK, OI
Reviewing paper	All

Support (2)

This project has not been funded.

1. INTRODUCTION

Rationale (3)

A zoonosis is an infectious disease that has jumped from a non-human animal to humans. Zoonoses represent a significant percentage of new and existing diseases in humans .There are over 200 known types of zoonoses. Zoonotic pathogens can be of bacterial, viral or parasitic origin, or can involve unconventional agents and spread to humans through direct contact or through food, water or the environment. They represent a major public health problem worldwide due to our close relationship with animals in different contexts (agriculture, domestic animals and natural environment). Zoonoses can also disrupt the production and trade of animal products for food or other purposes (WHO, 2020).

Zoonoses control is a major health problem and is part of the health challenges of the 21st century, which require action by governments.

The expansion of vector-borne zoonoses today stems mainly from the intensification and globalization of trade in goods and the movement of people. The interactions of man with his environment, as well as climate change are also factors in the spread of these diseases. (Santé publique France, 2019)

The emergence of vector-borne zoonoses involves at least three organisms: the pathogen, the vector and the vertebrate host (human and animal). Any modification of the natural environment of these three organisms can change the context of the interaction of these three entities, and potentially alter the epidemiology of vector-borne

diseases. These changes include deforestation, migration and international trade, agricultural practices and animal husbandry, water control projects, urbanization, loss of biodiversity, introduction of exotic species ("aliens"), climate change, etc. (Pépin and Artois, 2011). Vector-borne diseases are responsible for 22.8% of emerging infectious diseases, and 28.8% of those that have occurred during the last decade (Jones et al., 2008).This upsurge coincides with climate change observed during this same period, which confirms the hypothesis of the influence of climate in the emergence vector-borne diseases, the latter being susceptible to environmental conditions (rain, temperature, etc.).

These diseases are among the main causes of morbidity and mortality for humans and animals. For example, dengue fever affects 50 to 100 million people each year with a death rate up to 2.5%. (Failloux and Moutailler, 2015). Rift Valley fever has had four major epizootic outbreaks in Africa, which always occurred after an event which would favor the multiplication of vectors. In this case the impoundment of water retention dams, particularly in Kenya between 1997 and 1998, 89,000 people were infected and 500 died (Brugere-Picoux and Kodjo, 2007). Some studies related to these types of zoonoses have been conducted in Europe (Gale *et al*., 2010), (Wardrop, N. A. 2016); but to the best of our knowledge little is known about these diseases in Africa.

Summarize available information on prevalence and risks factors of vector-borne diseases particularly in central Africa has a great importance for policies and mitigation strategies to reduce the public health risk vector-borne zoonoses. To the best of our knowledge, this will be the first scoping review focused on this topic in central Africa.

Objectives (4)

This protocol defines the methodology to review and summarize the available information on risks factors and prevalence of vector-borne zoonoses both in humans and in domestic fauna in the area of central Africa (Cameroon, Congo, central republic of Africa, Chad, Equatorial Guinea) to better inform future policies aiming to control spreading of these specifics zoonoses.

This scoping review has the following objectives:

- To identify and describe the existing literature on vector-borne zoonoses in domestic fauna and human, particularly in central Africa's countries (mainly focusing on prevalence and risk factors in humans and domestics animals, and risk factors)
- To identify and discuss any research gaps within this topic.

The specific PICo elements are:

1. Population: Domestic animals: dog, cat, monkey, rats, mouse, rabbit, parrots, chicken, cattle, pigs, Goats, sheep, horse
2. Interest: vector-borne zoonoses from domestic animals
3. Context: Central African countries (Cameroon, Congo, Central Republic of Africa, Chad, Equatorial Guinea)

2. METHODS

Protocol and Registration (5)

This protocol is archived at School of Veterinary Medicine and Sciences, University of Ngaoundéré, Ngaoundéré, Cameroon

Eligibility criteria (6)

Inclusion criteria

1. Criteria related with the elements of the PICo question (Population, Interest and Context).
2. Language: Publications in English and French.
3. Publication types: Journal articles reporting original research data, fulfills the study design eligibility criteria (cross-sectional, longitudinal study, case-control study, cohort study)
4. Publication date: all
5. Geographical location of studies: Central Africa countries
6. Availability of full-text article

Exclusion criteria

Studies reporting aggregated data such as studies with the methodology or results aggregating data from domestic animal and other species.

Information sources (7)

To identify potentially relevant documents, the search will be conducted in four databases: CAB abstract (OVID interface), Web of Science (WOS), Agricola and PubMed available via the University of Bern (Switzerland). All the databases of WOS will be used (Web of science core collection, BIOSIS Citation Index, KCI-Korean Journal Database, Medline, Russian Science Citation Index and SciELO Citation Index). However, we will exclude the following editions: Arts & Humanities Citation Index (A&HCI), Conference Proceedings Citation Index-Science (CPCI-S), Conference Proceedings Citation Index-Social Science & Humanities (CPCI-SSH) and Social Sciences Citation Index (SSCI).

As a search validation procedure, if we get less than 10 papers includes after the full text screening, we will scan the reference lists of relevant review papers on this topic. Relevant articles found will be treated in an identical manner to those found during the initial database search.

Search (8)

The search terms will be the same for all databases, but the formatting of the terms will vary due to different architectures in the databases. If applicable, search terms will

include subject heading search, such as Medical Subject Headings (MeSH) from Pubmed. The concept of the search strategy will be the following.

> [**Vector-born Zoonoses**]AND [**domestic animal**] AND [**central Africa countries**]

The general search strategy to identify studies relevant to the PICo of this review will be the following:

> #1 (" vector-borne zoonose " OR " Lyme disease " OR " tick-borne encephalitis " OR " West Nile virus "OR Leishmaniosis OR " Crimean-Congo hemorrhagic fever " OR " equine encephalitis virus " OR " Cache Valley " OR " human granulocytic anaplasmosis " OR " human babesiosis " OR " Powassan encephalitis " OR " Rocky Mountain spotted fever " OR "tularaemia relapsing fever " OR " Eastern equine encephalitis " OR " tick-borne diseases " OR Erlichiosis OR " California serogroup viruses " OR schistosomiasis OR onchocercosis OR " yellow fever " OR malaria OR hantaviruses OR " Hendra virus " OR " Lymphocytic choriomeningitis " OR "Nipah" OR " Swine influenza " OR " Vaccinia " OR " monkeypox " OR " Rift Valley fever ")
>
> #2 ("Domestic fauna" OR dog OR cat OR rabbit OR horse OR monkey OR rat OR bord OR rodent OR hamster OR parrot OR pig OR swine OR sow OR piglet OR "Sus domesticus" OR chick OR poultry OR broiler OR layer OR turkey OR duck OR geese OR goose OR fowl OR hen OR hens OR flock OR cattle OR beef OR cow OR calf OR calves OR "Bos indicus" OR heifer OR bull OR bovine OR dairy OR zebu OR sheep OR caprine OR goat OR ovine OR ewe, OR "small ruminant" OR " animal husbandry" OR "animal farming" OR "domestic animal")

#3 ("central african republic" OR chad OR Cameroon OR Gabon OR Congo OR "equatorial guinea" OR "Central Africa")

#1 AND #2 AND #3

Selection of Sources of Evidence (9)

All citations retrieved in the literature search will be imported into Zotero and deduplication will be carried out by using the de-duplication process. After duplicate removal, the file obtained will be uploaded to Rayyan to facilitate collaboration among reviewers during the study selection process. Indeed, Tene-Kenne (TK) and Oumate Ibrahim (OI) will perform the screening together, at each stage of the review to reduce

the possibility of excluding relevant reports. A calibration exercice will be done before started each phase of the screening.

In the first stage of the selection process TK and OI will screen the titles and abstracts. Disagreements on study selection will be resolved by consensus and discussion with Vougat Ngom (VN) if needed (Duffett *et al*., 2013).
For the title and abstract screening, the eligibility of studies will be assessed with the following questions:
1. Is the abstract of the study available? YES [INCLUDE], NO [EXCLUDE]
2. Does the study concern vector-born zoonoses? YES [INCLUDE], NO [EXCLUDE], UNCLEAR [INCLUDE]
3. Does the study concern at least one of the domestic fauna species? YES [INCLUDE], NO [EXCLUDE], UNCLEAR [INCLUDE]
4. Is the study original research? YES [INCLUDE], NO [EXCLUDE], UNCLEAR [INCLUDE]
5. Does the study take place in at least one Central Africa country? YES [INCLUDE], NO [EXCLUDE] UNCLEAR [INCLUDE]

Full text screening will be performed for the papers that meet the inclusion criteria in the first phase. Eligibility of studies will be assessed with the following questions:
1. Is a full text available? YES [INCLUDE], NO [EXCLUDE]
2. Is the full text available in English or French? YES [INCLUDE], NO [EXCLUDE]
3. Does the study include prevalence and/or risk factors related to vector-born Zoonoses in domestic animals or human YES [INCLUDE], NO [EXCLUDE]
As in the title and abstract screening, disagreements will be resolved by consensus or by VN.

Data Charting Process (10)

TK and OI will extract data by using a pre-defined table created in Excel. This data-charting form will be jointly developed by all the authors. TK and OI will together chart the data, discuss the results and continuously update the data charting form in an iterative process (Lenzen *et al.,* 2017). Disagreements for which a consensus cannot be found will be resolved by MS.

Data items (11)

Data to be extracted from eligible studies will include the following items:
General information
- First author

- Year of publication
- Duration of study
- Country of study (where the study was conducted). If not stated, contact study authors or use
NA if the author didn't reply
- Study design (cross-sectional, longitudinal study, etc.)

Population data

- Animal type: dog, cat, monkey, rats, mouse, rabbit, hamster, parrot, chicken, duck, goose, etc.
- Types of vectors
- Place of study (farm, slaughterhouse, market, house, etc.)

Interest data

- Sample size
- Prevalence of the disease in humans
- Prevalence of the disease in domestics animals
- Risks factors
- Transmission mode
- Etc.

Synthesis of Results (12)

The results of the literature search will be reported, including numbers of citations screened, duplicates removed, and full-text documents screened. A flow diagram that details the reasons for exclusion at the full-text level of screening will also be provided. A narrative synthesis will be provided with information presented as text, diagrams, and maps. Tables to summarize and explain the characteristics, findings and research gaps of the included studies will also be used.

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