A Systematic literature (Impact of Climate Change on Filariasis)

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Abstract: Climate has an impact on the development of mosquito borne diseases, especially lymphatic filariasis. Erratic climate change can certainly cause a bad temperature in the natural environment and disturb human health. In this article, a survey of the impact climate change on filariasis. Materials or methods use review literature search by searching through emerald journals, journal journalists, journal proquests, and PubMed. The keywords "climate change", "filariasis disease transmitted through mosquito borne diseases" were searched with various literature or reference articles. Results: From 30 literature collected, 18 articles were excluded because they had no correlation, while 12 articles were included and met the inclusion criteria. The reviewed literature shows that, most of the researchers have been carried out in developed countries, and presumption of the effect of climate metamorphosis on diseases spread by the Aedes Aegypti SP, Anopheles SP, Culex sp and Mansonia. Mosquitoes. Which is due to the following uncertainties: 1. Uncertainty about the spread of disease through climate change and poor environmental sanitation, 2. Uncertainty through behavior between the indirect relationship between climate and human health, 3. Uncertainty about the relationship between climate and disease which is transmitted through the intermediary mosquito borne disease.

1. Introduction

Global warming occurs rapidly and results in climate which has a major impact on human. In the 21st century, it is predicted that the earth's temperature will rise by 1.5-5.8o C which is triggered by an increase in extreme weather, heat waves, floods and drought in various places [1]. The resulting impact is an increase in the incidence of mosquito borne disease which has the best participation in causing the stumbling block of problem disease in today's globalized era because it is very sensitive to climatic conditions. This condition will directly affect the lives of mosquitoes and indirectly also the cases of mosquito borne diseases [2]. This filariasis is one of the oldest diseases known in the world. Filariasis or elephantiasis disease is a chronic disease caused by phylariasis worms and transmitted by (Mansonina, Anopheles, Cx, Armigeres mosquitoes). These worms live in the ducts and lymph nodes white acute clinical manifestation in the form of recurrent fever, inflammation of the ducts and lymph nodes. At an advanced stage it can cause permanent disability in the form of swelling of the (legs, arms, breasts, and genitals)[3]. This disease is dangerous of contamination, especially in tropical areas. This disease can cause disability, social stigma, psychosocial barriers, and a decrease in the work productivity of sufferers, their families and communities, causing huge economic losses. Thus the sufferer becomes a burden to the family and the state. Filariasis is transmitted through the bite of several types of...
mosquitoes (mosquito borne disease). This disease can attack all age groups and sexes. In 2014 cases of filariasis attacked 1.103 million people in 73 countries at risk of filariasis. Filariasis cases affect 632 million people living in southeast Asia, 410 million people living in the African region, while the rest (61 million) are suffered by people living in the Americas, the East Mediterranean and the Western Asia Pacific region (Indonesian Ministry of Health, 2016 ). Filariasis is an infectious disease that is still a health problem in Indonesia. In 2015 it was reported that 29 provinces and 236 districts / cities experienced endemic filariasis so that an estimated 102,279,739 people live in endemic areas, tropical or subtropical areas are at risk of being infected with filariasis. In 2016 cases 13,009, 2017 case 12,677, (Indonesian Ministry of Health, 2016). [4]. Indonesia is feeling the real impacts of climate change.

Climate change affects the life cycle of mosquitoes and the intensity of mosquito suction. This is because mosquitoes are included in ectothermic, the period of the life cycle that are vulnerable to climate change are larvae to adults. Increasing the temperature will accelerate the development process of the mosquito larvae into adults. Climate change will also accelerate adult female mosquitoes to digest the blood they suck, so the intensity of the suction will be higher [5]. The risk of this disease is certainly very influential on human health, which can cause an imbalance in the relationship between the environment and humans. [6].

The types of mosquitoes that can be affected by climate change are anopheles gambiae, Anopheles Funestus, Anopheles Darling, Cx quinquefasciatus and Aedes Aegypti, Cx sp is one of the vectors for filariasis transmission and includes mosquitoes that are anthropophilic (like to suck human blood). The activity of sucking is done at night and outside the house [7].

Systematic objectives are to determine the impact of climate change on mosquito-borne filariasis. Hopefully this information can be useful in developing and implementing efficient public health interventions.

2. Technique

2.1. Search technique

Reference search was conducted through emerald journals, journal journalists, journal proquests, and PubMed. Searches using the keyword climate impacts on filariasis, climate change and mosquito borne diseases are taken from free journal downloads and pages on international health sites such as the World Health Organization (WHO).

Table 1. PICOC Criteria

| Population                   | filariasis                                      |
|------------------------------|-------------------------------------------------|
| Intervention                 | Assumption of Independence                      |
| Comparison                   | Climate, Disease                                |
| Outcomes                     | Troubleshooting independence of attributes       |
| Context                      | Research in journal journalists, journal proquests, and PubMed |

Table 2. Research Question (RQ)

| Research Question | Motivation |
|-------------------|------------|
| R Q               |           |
| R Q 1             | Which journal publishes the most research on independent attribute assumption of the climate disease filariasis? Survey methods and analysis of ordinary differential equations. |
| R Q 2             | The global program to eliminate lymphatic filariasis GPELF set a target of elimination as a public health problem EPHP, in 1997. resulting in more than 7.1 billion treatments being given as part of mass drug administration (MDA) since 2000. In 2000 2011, WHO published guidelines for stopping treatment and verifying (EPHP). Through the use of transmission survey TAS to measure target thresholds. As of October |
2018 14 countries have reached and target and
554 million people world wide no longer need
mass care

Survey methods and analysis of ordinary
differential equations

A combination method of qualitative data
instruments consisting of focus group
discussions and data analysis using a
combination of inductive and deductive
coding approaches.

Table 3. Inclusion and Exclusion Criteria

| Inclusion Criteria                                                                                   |
|-------------------------------------------------------------------------------------------------------|
| The study discusses the feature independence assumption on the climate                              |
| For research that has two types of journal and conference publications, it will take the type of journal publication |
| For duplicate research, the most comprehensive and up-to-date data is available                      |

| Exclusion Criteria                                                                                  |
|-------------------------------------------------------------------------------------------------------|
| The study discusses the independent attribute assumption on naïve nayes method, but does not propose methods to overcome the independent attribute assumption on the Climate method |
| Research that does not use strong validation                                                         |
| Studies not written in English                                                                      |

Table 4. Data Extraction for RQ

| Data Extraction                                    | Research Question (RQ) |
|----------------------------------------------------|------------------------|
| Research and Year of Publication                   | RQ1, RQ2               |
| A frequently used dataset                          | RQ3                    |
| Method approach is often used                       | RQ4                    |

3. Results

Initial literature searches of 30 literature were divided from articles from international and national journals taken from free journal downloads and pages of international health sites such as the World Health Organization (WHO) collected through search emerald journals, jstor journals, proquest journals, google scholar, and PubMed. By these, 18 articles had no correlation, 12 were included and met the inclusion criteria.
Then in Figure 4 can be seen a journal that published a paper about the assumption of feature independence in climate disease filariasis method. For the record, the journal in question is a journal that publishes papers that have been selected.
Figure 3. Number of publications per year
Table 1. Characteristics of the Study discusses the Impact of Climate Change on Filariasis

| Name / Year          | Title                                                                 | Area and Research | Research variable | Statistical Methods                                      | Main Findings                                                                 |
|----------------------|-----------------------------------------------------------------------|-------------------|-------------------|----------------------------------------------------------|-------------------------------------------------------------------------------|
| Jibril abdulmalik, et al (2018) | Emotional Difficulties and Experiences of Stigma among Persons with Lymphatic Filariasis in Plateau State, Nigeria | Nigeria           | Climate Lymphatic Filariasis | A combination method of qualitative data instruments consisting of focus group discussions and data analysis using a combination of inductive and deductive coding approaches. | The findings highlight the value of a rights-based and emphasized approach to states and non-states to provide needed access to the highest standards of health, including mental health, and protect people with LF from stigma, discrimination, and social exclusion. |
| R. A. Norman, et al (2000) | EPTIL: the development of an age-structured model for describing the transmission dynamics and control of lymphatic filariasis | South India       | Control measures   | Lymphatic Filariasis                                    | Survey methods and analyses of ordinary differential equations.               | Findings the results of chemotherapy have a greater short-term impact than vector control but effluent control can last beyond the duration of treatment. In addition, his study also compared the use of drugs with different macrophages. |
| Paul S. Weiss MSa, et al (2020) | Simulating a transmission of Disease Lymphatic Filariasis | European Union    | Disease Lymphatic Filariasis | Simulation Methods                                       | Methodological findings TAS has fundamental drawbacks and                    |                                                                                   |
| Name / Year          | Title                                                                 | Area and Research | Research variable | Statistical Methods                                                                 | Main Findings                                                                                                                                 |
|---------------------|----------------------------------------------------------------------|-------------------|-------------------|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Emma L. Davis, et al (2019) | Evaluating the evidence for lymphatic filariasis elimination          | Sri Lanka Public Health (EPHP) | Lymphatic Filariasis | Transmission assessment survey (TAS). WHO estimated one-sided interval CI, and nth order statistic MAX. | Often results in incorrect predictions of disruption of LF transmission across the EU. Modified the TAS methodology to determine the outcome of extreme cohorts based on the mean prevalence in the affected area and the results are greater for global elimination of LF. |

Findings. The global program to eliminate lymphatic filariasis GPELF set a target of elimination as a public health problem EPHP, in 1997, resulting in more than 7,1 billion treatments being given as part of mass drug administration (MDA) since 2000. In 2000-2011, WHO published...
| Name / Year       | Title                                                                 | Area and Research | Research variable | Statistical Methods | Main Findings                                                                                                                                                                                                                                                                                                                                 |
|-------------------|----------------------------------------------------------------------|-------------------|-------------------|---------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Devan Elumalai, et al (2016) | Gas chromatography mass spectrometry analysis and larvicidal activity of leaf essential oil extract of leucas aspera against dengue, malaria and filariasis vector. | India Disease Lymphatic Filariasis Probability analysis method. | Independen Dependen | guidelines for stopping treatment and verifying (EPHP). Through the use of transmission survey TAS to measure target thresholds. As of October 2018 14 countries have reached target and 554 million people worldwide no longer need mass care. Findings, the results showed that L. Aspera Oil extra and its effective content be considered as a potential source of natural larvicide production. |
4. Discussion

According to the European Environment Agency (EEA), climate change caused an rising in the earth’s surface temperature of 0.74°C in the 20th century, and an increase in world sea temperature of 1.8 millimeter per year since 1961. [8] Meanwhile, in the 21st century, it is predicted that the earth's temperature will rise by 1.5-5.8°C which is triggered by an increase in extreme weather, heat waves, floods and drought in various places. [1] Mosquito borne disease have the highest contribution in causing disease burden in today's global era because they are very sensitive to climatic conditions. This condition will directly affect the lives of mosquitoes and indirectly also the cases of mosquito borne diseases.

Global Situation and Progress Currently countries around the world are at risk of contracting filariasis due to filarial worms which are transmitted by mosquitoes and if, left untreated can cause permanent and debilitating disability, mosquito are one of the most medically important poisons, and they transmit parasite and bacteria. Which continue to have devastating effects on humans: vector disease caused by mosquito are one of the major health problem in many countries malaria, gum, yellow fever and phylariasis are some of the deadly disease spread by mosquitoes. Mosquitoes are the main vectors of vector-borne diseases that affect humans and other animals: several types of mosquitoes including aedes a, anopheles stephani and Culex quinquefasciatus are vectors of various disease bacteria (Karthi, Keyan, Sivakumar, Aishwarya, dan Mohanasundram, 2012). [9] Another type of mosquito that can be affected by climate change is Culex sp. Culex species, Culex. Pipiens and Culex. Quinquefasciatus. Difference Culex. Pipiens and Culex. Quinquefasciatis in its distribution area, Cx. quinquefasciatis are found in many tropical and sub tropical areas. Cx. quinquefasciatis is a vector of filarial worms, namely W. Bancrofti.

Observation result for life cycle component the evidence for the main parameters in the life cycle that drive transmission. As noted earlier, some of these component, such as the annual biting rate (ABR), are likely to make large differences due to high spatial variability. Others such as the possibility of a mosquito bite that transmits infection in humans, are potentially more consistent across settings but currently lacking in experimental advidence [10].

There are several models used to measure the effect of climate on mosquito development, for example the MaxEnt algorithm model. The MaxEnt style is used to predict the effect of temperature changes on the habitat and distribution of mosquitoes. The model results show that culex quinquefasciatus, culex univittatus, m. uniformis, m. Africana influences climate change. Changing climate will affect dissemination and habitat of the four mosquitoes are temperature and rainfall. [11] Lymphatic filariasis is not deadly but causes physical pain that is chronic and has permanent disability, thus reducing activity, productivity of sufferers and becoming a family social burden. In addition, lymphatic filariasis can cause economic and psychological impacts. The most endemic country for lymphatic filariasis in the world after India is Indonesia and the third largest is Nigeria [12].

5. Conclusion

Climate change that occurs can increase filariasis disease transmitted by CX. SP. Aedes SP, Mansonia SP and Anopheles SP with the following uncertainties: 1. Uncertainty about the spread of disease through climate change and poor environmental sanitation, 2. Uncertainty through behavior between the indirect relationship between climate and human health, 3. Uncertainty certainty about the relationship between climate and disease which is transmitted through the intermediary mosquito borne disease. With the existence of different empirical evidence, uncertain conclusions emerge in the study.

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