

KNOWLEDGE, BEHAVIOR, AND ATTITUDES ON DENGUE FEVER: A SYSTEMATIC REVIEW

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Abstract

Background: Dengue fever is a viral disease transmitted by mosquitoes and the fastest spreading in the world. However, there is still a lack of information about knowledge, behavior and attitudes regarding the disease.

aim: The purpose of this study was to determine the relationship between knowledge, behavior and attitudes in dengue fever.

Methods: This study is a systematic review and meta-analysis by searching for articles published by the online database PubMed in 2010 to 2021. The dependent variable in this study is the incidence of dengue fever. The independent variables in this study were knowledge, behavior and attitudes.

Results: A total of 25 articles met the inclusion criteria and were processed in a qualitative synthesis. Three articles explained that there was a relationship between knowledge about dengue fever and behavior in preventing and handling dengue fever, while there was 1 article explaining otherwise. Ten articles explained that there was a relationship between knowledge about dengue fever and attitudes towards preventing and handling dengue fever, while 4 articles explained otherwise. Two articles that explain that good knowledge is related to bad attitude. Four articles explain that good behavior regarding dengue fever prevention is associated with positive attitudes towards dengue fever. Two articles that explain that between 3 variables, namely knowledge,

Conclusion: Knowledge, behavior, and attitudes about dengue fever have varied relationships, but the majority of articles explain that the 3 variables have a positive relationship that affects each other.

Keywords: Knowledge, attitude, practice and dengue fever

Introduction

Dengue fever is one of the mosquito-borne diseases that has the most significant impact in the world, where this disease increases the threat to humanity due to climate change and globalization (Saker et al., 2004; Wu et al., 2016; Liu-Helmersson et al., 2016; Ebi & Nealon, 2016). Dengue virus is a type of virus from the *Aedes aegypti* mosquito with the fastest transmission spread in the world. This virus causes about 390 million cases annually and puts 3.9 billion people at risk in 128 countries (WHO, 2011; Brady et al., 2012)

In tropical and subtropical countries, dengue fever is prone to endemic, especially during the rainy season, which is the breeding season for the *Aedes* mosquito. According to WHO, the incidence ratio of dengue seems to be decreasing due to a lack of global reporting (WHO, 2020). Although many health programs have been established by the government to control and deal with the spread of dengue infection, the incidence of dengue infection continues to increase. This is because of the strong relationship between the epidemiology and ecology of dengue fever and human behavior (Yboa & Larague, 2013). Factors that cause the spread of dengue disease are uncontrolled urbanization programs, population growth, and lack of prevention efforts in endemic areas (Gubler, 1998).

Until now there is no cure for dengue fever. In 2015, the dengue vaccine Dengvaxia (Sanofi-Pasteur) was launched in the community, although it only has an efficacy rate of 60% and has a low level of protection against the DENV-2 virus. It may take several years for vaccines to be procured in low-income countries, therefore efforts to prevent the spread and control of vectors are needed (Capeding et al., 2014; Villar et al., 2015).

Knowledge, behavior, and attitudes of the general population are very important factors in preventing dengue virus infection (Alyusefi et al., 2016; Chandren et al., 2015). A study in Malaysia explains that lack of knowledge on methods of preventing dengue virus transmission can increase the spread of infection (Wong et al., 2014). The study by Rozita et al. shows the importance of increasing knowledge about the prevention of dengue virus infection to control the presence of endemic (Al-Zurfi et al., 2015). In addition, it is necessary to investigate the attitude of dengue fever patients in seeking health services (Elsinga et al., 2015). Prevention and control of dengue can be

achieved through appropriate preventive behaviors, such as the use of mosquito nets, mosquito repellent sprays, mosquito coils, elimination of stagnant water, and good waste management to prevent the breeding of mosquito vectors. Awareness in the community regarding the seriousness of efforts to prevent dengue is needed (Low & Ooi, 2013)

Therefore, an understanding of the knowledge, behavior and attitudes of local residents is needed to design suitable strategies in efforts to prevent and control dengue disease (Kumaran et al., 2018). At this time, systematic reviews of the relationship between knowledge, behavior and attitudes towards dengue fever are still rarely carried out. Based on the description of the problem, it is necessary to conduct research to determine the relationship between knowledge, behavior, and attitudes towards the prevention and treatment of dengue fever.

Methods

1. Study Design

The design of this study was a systematic review.

2. Inclusion Criteria

Search articles using the PubMed online database. The articles used in this review are articles published in 2010 to 2021. In the article search process, researchers used the keywords "Knowledge, attitude, practice and dengue fever". The inclusion criteria of this study are: 1) articles that explain the relationship of knowledge, behavior and practice on the prevention of dengue fever incidence, the respective relationship between knowledge and behavior, knowledge and practice, or behavior and practice in efforts to prevent and control the incidence of dengue fever, and other determinants of knowledge, behavior, and practice in efforts to prevent and control the incidence of dengue fever; 2) original research papers. The exclusion criteria of this study are: 1) articles in languages other than English and Indonesian; 2) review papers; 3) research data is incomplete or not available

3. Study Variables

The dependent variable in this study was the

incidence of dengue fever. The independent variables in this study were knowledge, behavior and attitudes.

4. Operational Definition

Dengue fever is a disease caused by dengue virus infection through the bite of the Aedes Aegypti or Aedes Albopictus mosquito. Knowledge is

information related to dengue fever that is known to the general public. Behavior is an action taken by the community in preventing and tackling dengue fever. Attitude is the opinion or assessment of people or respondents on the prevention and control of dengue fever.

Results

Characteristics of Research Subjects

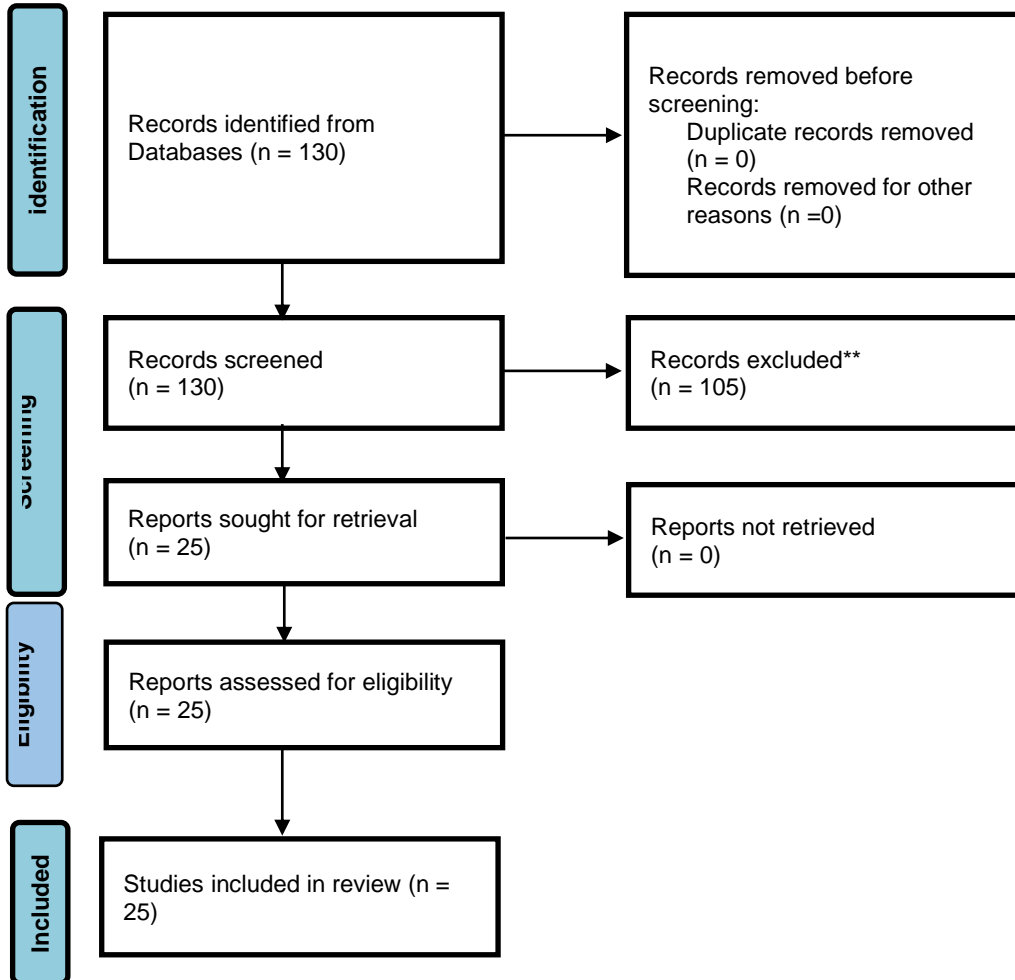


Chart 1. Prism Diagram

There are a total of 130 articles searched from the PubMed online database using the keywords "Knowledge, attitude, practice and dengue fever". by choosing the year of publication between 2016-2021. There were a total of 25 articles that met the inclusion criteria and were processed in a qualitative synthesis. The process of searching and filtering articles using a Prism diagram (chart 1). Articles included in this study must meet the inclusion criteria and have been reviewed using a critical appraisal in accordance with the research design of each article.

The number of samples of respondents varied and consisted of adults and children. Of the 25 articles, uniquely the author did not find articles originating from countries in the European continent. The majority of articles come from the Asian continent. Almost all of the articles used a cross-sectional method with a questionnaire as an instrument. The number of references and journal sources can be seen in table 1. The characteristics of each article included in the qualitative synthesis are described in more detail in table 2.

Relationship between Knowledge, Behavior, and Attitude in Dengue Fever Prevention and Management

The results of this study indicate that from a total of 25 articles that have been studied, the relationship between the three variables, namely knowledge, behavior, and attitudes, is varied.

There is 1 article which explains that there is no relationship between knowledge about dengue fever and the behavior of preventing and handling dengue fever, while there are 3 articles which explain otherwise.

There are 10 articles which explain that there is a relationship between knowledge about dengue fever and the attitude of preventing and handling dengue fever, while 4 articles explain otherwise. However, there are 2 articles that explain that good knowledge is related to bad attitude.

Four articles explain that good behavior regarding dengue fever prevention is associated with positive attitudes towards dengue fever. There are 2 articles that explain that between 3 variables, namely knowledge, behavior and attitudes, influence each other.

Knowledge of dengue fever includes signs and symptoms of the disease (Alobuia et al., 2015), as well as ways to prevent dengue fever (prevention of vector breeding, mosquito bites, and waste management) (Castro et al., 2013). Knowledge has a significant relationship with education and socioeconomic status (Sayavong et al., 2015). Prevention and attitudes about dengue fever, namely the frequency of fogging activities, plant management at home, composting, waste management and maintenance of a clean environment (Castro et al., 2013).

Table 1. Characteristics of Journal Articles

No	Journal	Amount
1.	PLoS neglected tropical diseases	3
2.	BMC infectious diseases	3
3.	The West Indian medical journal	1
4.	International journal of environmental research and public health	2
5.	PLOS one	2
6.	The Journal of the Pakistan Medical Association	2
7.	International health	1
8.	Annals of global health	1
9.	Journal of infection and public health	2
10.	BMC public health	1
11.	Journal of environmental and public health	1
12.	The American journal of tropical medicine and hygiene	2
13.	Journal of community health	2
14.	Asia-Pacific journal of public health	1
15.	Transactions of the Royal Society of Tropical Medicine and Hygiene	1

Table 2. Characteristics of Journal Articles

No	Author (Year)	Title	Country	Study Design	Sample	Outcome
1	Herbuela et al., (2019)	Knowledge, Attitude, and Practices Regarding Dengue Fever among Pediatric and Adult In-Patients in Metro Manila, Philippines	Manila, Philippines	case-control	Confirmed patients (children = 233; adults = 17) and controls (children = 233; adults = 17).	Knowledge and attitudes do not correlate with practice against dengue fever.
2	Dhimal et al., (2014)	Knowledge, Attitude and Practice Regarding Dengue Fever among the Healthy Population of Highland and Lowland Communities in Central Nepal	Central Nepal	Cross-sectional	589 respondents	There is a significant positive correlation between knowledge, attitude and practice.
3	Hope et al., (2018)	Knowledge, attitude, and practice regarding dengue virus infection among inhabitants of Aceh, Indonesia: a cross-sectional study	Aceh, Indonesia	Cross-sectional	609 respondents	There is a significant positive correlation between knowledge and attitude, knowledge and practice, and attitude and practice.
4	(Nguyen et al., 2019)	Knowledge, Attitude and Practice about Dengue Fever among Patients Experiencing the 2017 Outbreak in Vietnam	Vietnamese	Cross-sectional	330 respondents	Knowledge and attitudes relate to practice.
5	Saied et al., (2015)	Knowledge, attitude and preventive practices regarding dengue fever in rural areas of Yemen	Yemen	Cross-sectional	804 respondents	Poor knowledge about dengue fever and low level of education are significantly associated with poor prevention practices.
6	Alobuia et al., (2015)	Knowledge, Attitude, and Practices Regarding Vector-borne Diseases in Western Jamaica	Jamaica	Cross-sectional	361 respondents	Knowledge and attitudes are significant predictors of practice.
7	Ibrahim et al., (2009)	Knowledge, attitudes, and practices relating to Dengue fever among females in Jeddah high schools	Saudi Arabia	Cross-sectional	2693 students, 356 teachers and 115 supervisors	Practice is related to knowledge.
8	Kumaran et al., (2018)	Dengue knowledge, attitudes and practices and their impact on	Cambodia	Cross-sectional	600 households from 30 villages in	There is no relationship between practice and knowledge

		community-based vector control in rural Cambodia			Kampong Cham	
9	Mayxay et al., (2013)	Dengue in peri-urban Pak-Ngum district, Vientiane capital of Laos: a community survey on knowledge, attitudes and practices	Vientiane, Laos	Cross-sectional	231 households	There is a relationship between good knowledge and better practice, but good knowledge is associated with worse attitudes.
10	Mohamad et al., (2014)	Factors Associated with Larval Control Practices in a Dengue Outbreak Prone Area	Malaysia	Cross-sectional	322 respondents	The level of good behavior towards preventive measures and frequent attendance of health campaigns was significantly associated with good larval control practices.
11	Elsinga et al., (2018)	Knowledge, Attitudes, and Preventive Practices Regarding Dengue in Maracay, Venezuela	Maracay, Venezuela	Cross-sectional	105 households	Preventive practices relate to good knowledge of the symptoms of dengue fever.
12	Lugova & Wallis, (2017)	Cross-Sectional Survey on the Dengue Knowledge, Attitudes and Preventive Practices Among Students and Staff of a Public University in Malaysia	Malaysia	Cross-sectional	372 respondents	Knowledge and attitudes about dengue fever were significantly positively related to the practice of preventing dengue fever.
13	Naing et al., (2011)	Awareness of dengue and practice of dengue control among the semi-urban community: a cross sectional survey	Malaysia	Cross-sectional	-	Knowledge of dengue fever is significantly and positively related to the practice of controlling dengue fever.
14	Castro et al., (2013)	The Relationship between Economic Status, Knowledge on Dengue, Risk Perceptions and Practices	Havana, Cuba	Cross-sectional	780 households	Knowledge has a positive relationship with practice.
15	Chandren et al., (2015)	Practices of Dengue Fever Prevention and the Associated Factors among the Orang Asli in Peninsular Malaysia	Malaysia	Cross-sectional	505 respondents	Knowledge is a significant factor influencing the practice of preventing dengue fever.
16	Hairi et al., (2003)	A knowledge, attitude and practices (KAP) study on dengue among selected rural communities in the	Kuala Kangsar	Cross-sectional	200 respondents	There is a significant relationship between knowledge about dengue fever and attitudes towards controlling Aedes

		Kuala Kangsar district				mosquitoes. However, it was also found that good knowledge does not always lead to good practice.
17	Rahman et al., (2021)	Climate change and dengue fever knowledge, attitudes and practices in Bangladesh: a social media-based cross-sectional survey	Bangladesh	Cross-sectional	500 respondents	Good knowledge, attitude and previous experience are significantly associated with good dengue prevention practices.
18	Udayanga et al., (2018)	Socio-economic, Knowledge Attitude Practices (KAP), household related and demographic based appearance of non-dengue infected individuals in high dengue risk areas of Kandy District, Sri Lanka	Sri Lanka	Cross-sectional	1000 households	Knowledge and attitudes related to dengue-free status in the study population.
19	Alyousefi et al., (2016)	A household-based survey of knowledge, attitudes and practices towards dengue fever among local urban communities in Taiz Governorate, Yemen	Yemen	Cross-sectional	383 households	Poor knowledge of the signs and symptoms of dengue and its vectors is a significant factor associated with poor prevention practices.
20	Koenraad et al., (2006)	Dengue knowledge and practices and their impact on Aedes aegypti populations in Kamphaeng Phet, Thailand	Kamphaeng Phet, Thailand	Cross-sectional	-	There is no relationship between knowledge about dengue fever and adult mosquito reduction practices.
21	Wong et al., (2014)	Community knowledge, health beliefs, practices and experiences related to dengue fever and its association with IgG seropositivity	Malaysia	Cross-sectional	1,400 respondents	A weak correlation was found between independent practice to prevent dengue fever and the dengue seropositive rate in the community.
22	Sayavong et al., (2015)	Knowledge, attitudes and preventive behaviors related to dengue vector breeding control measures among adults in communities of Vientiane, capital of the Lao PDR	Vientiane, Laos	Cross-sectional	207 respondents	Preventive behavior is significantly related to the level of knowledge
23	Syed et al.,		Karachi,	Cross-	440 respondents	Good knowledge about dengue fever is

	(2010)	Knowledge, attitudes and practices regarding dengue fever among adults of high and low socioeconomic groups	Pakistan	sectional		associated with better prevention attitude.
24	(Nguyen et al., 2019)	Dengue fever in Southern of Vietnam: A survey of reported knowledge, attitudes, and practices	Southern of Vietnam	Cross-sectional	1,906 respondents	Participants with good knowledge were approximately 1.7 times more likely to have good attitudes and 5.0 times more likely to have good practice than those without.
25	Shuaib et al., (2010)	Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica	Jamaica	Cross-sectional	192 respondents	There is no relationship between knowledge about dengue fever with prevention practices.

DISCUSSION

The results of this systematic review show that there are varied relationships between knowledge, behavior, and attitudes about dengue fever. Knowledge of the signs and symptoms of dengue fever is related to the behavior of preventing dengue fever. Things explained by Udayanga et al., (2018), that knowledge and awareness about dengue fever, (prevention of vector breeding, mosquito bites, symptoms of disease and waste management) and community attitudes (towards home gardening, composting, waste management and maintaining a clean and dengue-free environment) are related to dengue-free status in the study population.

But different according to Herbuela et al., (2019) and Shuaib et al., (2010), which states that knowledge and attitudes are not related to the practice of preventing or treating dengue fever.

according to Al-Dubai et al., (2013) and Alves et al., (2016). Knowledge and behavior related to dengue fever are influenced by the level of education of an individual. This is also confirmed by Syed et al., (2010) and Sayavong et al., (2015) which states that preventive behavior is significantly related to the level of knowledge and knowledge has a significant relationship with education and socioeconomic status. High socioeconomic groups show better prevention practices.

according to Chandren et al., (2015), knowledge, perception of barriers to preventing dengue fever, frequency of fogging, and perception of susceptibility to dengue fever are significant factors in the practice of preventing dengue fever. People with low dengue knowledge scores tend not to do dengue fever prevention. However, people who score low perceived barriers to preventing dengue are more likely to practice dengue prevention. Participants with a low perceived susceptibility to contracting dengue fever were less likely to practice dengue prevention measures. But according to Hairi et al., (2003), good knowledge does not always lead to good practice.

CONCLUSION

The conclusion of this study is that knowledge, behavior, and attitudes about dengue fever have varied relationships, but the majority of articles explain that the 3 variables have a positive relationship that affects each other.

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CONFLICTS OF INTEREST:

The author declares that they have no conflict of interest

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