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Characteristics, 3M Behavior, and Climate Factors with Cases of Dengue Heart Fever (DHF) in Indonesia (Literature Review 2015-2021)

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Kata Kunci

Kasus DBD; Karakteristik; Perilaku 3M; Iklim; Literature review

Abstrak

Demam Berdarah Dengue (DBD), telah menjadi Vector Borne diseases (VBD) dengan pertumbuhan tercepat di dunia selama beberapa dekade terakhir, dengan peningkatan 30 kali lipat. Penelitian ini bertujuan menganalisis hubungan karaktersitik, perilaku 3M, dan faktor iklim dengan Kasus Demam Berdarah Dengue (DBD) di Indonesia. Penelitian ini dilakukan dengan metode literatur review. Penelitian dilakukan secara online dengan mengambil objek penelitian jurnal-jurnal berbahasa Inggris dan Indonesia yang membahas tentang kasus kasus DBD di Indonesia. Sampel yang digunakan sudah sesuai dan ditetapkan dalam penelitian ini adalah berjumlah 45 artikel penelitian. Hasil penelitian menunjukkan laki-laki lebih banyak terjangkit DBD karena mereka lebih banyak beraktivitas di luar rumah. Usia yang rawan DBD adalah usia di bawah 16 tahun, atau masa balita, anak, dan remaja awal. Pendidikan kepala keluarga juga menjadi faktor penting dalam upaya penanggulangan wabah DBD. Hasil kajian literature review menunjukkan bahwa karakteristik mempunyai hubungan signifikan dengan kasus DBD. Belum semua masyarakat menyadari akan pentingnya perilaku 3M, dilihat dari proporsi masyarakat yang menerapkan 3M lebih sedikit dibandingkan dengan masyarakat yang menerapkan 3M. Perilaku 3M menjadi faktor yang dapat mengurangi terjadinya kasus DBD. Para stakeholder ataupun pengambil kebijakan dalam bidang kesehatan, khususnya dalam yang bertugas dalam bidang pengendalian wabah DBD agar menjadikan hasil penelitian ini sebagai bahan pertimbangan dalam penentuan regulasi ataupun kebijakan terkait penanggulaan wabah DBD.

Keywords

DHF cases; Characteristics; 3M behavior; Climate; Literature reeview

Abstract

Dengue Hemorrhagic Fever (DHF), has become the fastest growing Vector Borne disease (VBD) in the world over the last few decades, with an increase of 30 times. This study aims to analyze the relationship between the characteristics, behavior of 3M, and climate factors with cases of Dengue Hemorrhagic Fever (DHF) in Indonesia. This research was conducted using a literature review method. The research was conducted online by taking research objects in English and Indonesian journals that discussed cases of DHF in Indonesia. The sample used was appropriate and determined in this study totaling 45 research articles. The results showed that men were more likely to be infected with DHF because they were more active outside the home. The age prone to DHF is the age under 16 years old, or the toddler, child, and early teens. The education of the head of the family is also an important factor in efforts to control the dengue outbreak. The results of the literature review show that the characteristics have a significant relationship with dengue cases. Not all people are aware of the importance of 3M behavior, seen from the proportion of people who apply 3M less than people who apply 3M. 3M's behavior is a factor that can reduce the occurrence of dengue cases. Stakeholders or policy makers in the health sector, especially those in charge of controlling the dengue outbreak, should take the results of this study into consideration in determining regulations or policies related to dengue outbreak control.

Introduction

Dengue Hemorrhagic Fever (DHF) is one of the diseases that is transmitted through vectors, or called Vector Borne diseases (VBDs). This disease has a huge impact on the health of the global population. Dengue Hemorrhagic Fever (DHF), has been the fastest growing VBD in the world over the past decades, with a 30-fold increase. Transmission occurs in 128 countries, 100 of which are endemic to DF (1).

Dengue Hemorrhagic Fever (DHF) is one of the endemic diseases in tropical areas including Indonesia. High rainfall and low sunlight are good conditions for Aedes aegypti mosquitoes to breed. In addition to climatic factors, a dirty environment can also affect the breeding of the Aedes aegypti mosquito. An unhygienic environment is the result of unhealthy people's behavior, which is strongly influenced by their perceptions (2).

Indonesia reports the highest number of cases of dengue hemorrhagic fever (DHF) in the WHO Southeast Asia region, although experts acknowledge that the number of cases is largely underreported and that reporting practices vary widely across regions. The 1997 World Health Organization (WHO) case definition was used for reporting dengue fever in Indonesia, where only dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS) could be notified (3).

Every year there are Extraordinary Events (KLB) of DHF in several provinces with a mortality rate of around 0.86-0.89% (4). Dengue Hemorrhagic Fever was identified as the fastest vector infectious disease, including in Indonesia with a national incidence rate of 24.73 per 100,000 population. Even having been circulating for more than 50 years, the dengue virus still persists in 440 districts or 85.60% of the total area and causes an imprinting burden. Therefore, an adequate dengue surveillance system may be the key to address dengue incidence (5). In Indonesia, DF is one of the emerging diseases and remains a major and growing public health problem. It was first reported in Surabaya and Jakarta in 1968, and the number of cases has been increasing year by year. In 1997 all provinces in Indonesia had reported cases of DF. North Sumatra is one of the endemic provinces of DD in Indonesia, and this disease is still a public health problem (6)[6]. In 2010, Indonesia became the first ranked country in the Association of Southeast Asian Nations by the highest number cases of dengue hemorrhagic fever (DHF) and was predicated as endemic area because multiple serotypes were found in blood circulation of dengue patients (7).

Therefore, the purpose of this literature study was to determine the relationship between the characteristics of the respondents (gender, age, and education level of the head of the family), the relationship between 3M behavior (draining water containers, closing water containers, stockpiling used goods) and the relationship between climate (rainfall). rainfall, air temperature, and humidity) with dengue cases in Indonesia.

Methods

The data collection method used in this research was by searching the literature related to the purpose of this research topic in the database used. Studies that were included in the literature review based on inclusion and exclusion criteria. The articles wereEnglish-language journal articles with the cases of dengue fever, the year of publication was from 2015 to 2021. The search is carried out by entering a combination of keywords: dengue fever, dengue, dengue hemmorragic fever in the Google Scholar, Science Direct, and Scopus databases. The results of the articles found were 125. The articles that have been collected were extracted and screened to 82 and synthesized in which 62 full text articles met the objectives of this study. The final article data selected according to the inclusion criteria were 45, then compiled, assessed and analyzed to be used as problem solving materials included in the systematic literature review (Figure 1).

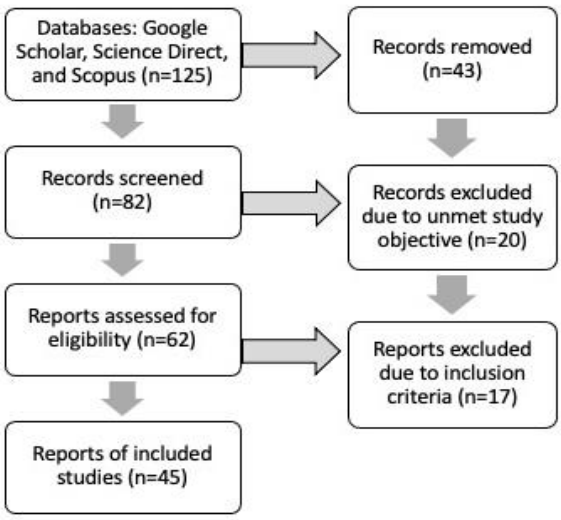

Figure 1. PRISMA flow diagram

Results

The risk factors for DHF can be seen from the characteristics of research respondents (covering three aspects, namely age, gender, and education level), Healthy Life Behavior and Climate Conditions in Indonesia. The following is the incidence of DHF in Indonesia which is described in quite detail in articles published in research journals.

Table 1. Research in several cities that lists the number of dengue cases

No	Author name	Research year	Province	City	Number of DBD cases	Year period
1	Ali K, Ma'Rufi I.(8)	2018	Jawa Timur, Bali	Pasuruan	182	2009 – 2013
2	Dhewantara (9)	2019		Bali	55.963	2012 – 2017
3	Hartati (10)	2021		Sidoarjo	963	2012-2016
4	Utama & Agustini, (11)	2020		Bali	24	2016-2017
5	Rahmadani (12)	2017	Jawa Tengah	Banyumas	215	2012 - 2015
6	Ganegoda (13)	2021		Semarang	83	2009-2014
7	Kesetyaningsih & Fauzan (14)	2021		Sleman	4.125	2008-2015
8	Ubaidillah & Kurniawan (15)	2020		Bantul	40	2017-2018
9	Anggraini (16)	2020		Gunungkidul	118	2019
10	Kesetyaningsih & Ulfabriana (17)	2016		Sleman	68	2008-2013
11	Salam (18)	2019	Sulawesi (Selatan, Tenggara, Utara)	Makasar		2012-2016
12	Istiqamah (19)	2020		Kendari	148	2014-2018
13	Monintja (20)	2021		Manado	521	2019
14	Tatura (21)	2021		Manado	146	2019
15	Sasmono (22)	2020	Maluku, Kalimantan Selatan, Riau	Batam, Banjarmasin, Ambon	732	2017-2019
16	Ardianti (23)	2018		Pekanbaru	180	2018
17	Husnayain (5)	2020	Sumatera Utara	Bandar Lampung	50	2010-2015
18	F. A. Siregar (24)	2015			190	2009-2011
19	Respati, Raksanagara, Djuhaeni, Sofyan, (25)	2017	Jawa Barat	Bandung	2536	2015-2016
20	Fuadzy (26)	2020		Bandung	261	2016
21	Faridah (27)	2021		Bandung	2133	2014-2016

Table 1 shows that there are 21 studies that list fairly complete cases of DHF studied in journals. In the cases studied, one study compared cases of DHF that occurred in several areas with Central Java is the most location for the case of DHF. The data taken was time series data from 2012 to 2017 with the number of cases reaching 55,963 cases.

The identity of the next respondent that is often used as a reference in research on DHF is the gender and education level of the head of the family. The data can be seen in Table 2.

Table 2. Research that includes research respondents based on gender and level of education of the head of the household

No	Author name	Research year	Number of respondents		Number of Respondents based on Family Head Education Level			
					Low	Intermediate		High
			male	female	Elementary school	Junior high school	Senior high school	Bachelor
1	Utama & Agustini (11)	2020	14 (58%)	10 (42%)	-	-	-	-
2	Kesetyaningsih & Ulfabriana (17)	2016	87 (64%)	49 (36%)	0 (0%)	11 (16%)	32 (47%)	25 (37%)
3	Ardianti (23)	2018	69 (38%)	111 (62%)	116 (64%)	0%	0%	64 (36%)
4	Hartati (10)	2021	499 (43%)	654 (57%)	36 (4%)	80 (8%)	719 (75%)	128 (13%)
5	Anggraini (16)	2010	67 (67%)	33 (33%)	-	-	-	-
6	Ubaidillah & Kurniawan(15)	2020	21 (53%)	19 (48%)	-	-	-	-
7	Faridah(27)	2021	5533 (52%)	5040 (48%)	-	-	-	-
8	Husnayain (5)	2020	16 (32%)	34 (68%)	27 (54%)	0%	0%	23 (46%)
9	Siregar (24)	2015	287 (42%)	395 (58%)	0%	138 (73%)	0%	52 (27%)
10	Sukesi, Satoto(2)	2020	-	-	20 (51%)	0%	15 (39%)	4 (10%)
11	Fuadzy(26)	2020	-	-	0%	0%	90 (34%)	171 (66%)
	Jumlah		6593 (51%)	6345 (49%)	199 (11%)	229 (13%)	856 (49%)	467 (27%)

Table 2 describes nine studies that clearly describe the gender of the research respondents. The number of comparisons or compositions between men and women in this study varied. There were nine studies, seven of which were male samples more than female samples. Only two studies show a larger number of female samples. This study is about dengue cases, so that sampling, both men and women, is related to the ongoing dengue outbreak. Sampling of men and women was based on dengue cases in the field. Male samples were taken more than female samples because in the cases in the field, male DHF patients were more than female DHF patients.

In general, the education level of the research respondents is divided into lower, middle and upper levels. The lower level is SD, the middle level is SMP and SMA, while the high level is diploma and undergraduate education. The majority of family heads have a good level of education, seen from the large number of family heads who have received high school education.

One of the important factors that need to be investigated in the case of DHF is the healthy lifestyle of the research respondents. Data on healthy living behavior of research respondents which are described quite clearly from several selected articles can be seen in Table 3.

There are ten articles in research journals that describe the respondent's healthy lifestyle related to the dengue outbreak. Based on the existing table, it can be seen that the types of behavior shown by respondents related to the dengue outbreak were the habit of hanging clothes, the habit of bathing more than twice a day, continuity of eradicating dengue nests, active larva monitoring cadres, closing water containers, drying water containers, burying things. useless, the use of permanent bathtubs, the use of landfill covers, the habit of draining the tub every 3 days, recycling used goods, using larvicides, and cultivating larvae to eat fish. This study focused on 3M behavior carried out by the community as an effort to reduce the occurrence of dengue cases.

Table 3. Research that includes clean living behavior of research object respondents

No	Author name	Research year	Respondent's clean living behavior			
			hanging clothes	bath	3M	without 3M
1	Nurrochmawati (28)	2017	√	-	√	-
2	Hidayati (29)	2017	-	-	√	√
3	Mubarok (30)	2018	√	√	-	-
4	Ardianti (23)(23)	2018	-	-	√	√
5	Martini (31)	2019	-	-	√	-
6	Lestari (32)	2020	-	-	√	-
7	Salam (18)(18)	2019	-	-	√	-
8	Kurniasa & Asmara (33)	2021	√	-	√	-
9	Fentia (34)	2021	-	-	-	-
10	Fini (35)	2021	√	-	-	-

Information:
√= factors that appear in the research results
- = factors that appear in the research results

Climatic conditions are also one of the aspects that need to be considered when analyzing the dengue outbreak. There are five studies that describe in sufficient detail various types of climatic conditions that can affect the occurrence of dengue cases. The types of climatic conditions include: PH conditions of the water used, temperature around the respondent's house, outside humidity, indoor humidity, altitude, CO2 concentration, and rainfall. During the 2015-2021 period, there were not many studies that discussed the influence of the environment on the occurrence of dengue cases, where environmental aspects were explained in detail. In studies published in journals, environmental aspects are often depicted in graphical form, so that the data presented is only in the form of trends, not in the form of numbers. Therefore, some of the studies published in the journal are not used to describe the climatic conditions in which the research takes place.

Discussion

Indonesia is located in a tropical country, where mosquitoes that cause dengue live and thrive in this area. As information published by Liu using a bibliometric analysis that outbreaks and the emergence of dengue outbreaks is mostly around tropical areas(36). Almost all regions of Indonesia fall into the category of areas with frequent or continuous dengue risk (37).

Various studies of DHF displaying research respondent data. The data shows that the most frequently explored age in research related to DHF is up to the adult age level. The available data shows that the education background of parents is very important for a family, especially in relation to the dengue outbreak. A study supported that Adults with more education tend to be healthier and live longer than adults with less education (38). In addition, 3M's behavior is a form of efforts to prevent mosquito breeding. Most cases of DHF are caused by the presence of DHF mosquitoes around human residences. If mosquito habitat is available, mosquitoes will nest and develop well. The more mosquito habitats, the more mosquitoes that develop well and eventually cause dengue cases around the place. One of the efforts that need to be done to overcome this condition is to create clean and healthy living behavior (39). This behavior will not be able to get rid of all the mosquitoes, but with this clean and healthy lifestyle it will be able to reduce the number of mosquitoes. Efforts to keep a person in good health is to maintain personal hygiene. Maintaining optimal personal hygiene is not possible without inculcating a clean living attitude and exemplary from the family and the surrounding community.

Indonesia is a country with a tropical climate with warm environmental temperatures and high humidity levels. The tropical climate region is very supportive of the breeding of mosquitoes that cause dengue fever. As stated by Sukesi et al., high rainfall and low sunlight are good conditions for Aedes aegypti mosquitoes to breed (2). Therefore, Indonesia and several other countries in tropical climates have become endemic areas for dengue outbreaks. In the absence of programs that are carried out intensively and effectively, as well as the absence of awareness and participation from the community, dengue cases will continue to increase. Some indicators that are often used in conjunction with climatic conditions are the PH condition of the water used, the temperature around the respondent's house, outside humidity, humidity depth, altitude, CO2 concentration, and rainfall.

Conclusion

. Indonesia has a tropical climate and become endemic areas for dengue outbreaks. Therefore, there is a need of programs that are carried out intensively and effectively, as well as the awareness and participation from the community to deal with dengue cases. Further exploration on community participation is recommended.

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