

Research Article

Epidemiology of Dengue Hemorrhagic Fever (DHF) in Semanu II Primary Health Centre, Gunungkidul from January-June 2019**Vidya Aries Anggraini¹, Sulistyawati Sulistyawati^{1,2*}, Desita Purnamawati³, Siwi Prammatama Mars Wijayanti⁴**¹Faculty of Public Health, University of Ahmad Dahlan, Yogyakarta, Indonesia²Department of Epidemiology and Global Health, Umeå University, Sweden³Semanu II, Primary Health Center, GunungKidul District, Indonesia⁴Department of Public Health, Faculty of Health Sciences, University of Jenderal Soedirman, Purwokerto, Indonesia*** Correspondence:** sulistyawatisuyanto@gmail.com. Tel: +628170402693

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ABSTRACT

Background: Dengue Hemorrhagic Fever (DHF) is a public health problem in Indonesia. The dengue virus causes the disease through mosquito *Aedes aegypti* bite. This study aims to describe Dengue Hemorrhagic Fever (DHF) in Semanu II Primary Health Centre, GunungKidul, Yogyakarta.

Methods: This is a quantitative study with a descriptive approach, describing DHF based variable person, place, and time, using secondary data. Data collection was carried out in August 2019 from secondary data reports SP2TP UPT Puskesmas Semanu II period January-June 2019.

Results: Dengue Hemorrhagic Fever (DHF), which occurred in the region of Primary Health Center Semanu II in 2019, was a total of 18 cases with Incidence Rate 72/100,000 population. The majority of cases were found in the age group 6-11 years. 67% of the cases occurred in males. 72% of the cases happened in Pacarejo village. Most of the DHF incidence occurred in March (39%).

Conclusions: The incidence of Dengue Hemorrhagic Fever in Primary Health Care Semanu II, most occurred in Pacarejo village, the majority in the age group 6-11 years. Male were the most infected group. And the highest DHF incidence occurred in March 2019.

Keywords: Descriptive, Dengue, Epidemiology**INTRODUCTION**

Dengue Hemorrhagic Fever is a mosquito-borne infection caused by Dengue Virus (DENV) that is mostly found in the tropics and sub-tropics. The virus is transmitted to humans through the bite of an infected female mosquito. *Aedes aegypti* is the primary vector, while *Aedes albopictus* is considered as a secondary vector. The period of incubations 4-10 days. People who have been infected with the virus become the host to spread of infection because they possible to transmit the dengue virus to the female mosquito. *Aedes aegypti* mosquito mostly lives in urban areas and breed in human-made containers or thrift (1).

Dengue fever in Indonesia generally influenced by the host factors, environmental factors, and the immune response. Dengue fever is a disease based on environment-related sanitation. When people have poor habits and do not maintain the cleanliness of the home environment, it will be increasing the risk of getting dengue infection. Environmental factors are geographic conditions such as altitude, rainfall, humidity, season. While demographic conditions are the density of residential houses, people mobility, bad behavior, and habits, low socioeconomic, on the other hand, the presence of dengue mosquito in a tropical country such as Indonesia is worsening this situation (2).

The incidence of dengue fever in recent years has increased significantly. In the Eastern Mediterranean, the incidence of dengue fever has increased dramatically since 2000, with a total of 16 outbreaks occurred during the period (3). Over the two-last decade, the number of dengue cases has to increase 15 folds. In addition, they are increasing not only for the number but also for the region infected. According to WHO, 2019 was the year with the largest dengue cases (4). Research in Malaysia showed that there were 10,000 cases of dengue in Malaysia every year and lead the country to suffer losses of US \$ 13 million per year. This loss is equivalent to 940,000 working days lost (5).

Asia region stands on the first ranks of dengue fever cases every year. From 1968 to 2009, the World Health Organization (WHO) notes that Indonesia as the country with the highest dengue fever cases in Southeast Asia. In this country, Dengue hemorrhagic fever is still one of the significant public health problems. Dengue fever was first discovered in Surabaya in 1968, whereas many as 58 people were infected, and 24 of them died. Since then, the disease was spread throughout Indonesia (6). The number of people and the distribution area is increasing along with the increasing mobility and population density. In 2016, about 204,171 and 68,407 dengue fever cases were reported for the years 2016 and 2017, respectively (7). While in 2018, dengue fever cases slightly decreased, with 65,600 cases reported (8).

Yogyakarta province is one of the dengue-endemic areas in Indonesia. Local health authorities reported in year 2017, there were 1,642 cases of dengue fever (9), and in 2018, it declined to 649 cases (5). Meanwhile, for Gunungkidul district, which part of Yogyakarta province, 208 cases were reported in 2017(9), and it declined to 124 in 2018 (5).

Semanu II Primary Health Centre (PHC) is one PHC in Gunungkidul that experience with the variation of dengue fever case number from 2017 to 2019. In 2017, they recorded 12 cases and immensely declined to 4 cases in 2018. However, until the half-year of 2019, reported 18 Dengue hemorrhagic fever case in this area. This study aims to describe the Dengue Hemorrhagic Fever (DHF) based on person, place, and time in Semanu II PHC during January-June 2019.

METHODS

This research located in Primary Health care of Semanu II, Gunungkidul district, Yogyakarta. A quantitative method with a descriptive approach was applied to this research. We describe the Dengue Hemorrhagic Fever (DHF) based on people, places, and time. Data was collected from secondary data using PHC monthly report from January-June 2019. We included patients who diagnosed with DHF, and it reported on the PHC report system.

RESULTS

From January to June 2019, 18 DHF cases were recorded in the monthly report of Semanu II PHC. Most of them aged between 6-11 years old (Figure 1). While most of the case (> 60%) were occurred in male (Figure 2)

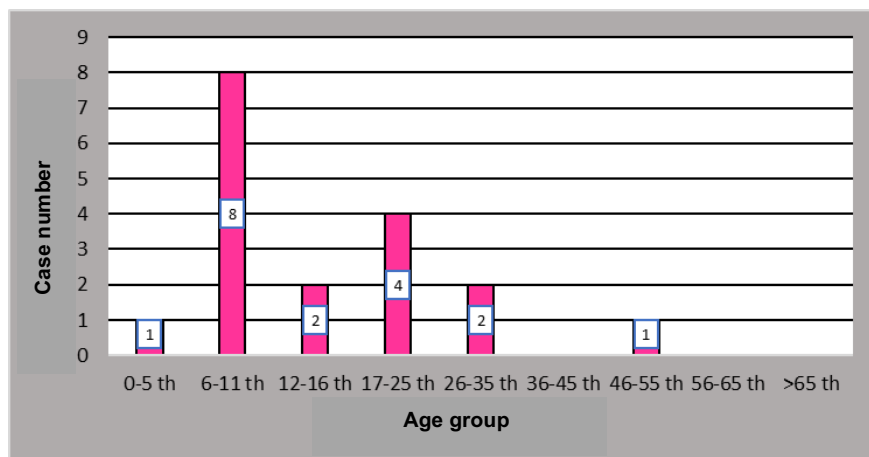


Figure 1. DHF patient by age in Semanu II PHC during January to June 2019.

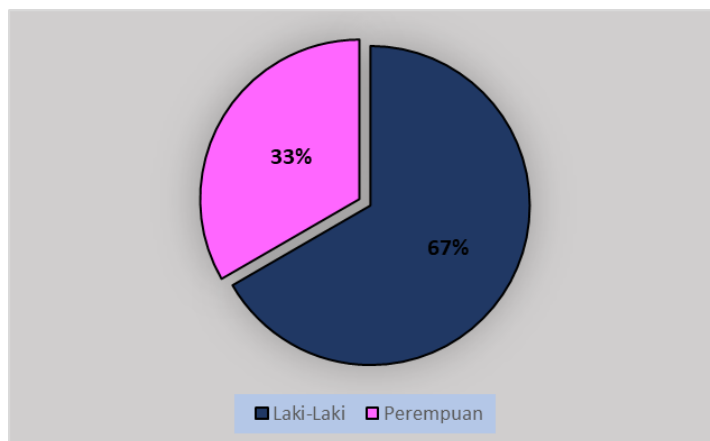


Figure 2. DHF patient by sex in Semanu II PHC during January to June 2019

Figure 3 shows that between the two villages in Semanu II PHC, most of the DHF cases occurred in Pacarejo village (n = 13, 72%). During the time of observation, DHF cases reached a peak in March 2019 with (n = 7, 39%) (Figure 4)

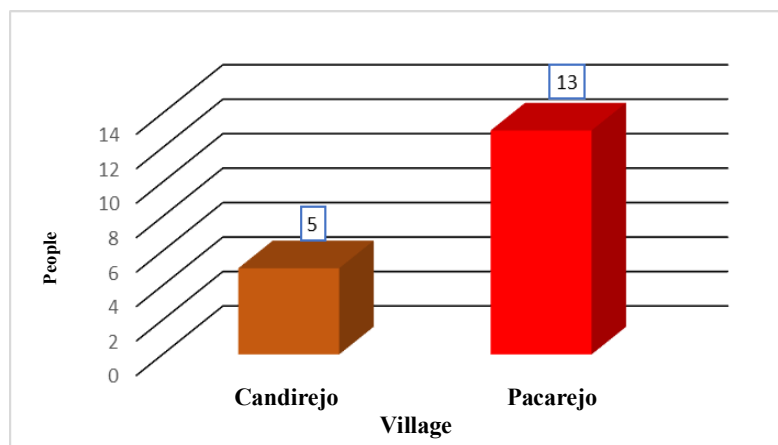


Figure 3. DHF patient by a village in Semanu II PHC during January to June 2019

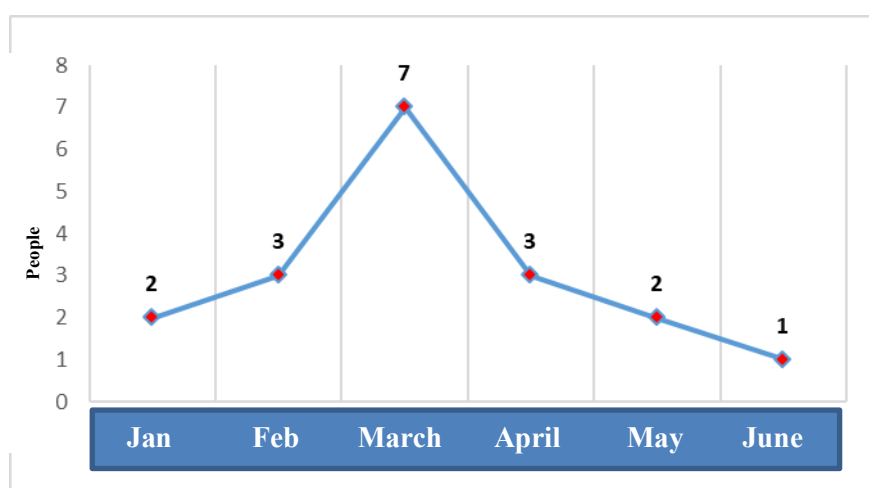


Figure 4. DHF patient per month in Semanu II PHC during January to June 2019.

DISCUSSIONS

Our result shows that the DHF incidence in Semanu II PHC occurred in children aged 5-11 years old and male. Children are a vulnerable group to dengue virus infection related to their many outdoor activities that make them exposed to *Aedes Aegypti*. This result is similar in the Blitar district that found dengue cases pattern during 2015 and 2017 mostly occurred in people aged 5-14 years. The same pattern was found in the United States and Venezuela, where the incidence of Dengue hemorrhagic fever peaked in children aged 5-9 years old in 2007 with 570 cases per 100,000 population(10). In Thailand, dengue occurred in children aged five years and adults in 25 years. During 2000 and 2001, most cases in Thailand were dengue hemorrhagic fever (DHF) and Dengue Shock Syndrome (DSS) that attacked children at 5 and 14 years old(11).

Majority DHF occurs in males. This result is consistent with studies in New York City that male has a higher risk than women to get dengue infection (OR: 1,878; 95% CI: 1,091 to 3,233) (12). The similar finding stated in Thailand refer to the data of the Ministry of Public Health of Thailand in 2003, 2006-2008, and 2010 proved that dengue mostly occurred in males compared to females. A similar study carried out in India, saying that more than 60% of dengue found in men (13). However, our finding is not in line with previous research, which stated that

the female has a 3,333 (OR = 3.333; 95% CI: 1.127 to 9.861) times higher chance of having dengue than men (14). The different results among the various settings/countries could be attributed to differences in health behavior between males and females (11), such as outdoor activity and high mobility among the men (15). These findings may serve as an implication of dengue prevention strategy in Indonesia that mostly engages the woman in the vanguard of dengue eradication, such as through vector control program or called as *Jumantik* (16).

Pacarejo is a village with the highest DHF cases in Semanu II PHC. The area spreads in poor environmental conditions and it worsened by the optimal humidity that leads to the survival of mosquitoes increases. In humidity less than 60%, mosquito lifespan will be shorter so that it cannot continue to the next life phase to transfer the virus from the stomach into the salivary glands (17). The role of humidity to the mosquito life has been discussed by research in Pandeglang, Banten, that during 2011-2016 they had 80.46% of humidity, which supports the development of *Aedes* mosquito. Research in southern Thailand found high humidity, temperature, and rainfall associated with a high risk of dengue transmission (18). In addition, the study in Yogyakarta from 2004 to 2011 stated that the increase of dengue cases from January-March, associated with ranged from 80-87%, and the humidity had decreased 72-77% in September that coincided that dengue was reducing. So it can be said that the increase in humidity will lead to an increased incidence of dengue (19). It is exacerbated by the poor implementation of vector control activity because they prefer to do farming mainly in the rainy season.

The high incidence of DHF in March might be related to the rainy season that categorized as extreme during the time. It was confirmed by the Meteorology, Climatology, and Geophysics Agency of Yogyakarta. In the wet season, the vector mosquito population has increased because there is an increase of the *Aedes* breeding place that most associated with poor sanitation (20). It is consistent with studies in Kendari from 2000-2015 that found there is a significant association between rainfall index with the incidence of dengue (21). Research in Karangayar, Central Java of Indonesia, stated that the incidence of dengue increased along with the heavy rainfall. The increase of 1 mm rainfall may improve opportunities to change of 0.131 dengue cases (22).

CONCLUSIONS

Dengue Hemorrhagic Fever in Semanu II PHC needs attention and intervention programs from the related stakeholder. Health promotion should be provided to refer to the most risk group, such as males, children, and people live in Pacarejo.

Authors 'Contribution

VA, SS, DP designed the study. VA collected the data with the supervision of DP. VA, SS drafted the article. DP and SP reviewed the article.

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Conflict of Interest

There are no conflicts of interest

REFERENCES

1. World Health Organization (WHO). Dengue and Severe Dengue. Regional Office for the Eastern Mediterranean. 2014. p. 1–4.
2. Soegijanto S. Demam Berdarah Dengue. Ed. Kedua. Surabaya: Airlangga University Press; 2012.
3. WHO. Dengue and severe dengue [Internet]. Web. 2014 [cited 2020 Apr 1]. Available from: <https://apps.who.int/iris/handle/10665/204161>
4. WHO. Dengue and severe dengue [Internet]. Web. 2019 [cited 2020 Apr 1]. Available from: <https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>
5. Dinkes Provinsi DIY. Profil Kesehatan D.I Yogyakarta Tahun 2018. Yogyakarta: Dinas Kesehatan DIY; 2018.
6. Kemenkes RI. Demam Berdarah Dengue. *Bul Jendela Epidemiol*. 2010;2:1–48.
7. Kementerian Kesehatan RI. InfoDatin Situasi Demam Berdarah Dengue. 2018.
8. Muller J. Indonesia: number of dengue cases 2018. *Statistica.com*. 2020.
9. Dinkes Provinsi DIY. Profil Kesehatan Provinsi Daerah Istimewa Yogyakarta Tahun 2017. Dinas Kesehatan DIY. Daerah Istimewa Yogyakarta; 2017. 1–224 p.
10. Martín JL., Brathwaite O, Zambrano B, Solórzano J., Bouckennooghe A, Dayan GH, et al. The Epidemiology of Dengue in the Americas Over the Last Three Decades: A Worrisome Reality. *Am J Trop Med Hyg*. 2010;82(1):128–35.
11. Limkittikul K, Brett J, L’Azou M. Epidemiological Trends of Dengue Disease in Thailand (2000–2011): A Systematic Literature Review. *PLoS Negl Trop Dis*. 2014;8(11):1–10.
12. Subagia K, Sawitri AAS, Wirawan DN. Lingkungan dalam rumah, mobilitas dan riwayat kontak sebagai determinan kejadian demam berdarah dengue di Denpasar tahun 2012. *Public Heal Prev Med Arch*. 2013;1(1):8–12.
13. Mistry M, Chudasama RK, Goswami Y, Dalwadi C, Mitra A, Mehta G. Epidemiological characteristics of dengue disease in Saurashtra region, India, during year 2015. *J Fam Med Prim Care*. 2017;Vol. 6(No. 2):249–53.
14. Permatasari DY, Ramaningrum G, Novitasari A. Hubungan Status Gizi, Umur, dan Jenis Kelamin dengan Derajat Infeksi Dengue pada Anak. *J Kedokt Muhammadiyah*. 2015;2(1):24–8.
15. Mayasari R, Arisanti M, Nurmaliani R, Sitorus H, Ambarita LP. Karakteristik penderita , hari dan curah hujan terhadap kejadian Demam Berdarah di Kabupaten Ogan Komering Ulu. *JHECDs J Heal Epidemiol Commun Dis*. 2019;5(1):23–9.
16. Sulistyawati S, Astuti FD, Umniyati SR, Satoto TBT, Lazuardi L, Nilsson M, et al. Dengue vector control through community empowerment: lessons learned from a community-based study in Yogyakarta, Indonesia. *Int J Environ Res Public Health*. 2019;161013.
17. Sucipto PT, Raharjo M, Nurjazulli. Faktor – Faktor Yang Mempengaruhi Kejadian Penyakit Demam Berdarah Dengue (DBD) Dan Jenis Serotipe Virus Dengue Di Kabupaten Semarang. *J Kesehat Lingkung Indones*. 2015;14(2):51–6.
18. Promprou S, Jaroensutasinee M, Jaroensutasinee K. Climatic Factors Affecting Dengue Haemorrhagic Fever Incidence in Southern Thailand. *Dengue Bull*. 2005;29:41–8.
19. Perwitasari D, Ariati J, Puspita T. Kondisi Iklim dan Pola Kejadian Demam Berdarah Dengue di Kota Yogyakarta Tahun 2004-2011. *Media Penelit dan Pengemb Kesehat*. 2015;25(4):243–8.
20. Rismawati SN, Nurmalia I. Hubungan Perilaku Host dan Environment dengan Kejadian DBD di Wonokusumo Surabaya. *J Berk Epidemiol*. 2017;5(3):383–92.
21. Rasmanto MF, Sakka A, Ainurafiq. Model Prediksi Kejadian Demam Berdarah Dengue

- (Dbd) Berdasarkan Unsur Iklim di Kota Kendari Tahun 2000-2015. *J Ilm Mhs Kesehat Masy Unsyiah*. 2016;1(3):1–14.
22. Nisaa A. Korelasi Antara Faktor Curah Hujan dengan Kejadian DBD Tahun 2010-2014 di Kabupaten Karanganyar. *J IKESMA*. 2018;14(1):25–32.

