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Factors Associated with Dengue Hemorrhagic Fever in the Lepo-Lepo Community Health Center Area

Faktor-Faktor Berhubungan dengan Demam Berdarah Dengue di Wilayah Puskesmas Lepo-Lepo

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ABSTRACT

Dengue Hemorrhagic Fever is one of the health problems in Indonesia that tends to increase in the number of patients and spread more widely and can cause extraordinary events (KLB). The prevalence of DHF in Kendari City in 2024 is 0.474% or 474/100,000 population, while the national figure is 0.03%. The purpose of this study was to determine the factors associated with DHF cases in the community within the working area of the Lepo-Lepo Community Health Center through an epidemiological study approach. This was a quantitative study with a cross-sectional design. The population consisted of 7,134 households, with a sample size of 99 respondents. The sampling technique used was proportional random sampling. The analysis method used the chi-square test. The results showed that DHF was significantly related to PSN knowledge (0.000<0.05), 3M Plus behavior (0.000<0.05), resting places (0.029<0.05), and indoor air humidity (0.003<0.05). The conclusion is that there is a relationship between PSN knowledge, 3M Plus behavior, resting place, and indoor air humidity. This study suggests that efforts to prevent DHF in the Lepo-Lepo Community Health Center working area should focus on intensively improving education and socialization regarding mosquito breeding site eradication (PSN) and 3M Plus behavior to the community. In addition, environmental control, such as managing mosquito resting places and regulating indoor air humidity, should be a priority to reduce the habitat of Aedes aegypti mosquitoes.

Keywords: **DHF, PSN, 3M Plus, humidity, resting place**

ABSTRAK

Demam Berdarah Dengue merupakan salah satu masalah kesehatan di Indonesia yang cenderung meningkat jumlah pasiennya dan semakin meluas penyebarannya serta dapat menimbulkan kejadian luar biasa (KLB). Prevalensi DBD di Kota Kendari tahun 2024 sebesar 0,474% atau 474/100.000 penduduk sedangkan angka nasional yaitu 0,03%. Tujuan penelitian ini untuk mengetahui faktor-faktor yang berhubungan pada masyarakat dengan kejadian DBD di wilayah kerja Puskesmas Lepo-Lepo melalui pendekatan studi epidemiologi. Jenis penelitian kuantitatif dengan desain Cross-Sectional Study. Jumlah Populasi 7.134 Kepala keluarga, dengan jumlah sampel 99 responden. Teknik pengambilan sampel menggunakan proportional random sampling. Metode analisis menggunakan uji chi square. Hasil penelitian menunjukkan bahwa DBD memiliki hubungan signifikan dengan pengetahuan PSN (0,000<0,05), perilaku 3M Plus (0,000<0,05), Resting Place (0,029<0,05), dan kelembaban udara indoor (0,003<0,05). Kesimpulan ada hubungan antara faktor pengetahuan PSN perilaku 3M Plus, resting place dan kelembaban udara indoor. Saran penelitian ini upaya pencegahan DBD di wilayah kerja Puskesmas Lepo-Lepo difokuskan pada peningkatan edukasi dan sosialisasi mengenai Pemberantasan Sarang Nyamuk (PSN) serta perilaku 3M Plus kepada masyarakat secara intensif selain itu, pengendalian lingkungan seperti pengelolaan resting place nyamuk dan pengaturan kelembaban udara dalam ruangan harus menjadi prioritas untuk mengurangi habitat nyamuk Aedes aegypti.

Kata Kunci: DBD, PSN, 3M Plus, kelembaban, resting place

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INTRODUCTION

Dengue hemorrhagic fever (DHF) is an endemic disease in tropical and subtropical regions.[1] DHF is caused by an infection with the dengue virus, which is transmitted to humans through the bite of an infected Aedes aegypti mosquito. DHF falls under the category of arboviruses, or arthropod-borne viruses transmitted through arthropod bites.[2]

The number of DHF cases reported globally through the World Health Organization (WHO) in 2023 was 4.6 million, with 7,300 deaths. By April 2024, the number of DBD cases had increased to 7.6 million, resulting in 3,000 deaths. As of 2024, 90 countries have reported active dengue transmission. The Southeast Asian region has environmental conditions conducive to endemic dengue transmission. There is a clear seasonal pattern in dengue incidence linked to climatic patterns in each country. In 2024, Bangladesh, Nepal, Thailand, and Indonesia reported varying case fatality rates (CFR), ranging from 0% in Nepal to 1.09% in Bangladesh and 0.5% in Indonesia.[3]

There were 114,720 cases of dengue fever in Indonesia in 2023, with a prevalence of 41.3 per 100,000 people, resulting in 894 deaths (CFR = 0.7%) (Indonesian Ministry of Health, 2023a). In 2024, there were 197,396 cases of dengue fever, with a prevalence of 69.8 per 100,000 people, resulting in 1,161 deaths (CFR = 0.5%).[4]

According to the Health Department Profile of Southeast Sulawesi Province, the population was 2,704,610 in 2022. There were 940 cases of dengue fever, which equates to a prevalence rate of 35.1 per 100,000 people. Eighteen people died, which equates to a CFR of 1.91%. In 2023, the population increased to 2,753,707, and there were 1,637 DBD cases in Southeast Sulawesi, with a prevalence rate of 59.4 per 100,000 people, resulting in 15 deaths (CFR = 0.92%).[5] The following year, the population increased to 2,822,613, and dengue fever cases surged to 4,491 with a prevalence rate of 159 per 100,000 people, resulting in 20 deaths (CFR = 0.7%).[6]

Dengue fever cases in Kendari City predominantly affect children aged 5–9, with males accounting for the majority of cases.[6] Meanwhile, in 2024, the population of Indonesia reached 355,655,000, and the number of dengue fever cases increased to 1,689 with a prevalence rate of 474 per 100,000 people, resulting in 13 deaths (CFR = 0.76%).[6] Dengue fever cases in Kendari City predominantly affect individuals over 19 years of age, with males accounting for the majority of cases.[7]

There are 11 sub-districts and 15 health center service areas in Kendari City. According to the 2024 case report, Baruga Subdistrict had the highest number of cases with 326, followed by Poasia Subdistrict with 265, Kadia Subdistrict with 199, Wua-Wua Subdistrict with 182, Kambu Subdistrict with 171, Puuwatu Subdistrict with 153, West Kendari Subdistrict with 136, Mandonga Subdistrict with 129, Kendari Subdistrict with 55, Abeli Subdistrict with 52, and Nambo Subdistrict with 21.[7]

The Lepo-Lepo Health Center service area in Baruga District had the most DBD cases. According to data from the Kendari City Health Office, the number of dengue fever cases in the Lepo-Lepo Health Center's service area over the past three years was as follows: In 2022, the population was 41,868,

and there were 31 cases of dengue fever, with a prevalence rate of 93 per 100,000 people. In 2023, the population was 34,241, and the Lepo-Lepo Health Center saw the highest number of dengue fever cases, with 42 cases and a prevalence rate of 122 per 100,000 people. In 2024, the population increased to 35,342, and there was a significant increase in cases, with 326 cases and a prevalence rate of 922 per 100,000 people. There were also two deaths (CFR = 0.6%).

This study examines the epidemiology of dengue hemorrhagic fever (DHF) and related factors in the Lepo-Lepo community health center service area in Kendari City.

MATERIALS AND METHODS

This quantitative research study employed an analytical observational design and a cross-sectional study design. It was conducted in the service area of the Lepo-Lepo Community Health Center in the Baruga District of Kendari City in July 2025. The study population consisted of 7,134 households, and the sample size was 99 respondents. Proportional random sampling was used for the sample, and univariate and bivariate analyses were performed using the Chi-Square Test.

RESULTS

The results of the data tabulation can be seen in the characteristics of the respondents, as well as in the number of samples as many as 99 people. See the following table for details.

Table 1 shows that the largest group of respondents were aged 21-30 years (34 respondents, or 34.4%), while the smallest group were aged 51-60 years (13 respondents, or 13.1%).

The characteristics of the respondents show that they are predominantly male (57 respondents, or 57.6%) and female (42 respondents, or 42.4%).

Table 1 also shows that eight respondents (8.1%) did not attend school, 33 respondents (33.3%) had a college education, and 18 respondents (18.2%) had an elementary school education, the lowest level.

Table 1. Distributions of Respondent Characteristics in Working Area of The Lepo Lepo Community Health Center Kendari City

Category	n	%
Age		
22-26	18	18.2
27-31	18	18.2
32-36	16	16.1
37-41	11	11.1
42-46	17	17.2
57-51	7	7.1
>52	12	12.1
Gender		
Male	57	57.6
Female	42	42.4
Subdistrict		
Lepo-lepo	19	19.2
Wondudopi	12	12.1
Baruga	40	40.4
Watubangga	28	28.3
Education Level		
SD	18	18.2
SMP	5	5.1
SMA	35	35.4
University	33	33.3
Not school	8	8.1
Total	**99**	**100.0**

Source: Primary Data, 2025

Table 2. Distributions of Respondent Characteristics in working Area of The Lepo Lepo Community Health Center Kendari City

Category DHF	n	%
Yes	50	50.5
No	49	49.5
Total	**99**	**100.0**

Source: Primary Data, 2025

According to Table 2, 50.5% (50 respondents) of the participants had been diagnosed with DBD

within the past three months, while the remaining 49.5% (49 respondents) had not.

Table 3. Frequency Distribution of Knowledge of PSN, 3M Plus Behavior, Resting Place, and Indoor Air Humidity in the Working Area of the Lepo-Lepo Community Health Center

Category	n	%
Knowledge (PSN)		
Insufficient	38	38.4
sufficient	61	61.6
Behavior 3M Plus		
Not good	43	43.4
Good	56	56.6
Resting Place		
Yes	82	82.8
No	17	17.2
Indoor Air Humidity		
MS	21	21.2
TMS	78	78.8
Total	**99**	**100.0**

Source: Primary Data, 2025

Table 3 shows that 38 respondents (38.4%) had insufficient knowledge of PSN, while 61 respondents (61.6%) had sufficient knowledge. Table 3 also shows that most respondents exhibited poor 3M Plus behavior (43.4%), while 56.6% exhibited good 3M Plus behavior.

Table 3 also shows that 82 respondents (82.8%) had a resting place, while 17 respondents (17.2%) did not. The results of indoor air humidity measurements indicate that 78 respondents (78.8%) did not meet the requirements, while 21 respondents (21.2%) did.

Table 4. Analysis of the Relationship between Knowledge of PSN, 3M Plus Behavior, Resting Place, and Indoor Air Humidity in the Working Area of the Lepo-Lepo Community Health Center, Kendari City

Variabels	Incidence of Dengue Hemorrhagic Fever						Statistical Test Results
	Yes		No		Total		
	n	%	n	%	n	%	
Knowledge PSN							*p-Value = 0,000* *α = 0,05* *Phi= 0,698*
Less	36	94.7	2	5.3	38	100.0	
Enough	14	23.0	47	77.0	61	100.0	
Total	50	50.5	49	49.5	99	100.0	
Behavior 3M Plus							*p-Value* = 0,000 *α = 0,05* *Phi= 0,516*
Not Good	10	22.2	35	77.8	45	100.0	
Good	40	74.1	14	25.9	54	100.0	
Total	50	50.5	49	49.5	99	100.0	
Resting Place							*p-Value* = 0,029 *α* = 0,05 *Phi= 0,246*
Yes	46	56.1	36	43.9	82	100.0	
No	4	23.5	13	76.5	17	100.0	
Total	50	50.5	49	49.5	99	100.0	
***I*ndoorAir Humadity**							*p-Value* = 0,003 *α* = 0,05 *Phi= 0,326*
TMS	46	59.0	32	41.0	78	100.0	
MS	4	19.0	17	81.0	21	100.0	
Total	50	50.5	49	49.5	99	100.0	

Source: Primary Data, 2025

Based on Table 3, the analysis of the relationship between PSN knowledge and DHF incidence, tested using the chi-square test, yielded a p-value of 0.000 (<0.05). This indicates a significant relationship between PSN knowledge level and DHF incidence. As shown in the table, 94.7% of individuals with insufficient PSN knowledge experienced DHF, while 5.3% did not. Conversely, 23.0% of those with adequate PSN knowledge experienced DBD, while 77.0% did not. Based on the strength of the relationship test, a Phi value of 0.698 was obtained, indicating a strong relationship between the two variables tested in the study. Therefore, there is a strong relationship between PSN knowledge and DBD incidence in the Lepo-Lepo Health Center work area.

Table 3 shows that the Chi-Square analysis yielded a p-value of 0.000, which is less than 0.05 and indicates a significant association between 3M Plus behavior and dengue fever occurrence in the community. Among those with poor 3M Plus behavior, 22.2% had dengue fever, while 77.8% did not. Conversely, 74.1% of those with good 3M Plus behavior experienced DBD, while 25.9% did not. The Phi value based on the strength of the relationship test was 0.516, indicating a moderate relationship between the two variables tested in the study. Thus, there is a moderate relationship between 3M Plus behavior and DBD incidence in the Lepo-Lepo Health Center work area.

Table 3 shows that there is a significant relationship between the presence of mosquito resting places and the incidence of dengue fever, with a p-value of 0.015 < 0.05. This suggests that mosquitoes were present in the resting places of 82 respondents. Of those respondents, 56.1% experienced DBD, while 43.9% did not. Meanwhile, mosquitoes were not found in the resting places of 17 respondents. Of those respondents, 23.5% experienced DBD, while 76.5% did not. The Phi value, based on the strength of association test, was 0.246, indicating a weak association between the two variables tested in the study. Therefore, there is a weak association between the presence of resting places and the occurrence of DBD in the Lepo-Lepo Health Center's service area.

Based on Table 3, the results of the Chi-square test analysis yielded a p-value of 0.003, which is less than the significance level of 0.05. This indicates a significant relationship between indoor air humidity and the incidence of dengue fever. This suggests that indoor air humidity that does not meet human comfort levels is associated with a higher incidence of dengue fever. Among the 78 respondents, 59.0% experienced dengue fever, while among the 21 respondents, 19.0% experienced dengue fever. The Phi value, which indicates the strength of the relationship, was 0.326, suggesting a weak relationship between the two variables tested in the study. Therefore, there is a weak relationship between indoor air humidity and dengue fever cases in the Lepo-Lepo Health Center's service area.

DISCUSSION

According to John Snow's theory and epidemiological studies, the occurrence of dengue fever is inseparable from the epidemiological triangle (triad epidemiology), the basis of all

epidemiological fields. The occurrence or absence of disease in humans is influenced by three main factors: the host, the agent, and the environment. The host is the human or other living organism in which the disease develops. In the case of dengue fever, the host can be affected by age, gender, occupation, genetics, knowledge, and behavior. The agent is the disease-causing factor, which can be living or non-living, visible or invisible, and present in quantities that exceed or fall short of certain limits, thereby triggering the disease process. In DBD, the agent includes breeding and resting sites. The environment is an external factor that can serve as a site for the causative agent, such as temperature, rainfall, humidity, and population density.[10]

Public knowledge about PSN plays a very important role in preventing dengue fever (DBD). Knowledge of the dangers of DBD and ways to eradicate mosquito breeding sites can encourage communities to take preventive measures, such as cleaning water storage areas and covering containers that could become breeding sites. Communities should also consistently implement the 3M Plus behavior.[11]

The survey results showed that the average respondent was unaware that dengue mosquitoes breed in clean water. This indicates a lack of knowledge in the community about the ecological characteristics of the Aedes aegypti mosquito, the main vector of dengue fever. Many people mistakenly believe that dengue mosquitoes can only breed in dirty water. However, clean water storage areas, such as bathtubs, flower vases containing water, and rarely cleaned water drums, are actually the preferred locations for dengue mosquitoes to lay eggs. Most respondents (61.6%) had sufficient knowledge of PSN. This result aligns with previous research,[12] which showed an impact of triggering on the larval-free rate (LFR) in Rahandouna Village. The intervention method provided to the community in this area included focus group discussions on how to eliminate mosquito breeding sites, thereby enhancing the community's understanding of PSN.

The analysis results showed a strong correlation, with a Phi value of 0.698 indicating that PSN knowledge contributed less than 70% to the incidence of DHF.

The 3M Plus method is an important part of the effort to eradicate mosquito breeding sites and prevent dengue hemorrhagic fever (DHF).[13] In general, the 3M method consists of three main actions: draining, covering, and reusing used items. Draining involves regularly cleaning water storage areas, such as bathtubs, jugs, water towers, and drums. This includes scrubbing the storage area walls so that mosquito eggs do not adhere firmly. Covering involves tightly covering water storage areas to prevent adult mosquitoes from laying eggs. The goal of reusing or recycling used items is to reduce waste that can become stagnant water and breeding grounds for mosquitoes.[14]Analysis of questionnaire data revealed that the majority of respondents (77.8%) did not install wire mesh on their home ventilation systems due to the absence of roofs or ceilings in their homes. This condition also affected their behavior in regulating air humidity and lighting; 77.8% of respondents did not regulate these factors.

Additionally, most respondents (97%) do not maintain mosquito-repelling plants or keep mosquito-eating fish. This is due to a lack of adequate storage space as well as a reluctance to deal with the hassle and additional costs required to care for the plants and fish.

Nevertheless, 54.5% of respondents reported good behavior in implementing dengue prevention measures through the 3M Plus approach. This finding confirms that proper implementation of the 3M Plus approach contributes to reducing dengue incidence. Conversely, respondents who reported poor 3M Plus behavior (45.5%) tend to face an increased risk of dengue incidence.

The analysis results showed a moderate correlation, with a Phi value of 0.516 indicating that 3M Plus behavior contributes 51.6% to dengue fever incidence. Previous research indicates that good 3M Plus behavior can reduce dengue fever cases. For example, one study showed an increase in 3M Plus actions, indicating good community behavior regarding dengue fever. In this study, 23 out of 33 respondents (69.7%) exhibited good behavior, and this increased to 30 out of 33 respondents (91%) after the post-test. These results emphasize the importance of consistently applying healthy living habits in the community, especially in dengue fever prevention activities through the implementation of 3M Plus.[15]

The Aedes aegypti mosquito, the primary vector for the dengue virus, tends to rest in dark, damp, hidden places inside and around homes. These locations are typically found indoors at heights below 1.5 meters and in areas not exposed to direct sunlight. Examples include under tables, under beds, under chairs, behind cabinets, on piles of clothing, and on damp, dark walls. [16]

Data analysis and direct observation revealed that the most common resting places in respondents' homes were located in areas of the house that did not receive sunlight or artificial light and were damp (27.3%). Resting places were also commonly found in areas with plants around respondents' homes (10.1%). Respondents with one resting place in their homes (92%) reported a higher incidence of dengue fever than those without. The most common resting place in respondents' homes was found to be on the side of the house that did not receive sunlight or artificial light and was accompanied by a damp area (27.3%). Resting places were also commonly found in areas with plants maintained by respondents around their homes (10.1%). Respondents with one resting place in their homes (92%) reported a higher incidence of dengue fever than those without.

The analysis revealed a weak association, with a Phi value of 0.246 indicating that resting places contribute 24.6% to the incidence of dengue fever. The analysis revealed a weak association with a Phi value of 0.246, indicating that the resting place factor contributes 24.6% to the incidence of dengue fever.

This finding aligns with Saraswati's research and others', which shows that mosquito resting places play an important role in spreading dengue fever because adult mosquitoes often rest in damp, sheltered areas around people's homes.[17]

Indoor humidity plays an important role in supporting the survival and reproduction of Aedes aegypti mosquitoes, which are the main vector for

dengue fever. Relatively high humidity inside homes creates a more comfortable environment for the mosquitoes, which extends their lifespan and increases their egg-laying activity. This, in turn, supports the development of eggs and larvae into adult mosquitoes. Optimal humidity levels for the growth and reproduction of these mosquitoes are between 60% and 90%, as sufficient humidity prevents the mosquitoes' bodies from dehydrating and optimizes their life cycles.[18]

Measurements taken at respondents' homes in the morning between 6:00 and 10:00 WITA revealed that most measurements were between 60% and 80%. This indicates that indoor air humidity did not meet human requirements but met mosquito breeding requirements. The study found that respondents whose indoor air humidity did not meet the criteria (78.8%) were more likely to experience dengue fever than those whose humidity measurements met the criteria (21%). This finding suggests that uncontrolled indoor humidity can contribute to the breeding of Aedes aegypti mosquitoes, the primary vector of dengue fever. The analysis revealed a weak correlation indicating that indoor humidity contributes 40,2% to dengue fever incidence.[19]

This finding is consistent with the research of, which notes that inappropriate humidity levels can support mosquito development. However, the results of this study suggest that other factors, such as environmental cleanliness and the presence of breeding and resting places, may play a greater role in dengue fever occurrence.[20]

CONCLUSIONS AND SUGGESTIONS

There is a significant relationship between PSN knowledge, 3M Plus behavior, resting places, and indoor humidity levels and the incidence of dengue fever in the Lepo-Lepo Community Health Center's working area in Kendari City.

Further research is needed to explore the relationship between other factors, such as sociocultural factors, and to measure outdoor humidity levels in relation to dengue fever cases. Longitudinal studies or experiments should be conducted to determine the direct impact of specific interventions, such as implementing PSN programs or promoting the use of dengue prevention tools in the community. Research should also consider the impact of local government policies on dengue fever control and evaluate the success of implemented programs.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest that could affect the results or interpretation of this study.

REFERENCES

1. Bhatt S, Gething PW, Brady OJ, et al. The global distribution and burden of dengue. Nature. 2020;496(7446):504–7.
2. Weaver SC, Charlier C, Vasilakis N, Lecuit M. Zika, chikungunya, and dengue viruses:

emerging arboviral threats. Nat Rev Microbiol. 2022;20(3):148–59.

3. Ministry of health. WHO Health Emergencies [Internet]. 2024. Available from: https://cdn.who.int/media/docs/default-source/searo/indonesia/whe-monthly-report/march-2024---id.pdf?sfvrsn=cc784756_3
4. Kemenkes RI. Update Data Dengue [Internet]. Jakarta; 2024. Available from: file:///C:/Users/hp/Downloads/35.-Infografis-mg-35-tahun-20241.pdf
5. Dinkes Provinsi Sulawesi Tenggara. Profil Dinas Kesehatan Provinsi Sulawesi Tenggara Tahun 2023. Kendari; 2024.
6. Dinkes Kota Kendari. Profil Dinas Kesehatan Kota Kendari Tahun 2023. Kendari; 2024.
7. Dinkes Kota Kendari. Data DBD Kota Kendari Tahun 2024. Kendari; 2025.
8. Dinkes Kota Kendari. Profil Dinas Kesehatan Kota Kendari Tahun 2022. Kendari; 2024.
9. Morabia A. John Snow and the foundations of epidemiology revisited. Am J Epidemiol. 2020;189(11):1213–21.
10. Pakaya R, Daniel D, Widayani P, et al. Spatial model of Dengue Hemorrhagic Fever (DHF) risk: scoping review. BMC Public Health. 2023;23:2448. doi:10.1186/s12889-023-17185-3.
11. Yandika AP. Hubungan Antara Tingkat Pendidikan dan Tingkat Pengetahuan Masyarakat Terhadap Kejadian Demam Berdarah. J Ilm Indones. 2022;2(10):874–82.
12. Mangidi MAT, Sunarsih, Jayadipraja EA. Pengaruh Pemicuan Terhadap Angka Bebas Jentik di Kelurahan Rahandouna Kota Kendari. Al-Sihah Public Heal Sci J. 2019;11(2086–2040):133–42.
13. Periatama S. Hubungan Perilaku 3m Plus Dengan Kejadian Demam berdarah dengue (dbd) 3m plus behavior with event dengue hemorrhagicfever (DHF). J Surya Med. 2019;7(2460–7266):77–81.
14. Kemenkes RI. Pemberantasan Sarang Nyamuk dengan Metode 3M Plus [Internet]. Jakarta: Kemenkes RI; 2023 [cited 2025 Feb 1]. p. 1. Available from: https://ayosehat.kemkes.go.id/pemberantasan-sarang-nyamuk-dengan-3m-plus
15. Alvarado-Castro V, Paredes-Solís S, Nava-Aguilera E, et al. Assessing the effects of community participation on dengue control: a systematic review. PLoS Negl Trop Dis. 2020;14(7):e0008389.
16. Reddy N. An Epidemiological Study On Susceptibility Of Humans To Dengue Fever In Relation To Blood Groups, Age and Sex. Int J Biol Allied Scienes. 2022;11(9):4229–36.
17. Nanda M. Analisis Penerapan Manajemen Pengendalian Vektor DBD. J Visions Ideas. 2023;3(2):425–33.
18. Zubaidah T. Demam Berdarah Dengue dari Sudut Pandang Kesehatan Lingkungan. 1st ed. Rotadi M, editor. Kuningan: Goresan Pena; 2016. 4 p.
19. Yanti, F., Ali L.A.,Violita RD. Faktor-Faktor yang Berhubungan Penyakit DBD pada Wilayah Kerja Puskesmas Puuwatu Kota Kendari. Jurnal Healthy Mandala Waluya. 2024; 3(1):21-32.

20. Lahdji A, Putra BB. Hubungan Curah Hujan , Suhu , Kelembaban dengan Kasus Demam Berdarah Dengue di Kota Semarang. Syifa Med. 2019;8(1):46–53.