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Effectiveness Of Pandan Wangi Leaf Extract (Pandanus Amaryllifolius Roxb.) On Numbers Death Of Larva Aedes Aegypti

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ABSTRACT

Increased cases of dengue hemorrhagic fever accompanied by the emergence of resistance to temephos, making the use of natural larvicides begin to be considered. One of the natural ingredients that can be used is the fragrant pandan leaves (Pandanus amaryllifolius Roxb). The purpose of this study was to examine the concentration and effectiveness of Pandanus leaf extract (Pandanus amaryllifolius Roxb.) To kill Aedes aegypti larvae. This research is an experimental research with posttest only control group design where the object is divided into two groups: the control group and the treatment group. Samples were 25 larvae in each group, and it was repeated four times. So the total sample is 800 Aedes aegypti larvae. The results of this study indicate that at a concentration of 0% (negative control) aquades can kill 0 Aedes aegypti larvae, at a concentration of 1% (positive control) can kill an average of 56%, a concentration of 0.5% can kill 16.75 (17) larvae (67%), a concentration of 0.7% can kill 18.75 (19) larvae (75%), a concentration of 0.9% can kill 20.5 (21) larvae (82%), a concentration of 1.0% can kills 22.25 (23) larvae (89%), a concentration of 3.0% can kill 24 larvae (96%), and a concentration of 5.0% can kill 25 larvae (100%). Based on the analysis of the one way ANOVA test, it can be concluded that there is an effect of fragrant pandanus leaf extract on the mortality of Aedes aegypti larvae with a significant p value of 0,000 ($p < 0.05$). Pandan (Pandanus amaryllifolius Roxb.) Fragrant pandan leaf extract (Pandanus amaryllifolius Roxb) at 5.0%concentration is the most effective concentration to kill Aedes aegypti mosquito larvae. Conclusion: Fragrant pandan leaves (Pandanus amaryllifolius Roxb) are effective in causing the death of Aedes aegyti mosquito larvae.

Keywords : Effectiveness, Fragrant pandan leaves (Pandanus amaryllifolius Roxb),, Death of larvae, Aedes aegyti

INTRODUCTION

Dengue Hemorrhagic Fever is a disease caused by Dengue virus transmitted to humans through the bite of the Aedes Aegypti and Aedes Albocpictus mosquitoes. In Indonesia is an endemic area with distribution throughout the country. Symptoms that will appear as marked by sudden fever, headache, back pain of the eyeball, nausea and manifest bleeding such as nosebleeds or bleeding gums and redness on the surface of the body in patients (MOH RI, 2017).

Dengue Hemorrhagic Fever (DHF) is still a health problem in the world. DHF is found in almost all parts of the world, especially in tropical and subtropical countries, both as an endemic disease and epidemic disease. Around 2.5 billion people live in dengue endemic countries, 70% of the population at risk of dengue live in the WHO countries of Southeast Asia and the Western Pacific. According to WHO, Dengue Hemorrhagic Fever in Indonesia is included in category A namely DHF, Ovitrap Index, Mapping, Endemic. Dengue hemorrhagic fever (DHF) has become a major problem. Indonesia is a dengue endemic area and experiences epidemics once in 4-5 years. Until now there has been a tendency to increase in the number of cases and the wider spread (WHO, 2016).

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The number of DHF cases fluctuates every year. In 2014 the number of sufferers reached 100,347 per 907 thousand people of whom died. In 2015, there were 129,650 sufferers and 1,071 deaths. While in 2016 there were 202,314 sufferers and 1,593 deaths. In 2017 there were 17,877 cases, with 115 deaths. The morbidity / Incidence Rate / IR in 34 provinces in 2015 reached 50.75 per 100 thousand population, and IR in 2016 reached 78.85 per 100 thousand population. This figure is still higher than the national IR target of 49 per 100 thousand inhabitants. (RI Ministry of Health, 2017).

In 2018 there were 53,075 patients, with 344 cases and 2019 as many as 13,692 patients, with 169 cases / February 2019 who died (DG P2PL, 2019).

Data from the East Java Provincial Health Office shows, in 2014 there were 9,445 people. Meanwhile, in 2015 there was a quite high increase in the number of DHF sufferers reaching 21,266 people, so that it was designated as an outbreak. Then in 2016, the number of sufferers dropped again to 3,590 people. While in 2017, DHF cases in East Java have 410 sufferers. Of that number, 5 people died. In 2018, East Java will also occupy the first position with a total of 7,800 cases and 80 deaths. In 2019 even the East Java province was in the top position of the distribution of DHF as many as 2,657 cases were recorded in the East Java area (East Java Health Office, 2019).

Based on information from the Head of the Disease Control and Eradication Section of the Jombang District Health Office, said in 2014 the death rate reached 6 people with 356 people affected by the Dengue virus then decreased in 2015 with 674 cases, 4 of them died. In 2016 the number of DHF sufferers reached 700 people with a mortality rate of 8 people and continues to increase. In November 2017, dengue fever was again present with the number of sufferers reaching 305 people. DHF sufferers in 2018 reached 454 people with 1 of them died. While in 2019, there were already 31 residents exposed to positive dengue virus.

On the ABJ indicator nationally that is used in efforts to control DHF in 2017 has not reached the program target of ≥ 95%. ABJ in 2017 decreased by 46.7%, declining far enough compared to 2016 which amounted to 67.6% so that it has not met the program target. ABJ is the expected output from the 1 jumantik 1 house movement activity, therefore it is necessary to optimize these activities from all districts or cities, optimizing DAK funds to meet logistical needs that support DHF control and monitoring and coaching to the provincial health office in the management of the reporting system.

Temephos 1% is a larvacide that is widely used to control Aedes aegypti larvae until now, but resistance of Aedes aegypti larvae to Temephos 1% begins to occur (Marreta, 2017). This encourages the development of other alternatives by using natural ingredients, for example materials from plants as vegetable pesticides which are relatively safer. The use of natural resources as larvicides which also does not contaminate the environment needs to be considered, in connection with the start of resistance to temephos. One of the natural materials that can be used is leaf fragrant pandanus (Pandanus amaryllifolius Roxb.). P. amaryllifolius Roxb. has been known to contain alkaloids, saponins, flavonoids, polyphenols, and tannins (Dalimartha, 2009). Based on the results of Hastuti's research (2008) it is known that, saponins and polyphenols can inhibit and even kill mosquito larvae, saponins can damage cell membranes and interfere with insect metabolic processes while polyphenols as digestive inhibitors of insects including mosquitoes Anopheles aconitus.

METHODS

This research is an experimental research with posttest only control group design where the object is divided into two groups: the control group and the treatment group. Samples were 25 larvae in each group, and it was repeated four times. So the total sample is 800 Aedes aegypti larvae.

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RESULT

Characteristics of Subjects

Table 1. Samples of Aedes aegypti larvae used in pandanus leaf extract test (Pandanus amaryllifolius Roxb.) In the Parasitology Laboratory, Kaliwungu, Jombang (WHO, 2005; Bria, 2008)

Perlakuan	Number of Larvae x Number of Repetitions	Total
Control (-) : 0%	25 Larvae x 4	100 larvae
Treatment I :	25 Larvae x 4	100 larvae
Treatment II :	25 Larvae x 4	100 larvae
Treatment III :	25 Larvae x 4	100 larvae
Treatment IV :	25 Larvae x 4	100 larvae
Treatment V :	25 Larvae x 4	100 larvae
Treatment VI :	25 Larvae x 4	100 larvae
Control (+) :	25 Larvae x 4	100 larvae
Jumlah Larva		800 Larvae

Table 2. Number of Death of Aedes aegypti Larvae at Various Concentrations of Pandan Wangi Leaf Extract (Pandanus amaryllifolius Roxb.) After 24 Hours of Treatment.

Concentration (%)	The number of test larvae	Number of larval deaths in replication to 1		2		3		4		Average	
		Σ	%	Σ	%	Σ	%	Σ	%	Σ	%
Control (+)	25	13	52	15	60	13	52	15	60	14	56
Control (-)	25	0	0	0	0	0	0	0	0	0	0
0,5	25	16	64	17	68	17	68	17	68	16.75	67
0,7	25	19	76	19	76	19	76	18	72	18.75	75
0,9	25	21	84	20	80	20	80	21	84	20.5	82
1,0	25	22	88	23	92	22	88	22	88	22.25	89
3,0	25	24	96	25	100	24	96	23	92	24	96

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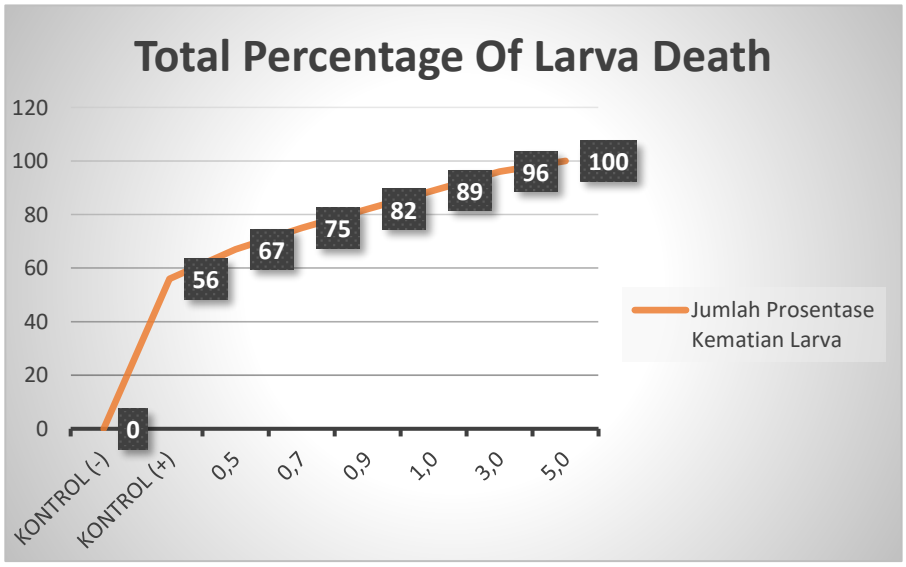
5,0	25	25	100	25	100	25	100	25	100	25	100

Based on table 2 it can be seen that during the test to the control group and treatment for 24 hours starting at 15.00-15.00 ie in the negative control group there were no larvae deaths in all replications / replications. in the positive control group that was stirred on the test material there were 67% average larval deaths. In the treatment group the lowest average mortality was at a concentration of 0.5% namely 16.75 which is 67%, while the highest average mortality was at a concentration of 5.0% which reached 100%.



of Concentration Death Response of Aedes aegypti Larvae at Various Concentrations After 24 Hours Treatment

of Based on Graph 1 it can seen that the higher be concentration causes a high percentage of Aedes aegypti larvae mortality. Larvae mortality on average at concentrations of 3% and 5% has reached 100%. So the concentration of fragrant pandan leaf extract that is faster and more effective in killing Aedes aegypti larvae is at a concentration of 5.0% because it can kill Aedes aegypty larvae by 100%.

There is a significant difference in each concentration (sig <0.05), except for the following concentration because the result of p value is greater than the value of sig 0.05, ie concentration of 0.7% vs concentration of 0.9% (sig 0.037> 0.05), 0.9% Concentration vs 1.0% Concentration (sig 0.008> 0.05), then, 1.0% Concentration vs 3.0% Concentration (sig 0.037> 0.05), Concentration 1, 0% vs concentration of 5.0% (sig 0.006> 0.05), and concentration of 5.0% vs concentration of 3.0% (sig 0.310> 0.05).

DISCUSSION

A. Effectiveness of Pandan Wangi (Pandanus amaryllifolius Roxb.) Leaf Extract in Killing Aedes aegypti Larvae

Based on Table 4.3 it can be seen that in the control group there were no test larvae deaths, the average larval mortality after 24 hours of treatment, at the lowest concentration of 0.5% of 16.75 (17) larvae (67%), a concentration of 0.7% of 18.75 (19) larvae (75%), concentration 0.9% of 20.5 (21) larvae (82%), concentration of 1.0% of 22.25 (23) larvae (89%), concentration 3.0% of 24 larvae (96%), and 5.0% concentration of 25 larvae (100%). The increase in the average mortality of Aedes aegypti larvae occurs along with the increased concentration of pandanus fragrant leaf extract (Pandanus amaryllifolius Roxb.) Ie the higher the concentration the higher the average mortality of Aedes aegypti larvae.

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Polyphenols work as digestive blockers which reduce the ability of insects to digest food. The content of saponins and polyphenols in a plant extract can work as stomach poisons and respiratory poisons. Saponins and polyphenols can be stomach poisons if ingested by larvae, whereas as respiratory poisons, saponins and polyphenols can poison larvae through the respiratory tract located on the surface of the larval body (Pratama BA, 2009).

Flavonoids can enter the larvae and these substances will go to the respiratory system, flavonoids are damaging the respiratory system and cause nerve disorders in the larvae. These things cause the larvae have difficulty to process the breath and can not survive. Flavonoids cause damage when entering through the siphon, which makes the position of the larvae parallel to the surface of the water as an effort to get oxygen (Cania E, 2013).

Alkaloids are chemicals that can enter cells and damage cells by degrading cell membranes. Alkaloids can inhibit the action of the enzyme acetylcholinesterase, which causes interference with the workings of the larval nervous system. Alkaloids can also cause the movement of larvae to slow when given a touch of stimulation and the larvae 's body becomes curved continuously.

B. Concentration of Pandan Wangi (Pandanus amaryllifolius Roxb.) Leaf Extracts Effective Against Death of Aedes aegypti Larvae

Based on Table 4.3 it is known that the concentration of fragrant pandan leaf extract (Pandanus amaryllifolius Roxb.) At the lowest concentration of 0.5% is 16.75 (17) larvae (67%), the concentration of 0.7% is 18.75 (19) larvae (75%), 0.9% concentration of 20.5 (21) larvae (82%), 1.0% concentration of 22.25 (23) larvae (89%), 3.0% concentration of 24 larvae (96 %) has started to be effective in killing larvae but the one that can kill 100% Aedes aegypti larvae is a concentration of 5.0%.

The results of data normality test using Shapiro-Wilk using SPSS 16.0 indicate that the distribution of data obtained is normally distributed because the value is (sig> 0.05).

In the variance homogeneity test results (sig 0.289> 0.05), which means the data variance is the same, can then proceed to the Anova test with a confidence level of 95% (α = 0.05) it is known that a significant value of p = 0,000 (p <0, 05) it can be said that in the Anova test the results obtained were significant differences.

Then proceed to the Post Hoc LSD test that there are significant differences in each of each concentration (sig <0.05), except in the following concentration because the results of the p value are greater than the sig value of 0.05 ie Concentration 0.7% vs Concentration 0.9% (sig 0.037> 0.05), concentration 0.9% vs concentration 1.0% (sig 0.008> 0.05), then, concentration 1.0% vs concentration 3.0% (sig 0.037> 0.05), 1.0% Concentration vs 5.0% Concentration (sig 0.006> 0.05), and 5.0% Concentration vs 3.0% Concentration (sig 0.310> 0.05).

This shows that there is an effect of giving the extract of fragrant pandan leaf (Pandanus amaryllifolius Roxb.) On the death of Aedes aegypti larvae.

Research by (Pratama et al, 2009) found 100% larval mortality at 0.9% concentrations, this could be due to differences in extraction methods. For conditions of temperature, pH and humidity researchers have controlled so that the accuracy in this study can minimize deficiencies in the observation process.

CONCLUSIONS

1. From the analysis of the quality of antenatal care services 58 or 67.4% of respondents stated that the quality of antenatal care services is good and 28 or 32.6% of respondents stated that the quality of antenatal care services is sufficient and none of the number of respondents stated the quality of service Less antenatal care. The significance value generated for the service quality variable is 0.001. This value is smaller than 0.05 (5%) so that the conclusion

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drawn is that the independent variable of knowledge has a significantly (individually) significant effect on patient motivation

2. From the analysis of therapeutic communication of midwives, 61 or 70.9% of respondents stated that midwife's therapeutic communication was good and 25 or 29.1% of respondents stated that midwife's therapeutic communication was sufficient and none of the respondents stated that midwife's therapeutic communication was lacking. The significance value of the therapeutic communication variable is 0,000. This value is smaller than 0.05 so the conclusion that can be drawn is that there is a significant influence individually (partial) therapeutic communication variables of midwives on patient motivation.
3. From the analysis of patient motivation, 65 or 75.6% of respondents had strong motivation and 21 or 24.4% of respondents had moderate motivation and none of the respondents who had weak motivation to give birth at Griya midwife and Spa were . "F" Jombang.
4. There is an Influence of the Quality of the Antenatal Care Service and Therapeutic Communication of Midwives on the Motivation of Patients to Give Birth at the Midwife's Griya and Spa Ny. "F" Jombang Regency. Can be seen from the resulting significance value of 0,000. This value is smaller than the level of research error used which is equal to 5% (0.05).

REFERENCE

Buchbauer, Gerhard and Kemal Husnu Can Başer. 2010. Handbook of essential Oils: Science, Technology, and Applications. CRC Press/Taylor & Francis,975 h

Departemen Kesehatan RI, 2008. Tata Laksana Demam Berdarah Dengue., Jakarta.

Dalimartha, S. 2009. Atlas Tumbuhan Obat Indonesia Jilid 1. Jakarta :Trubus Agriwidya.

Departemen Kesehatan RI. 2017. Acuan Sediaaan Herbal. Jakarta : Diktorat Jendral POM-Depkes RI

Departemen Kesehatan RI.2000. Parameter Standar Umum Ekstrak Tumbuhan Obat. Jakarta : Diktorat Jendral POM-Depkes RI

Depkes RI, 2005. Rencana Strategi Depkes 2005-2009. Jakarta : Depkes RI

Depdikbud. 1999. Pengelolaan Laboratorium. Jakarta: Departemen Pendidkan Nasional.

Dinkes Jatim. 2019. Profil Kesehatan Provinsi Jawa Timur 2012. Surabaya: Dinas Kesehatan Jawa Timur.

D'Incao MP, Gosmann G, Machado V, Fiuza LM, Moreira GRP. Effect of Saponin Extracted from Passiflora alata Dryander (Passifloraceae) on development of the Spodopterafrugiperda (J.E. Smith) (Lepidoptera, Noctuidae). International Journal of Plant Research. 2012;2(5):151-9.

Gandahusada, S. dkk, 2000. Parasitologi Kedokteran. Edisi II. FKUI. Jakarta

Ginanjar, Genis. 2007. Demam Berdarah A Survival Guide. Yogyakarta: Mizan Group

Harvey R.A., Champe P.C. 2009. Pharmacology. 4 nd ed. China: Lippincott William & Wilkins.p.249-60.

Heinrich, M. Barnes, J. Gibbons, S. Williansom. 2004. Fundamental of Pharmacognocy and Phytotherapy. Philadelpia. Elsevier.

Hoedojo, R. dan S. Sungkar. 2008. Morfologi, Daur Hidup dan Perilaku Nyamuk : Parasitologi Kedokteran Edisi Ke-4. Fakultas Kedokteran Universitas Indonesia. Jakarta. 383 hlm.

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IDI 2013, Panduan praktis klinis bagi dokter di fasilitas pelayanan kesehatan primer, IDI, Jakarta.

Katyal, R., et al. 2001. Susceptibility Status of Immature and Adult Stages of Aedes aegypti Against Conventional Insecticides in Delhi, India. Dengue Bulletin. Vol 25, Hal : 84-87.

Kemenkes RI. (2017). Infodatin: situasi DBD di Indonesia. Kementerian Kesehatan RI. Jakarta

Jakarta. Kemenkes RI. (2016). Profil kesehatan Indonesia tahun 2015. Kementerian Kesehatan RI. Jakarta

Kementerian Kesehatan Republik Indonesia, 2016. Demam Berdarah Biasanya Mulai Meningkat Di Januari., Jakarta.

Margono. 2004. Metodologi Penelitian Pendidikan. Jakarta: PT Rineka Cipta.

Notoatmodjo, S 2010, Metodologi Penelitian Kesehatan, Rineka Cipta, Jakarta.

Nursalam 2013, Konsep dan Penerapan Metodologi Penelitian Ilmu Keperawatan, Edisi II, Salemba Medika, Jakarta.

Pohan, I.S., 2006, Jaminan Mutu Layanan Kesehatan, Buku Kedokteran, Jakarta.

Pratama BA, Astuti D, Ambarwati. Pemanfaatan Ekstrak Daun Pandan Wangi (Pandanus amaryllifolius Roxb.) sebagai Larvasida Alami. Jurnal Kesehatan. 2009;2(2):115-24.

Redaksi Agromedia dan Utami P. Buku Pintar Tanaman Obat 431 Jenis Tanaman Penggempur Aneka Penyakit. Jakarta : Agromedia Pustaka. 2008.

Rina M. dan Endang P.A. 2012. Potensi Daun Pandan (Pandanusmaryllifolius) dan Mangkokan (Notophanaxscutellarium) Sebagai Repelen Nyamuk Aedes Albopictus. ASPIRATOR 4 (2), 2012:85-91.

Saryono 2011, Metodelogi Penelitian Kesehatan, Mitra Cendikia, Yogyakarta.

Setiadi. (2013). Konsep dan praktek penulisan riset keperawatan (Ed.2) Yogyakarta: Graha Ilmu

Soeharsono, 2002. Zoonosis penyakit menular dari Hewan Ke Manusia .Jakarta : kanisius

Sugiyono. (2011). Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: Alfabeta.

Sugiyono. (2013). Metode Penelitian Kuantitatif Kualitatif dan R&D. Bandung: Alfabeta.

Sudoyo, dkk. 2007. Buku Ajar Ilmu penyakit Dalam. Edisi 4, Jilid 1. Jakarta : Departemen Ilmu Penyakit Dalam FKUI.

WHO. 2005. Guidelines For Laboratory and Field Testing Of Mosquito Larvacides. Diakses tanggal 12 November 2009. http://whqlibdoc.who.int/hq/2005WHOCDSWHOPESGCDPP2005.13.pdf.

WHO. Monitoring and managing insecticide resistance in Aedes mosquito populations: Interim guidance for entomologists. Geneva : WHO Press ; 2016

WHO (2016). Dengue and Severe Dengue. ://www.who.int/mediacentre/factsheets/fs117/en/ – Diakses September 2016.

Widiyanti, NLPM., Muyadihardja, S. 2004. Uji Toksisitas Jamur Metarhizium Anisopliae Terhadap Larva Nyamuk Aedes Aegypti. Media Litbang Kesehatan. Vol. XIV, No. 3, Hal : 25-30.

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Widiyanto, Teguh. 2007. Kajian Manajemen Lingkungan Terhadap Kejadian Demam Berdarah Dengue (DBD) Di Kota Purwokerto Jawa Tengah. [Thesis]. Semarang: Program Pasca Sarjana Universitas Diponegoro Semarang

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