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The Determinant of Lung Function Disorders of The Textile Industry Spinning Section

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Abstract

Many factors affect lung function capacity in textile industry workers. This research aims to determine the factors that affect the vital role of pulmonary spinning workers in the textile industry. This research used an analytic observational research design with a cross-sectional approach. The sampling technique used total sampling and getting the sample was 96 people, and measurement of lung vital capacity used spirometry. The Low Volume Sampler was applied to measure dust concentration, and the questionnaire was used to assess the individual characteristics. Bivariate analysis of the variables is the working environment dust, exercise habits, smoking behavior, and gender are significant. The result of multivariate analysis of dust is the most affecting to the lung vital capacity. In conclusion, dust concentrations are classified above the Threshold Limit Value (TLV), so the company should control the source of dust exposure.

Introduction

Occupational respiratory disease is a major global public health problem that accounts for up to 30% of all occupational diseases. Besides, 10-20% of deaths are caused by respiratory disorders (Gizaw et al., 2016). Exposure to dust in textile industry workers can be at risk of causing lung function disorders. Health effects, in the form of impaired lung function, have been documented in workers exposed to dust in both small, medium, and large industries (Subbarao et al., 2009). Occupational Lung Disease (OLD) is a pulmonary disease arising from prolonged or repeated exposure that causes toxic effects, both acute and chronic (Stobnicka and Górny, 2015). Occupational diseases are caused by pathological responses from patients to their working environment (Qian et al., 2016). There is a growing consensus on the adverse impact of organic dust on the symptoms and respiratory

function of industrial workers, one of which is impaired lung function (Khodadadi et al., 2011).

ILO shows that annually there are more than 250 million accidents at workplaces. While 160 million workers become sick due to hazards in the workplace. Also, around 1.2 million workers die due to accidents and occupational diseases. New materials for the production process are distributed annually in the workplaces, and many of them cause lung disease (ILO, 2013). Indonesia is one of the developing countries with many companies producing dust from the production process. OLD is a group of occupational diseases in which the target organ of the disease in the lung (Sumakmur, 2014).

The textile industry is one of the many vital sectors in Indonesia, especially in the Surakarta Raya region. Workers can be exposed to a variety of different environmental factors,

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Hearing Aids and The Quality of Life of Children with Hearing Loss

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Abstract

Hearing loss in children may cause social isolation and poor communication skills, potentially affecting mental disorders and quality of life. Hearing aids (HA) provide auditory stimuli that can improve children's speech ability and influence their quality of life. A cross-sectional study in three special schools-B (SLB-B) in Semarang was carried out. A total of 82 children (7-12 years old) with severe hearing loss with or without hearing aids were included. Quality of life was assessed by the Hearing Environments and Reflection on Quality of Life (HEAR-QL) questionnaire. The results showed that 48 (58.54%) subjects used hearing aids, and 34 (41.46%) did not use hearing aids. The average subject's age was 10.77 ± 1.56 years old. Hearing-aid use was associated with a good quality of life of children with hearing loss ($p < 0.001$). Good quality of life was found in 68.8% of children with hearing aids compared to only 2.9% in children without hearing aids. Duration of hearing-aid use ($p < 0.001$), mother education ($p < 0.006$) was associated with good quality of life of children, whereas gender ($p = 0.49$), number of siblings ($p = 0.06$), and socioeconomic status ($p = 0.63$) were not. The quality of life of children who use hearing aids is better than without hearing aids.

Introduction

Hearing loss in children that is not immediately treated can harm speech, language, academic, emotional, and psychosocial development (Madell, 2014). With the maturity process, the auditory function, and lasts speech development. A person's speech and language proficiency can only be achieved when sensory and motor input are normal. Speech development is closely related to the stage of hearing development (Suwento et al., 2017). Severe sensorineural hearing loss can cause more severe impairment in language and speech development, especially in the pre-lingual phase (Sobreira et al., 2015).

According to WHO, as many as 360 million people (approximately 5% of the world population) experience hearing loss, and nearly 32 millions of them are children (World Health Organization, 2016). Based on 29

countries' data, Stevens and colleagues (2013) reported that 1.4% of children and 9.8–12.2% of suffer hearing loss, whose prevalence is high, especially in low- and middle-income countries (Stevens et al., 2013). Sensorineural hearing loss (SNHL) is a result of damage to the auditory nerve or the hair cells of the inner ear and may be acquired, genetic or idiopathic. About 1–4 per 1000 babies are born with SNHL (Prosser et al., 2015). At the Ear, Nose, and Throat (ENT) outpatient clinic of Dr. Kariadi Hospital Semarang, there were up to 60 children visits monthly due to speech delay, in which nearly 50% had moderate-to-severe hearing loss. Hearing loss can cause social isolation and poor communication skills, which eventually may affect mental health and quality of life, (Azizi et al., 2013).

Quality of life that refers to individual health is called health-related quality of life

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“Health Belief Model” in the Prevention of Chronic Disease in the Elderly

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Abstract

Chronic disease is a non-communicable disease categorized as a long-term disease due to physiological changes in the body in the elderly. Chronic disease can be prevented with a healthy lifestyle and education through the Health Belief Model with the belief that someone takes a series of actions to overcome disease and reduce side effects. This study aims to determine how the effect of the application of the “Health Belief Model” in the Prevention and Health Care of Chronic Disease in the Elderly, which was carried out with a total sample of 100 respondents. The research design used Quasi Experiment with a pre-test and post-test approach with a control group design, a knowledge questionnaire about chronic disease, disease prevention, and health care including pre-test and post-test, used Paired T-Test with knowledge result $p\text{-value } 0.000 < \alpha$ ($\alpha = 0.05$) and health prevention and maintenance $p\text{-value } 0.000 < \alpha$ ($\alpha = 0.05$) so it can be concluded that there is an effect of implementing the “Health Belief Model” in the prevention and maintenance of chronic disease health in the elderly.

Introduction

Chronic disease is a non-communicable disease and is categorized as a long-term disease because it undergoes physiological changes in the body (Ribeiro et al., 2014). Chronic illness can cause job loss, experience physical dependence, and require treatment assistance (Gonzalez, Maria, Roth, Gelehrter, & Lopes, n.d.). Indonesia has 20.24 million people in the elderly category, equivalent to 8.03% of the total population (Yulianti, Baroya, & Ririanty, 2014). The number has not been matched by good health. The elderly morbidity rate in Indonesia is calculated at 25.05%, meaning that out of every 100, there are 25 sick elderly. The morbidity rate of the elderly is moderate due to chronic diseases in the highest order, such as hypertension, arthritis, stroke, COPD, DM, cancer, coronary heart disease, kidney stones, heart failure, and kidney failure (Sudarmaja, Swastika, & Ariwati, 2020).

Chronic diseases generally attack the elderly, and this condition requires treatment

until the end of life (Periyakoil, Neri, & Kraemer, 2016). The increasing population of chronic diseases affecting the elderly poses challenges for social care and health care. They experience the aging process, so they have a health burden. The decline in health functions prevents the elderly from being independent and participating in social activities (Perdamaian, Manus, Periska, & Steffiasih, 2020). The incidence of elderly people with chronic diseases requires long-term care and increases the cost of health care. In addition, chronic conditions cause the elderly to experience an inability to perform activities independently due to aging, disease conditions, and cognitive abilities that can make them dependent on care providers and require health services (Ondiege & Clarke, 2017).

The elderly with chronic diseases require long-term treatment. Treatment compliance is vital for them. Compliance is affected by several factors. Like medication, patient, physician, system-based factors, etc. Low medication compliance usually leads to poor

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Diarrhea Incidence in Tanah Bumbu, South Kalimantan, Under A Spatial Approach

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Abstract

Indonesia has seen an increase in diarrhea incidence from 4.5% in 2013 to 6.8% in 2018. South Kalimantan, diarrhea is still a common disease with a relatively high incidence rate. In Tanah Bumbu itself, the incidence of diarrhea from 2014 to 2019 was among the top 10 most common diseases. The percentage of patients served in 2019 was 33.26% of the detection targets. While in infants, only 3.4% of the number of detection targets. This study aims to see the spatial description and influence of the districts' condition in Tanah Bumbu Regency with the diarrhea incidence. This research took place in the ten districts of Tanah Bumbu Regency. The analysis used in this study was SAR to see the relationship between districts and the incidence of diarrhea and other factors. The results showed that in Tanah Bumbu, factors that affected the incidence of diarrhea include population density (p-value 0.0001), access to quality drinking water (p-value 0.0001), and health facilities (p-value 0.0001).

Introduction

As a developing country, Indonesia has diarrhea problems prevalent because of its high morbidity and mortality (Margarethy, 2020). The incidence of diarrhea needs to be watched out for because it could cause outbreaks (Bellido-Blasco & Arnedo-Pena, 2019). Diarrhea is a condition characterized by loose or watery stool, increased defecation frequency, usually more than three times a day, and can be accompanied by blood and/or mucus (Jung et al., 2017; Margarethy, 2020). Factors that can exacerbate diarrhea cases include germs, nutritional conditions, hygiene and sanitation, population density, sociocultural and socioeconomic conditions. Diarrhea is highly affected by environmental conditions. If the environment is unhealthy (because it is contaminated with diarrhea germs) and it

accumulates with unhealthy human behavior (through food and drink), diarrhea will likely happen (Jarquin et al., 2016; Vincent, 2018).

Based on Basic Health Research, Indonesia has seen an increase in diarrhea incidence from 4.5% in 2013 to 6.8% in 2018 (Kemenkes, 2018). Meanwhile, in South Kalimantan, diarrhea is still one of the largest disease groups. It has a relatively high incidence rate. In 2018, the coverage of diarrhea services for children under five was only 41.12% (Directorate General of P2P, Ministry of Health RI, 2019) (Kemenkes RI, 2019; Kementrian Kesehatan RI, 2014). This condition is supported by environmental factors, mainly by common sanitation conditions that are still not good. For example, the use of water for daily needs that do not meet the requirements, family latrines that are still insufficient and does not meet

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Stunting Incidence in Infant Related to Mother's History During Pregnancy

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Abstract

Stunting in an infant aged under two years old will affect the health and well-being of the children in the future. Banyumas Regency has 10 stunting locus villages with various nutritional problems that could lead to the incidence of stunting. Diet, nutritional status, and mother's history during pregnancy will affect stunting in infants aged under two. This study aims to determine the relationship between the incidence of stunting in under-two infants related to parenting styles and mother's history during pregnancy in stunting locus villages in Banyumas Regency. This study used a case-control design using a total sampling technique with 181 respondents. This type of data was collected through interviews using a questionnaire to mothers of the infants aged under two. While the measurement of body height and weight of under-five children was derived from the latest weighing data conducted by research enumerators using infatometers and digital baby scales. There was no relationship between maternal age ($p = 0.21$), birth spacing ($p = 0.63$), nutritional status ($p = 0.40$) with the incidence of stunting, and there was a significant relationship between maternal parenting styles and the incidence of stunting ($p = 0.04$).

Introduction

Several low and middle-income countries are facing the double burden of malnutrition. It is characterized by facing the problem of malnutrition and an increasing incidence of overweight and obesity (Demaio & Branca, 2018). One of the chronic nutritional problems in infants aged under two that becomes the world's concern is stunting or shortness in body length or height. Eighty percent of under-five children were reported to be stunted in 14 countries worldwide. Indonesia is in the 5th with the number of stunting (UNICEF, 2013). Stunting is the result of a formula measurement by dividing body length or height according to age which value is less than minus 2 Standard Deviations (-2 SD) from the World Health Organization (WHO) reference of median value (Ikeda et al., 2013). Stunting that occurs in infants aged under two could lead to poor health of children in the future, such as short

height during adulthood, poor learning performances, and risks of developing chronic diseases (Dewey & Begum, 2011).

In Southeast Asia, the prevalence of under-five children with stunting has reached 33.8%, and Indonesia is in fifth place with the highest number of stunting amongst 81 countries in the world (Ohyver et al., 2017). The prevalence of stunting under-five children becomes a public health problem if its prevalence exceeds up to 20%. According to Basic Health Research Results in 2018, the prevalence of stunted children in Indonesia reached 29.6% (Kemenkes, 2018). So stunting in Indonesia is one of the health problems that need to be addressed.

The causes of growth faltering in toddlers are maternal parenting style and family income. Another study also has identified maternal factors that have a role in under-nourished children under five years old, such as education,

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Detection of Dengue Virus Transovarial Transmission in Dengue Hemorrhagic Fever Endemic Areas

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Detection of Dengue Virus Transovarial Transmission in Dengue Hemorrhagic Fever Endemic Areas

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Abstract

Dengue virus is a group of RNA viruses that are highly pathogenic in humans and spread quickly through the bites of *Aedes aegypti* and *Aedes albopictus* mosquitoes, especially in tropical countries. More than half a billion out of 100 countries worldwide are at serious risk of dengue virus infection. Vector surveillance activities with Ovitrap and detection of dengue virus types in *Aedes aegypti* and *Aedes albopictus* have never been carried out in Pontianak City. It is important in early alert systems at transmission foci. The purpose of this study was to prove the transovarial transmission of dengue virus in *Aedes aegypti* and *Aedes albopictus* mosquitoes with a transovarial transmission index (TTI) in endemic areas in Pontianak City, West Kalimantan. The method used in this research is descriptive observational, viral examination method with immunocytochemistry streptavidin-biotin peroxidase complex (ISBPC) and Polymerase Chain Reaction Transcription Reaction (PCR) aimed at proving the presence of transovarial transmission of dengue virus in the same period. The conclusion in this study is that there is evidence of transovarial transmission of dengue virus in *Aedes* mosquitoes in endemic areas by 29.3% in Sungai Jawi Dalam sub-district, West Pontianak sub-district, and 39.6% in Batu Layang sub-district, North Pontianak sub-district, mosquito density from the results of the Ovitrap Index measurement (OI) in Batu Layang Village is denser, namely 41.3%, compared to Sungai Jawi Village, which is 38.22% and has succeeded in identifying the type of dengue virus, namely the Dengue virus strain, in the two research locations.

Introduction

Dengue Hemorrhagic Fever is a health problem in Indonesia. All regions of Indonesia are at risk of contracting dengue disease because both the virus that causes it and the mosquitoes that transmit it are widespread in residential areas and public facilities throughout Indonesia. Based on the report from the Ministry of Health of the Republic of Indonesia, DHF has become an endemic problem in 33 provinces and 436 districts or cities, 605 sub-districts, and 1800 villages or urban villages. From 2014 to 2015, it reached 41.25/100,000 population, with a case fatality rate of 0.7%.

DHF in West Kalimantan Province in 2009, the mortality rate of DHF CFR ranked second in Indonesia. Although, the number of sufferers was only 979 cases compared to West Java with 35,453 and DKI Jakarta with 27,964. But the mortality rate reached CFR: 3.38%, after Jambi with a CFR of 3.67%. West Kalimantan Province ranks 2nd in the Kalimantan Islands region, after East Kalimantan with 5,762 cases of DHF. An increase in dengue cases occurs every year. In 2017 there were 5,049 dengue fever cases with 68 deaths. The highest mortality rate was in Pontianak with CFR; 7% and declared KLB.

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Previous research by Sucipto (2012) in the Pontianak Kota sub-district showed a transovarial transmission of 76.6%. This study was conducted one month before being declared a DHF outbreak. Another study in Malalaya⁴ and Banjar Negara Districts showed the transovarial transmission of the Dengue virus in Aedes mosquitoes. But the results were lower than in Pontianak City, namely 6.1%-17.1% and 9.42% (Sorisi et al., 2014). Transovarial transmission of the dengue virus in an area is an important etiological phenomenon. It is responsible for outbreaks due to the maintenance of the virus during the disease inter-epidemic period.

The spread of DHF in Pontianak City is evenly distributed in all sub-districts so that it is declared a DHF endemic city which every year there is an increase in cases of potential outbreaks. The 2017 data survey showed that the highest is in two urban villages, namely Batulayang Village, Batu Layang Health Center, North Pontianak Subdistrict. There are 40 cases of DHF and Sungai Jawi Village, Komyos Sudarso Health Center Working Area, West Pontianak District, with 93. It is known that the transmission of the dengue virus is from the bite of the Aedes aegypti mosquito, which initially bites people infected with the dengue virus and transmits it through bites to people who are not infected with the dengue virus. But there are also cases of DHF that appear when there are no previous cases of DHF. It is thought to be due to the transovarial transmission of the dengue virus in dengue hemorrhagic fever vectors. This study aims to determine transovarial transmission in dengue-endemic areas and detect the virus. This research is also an active observation in the context of implementing an early warning system (SKD) or an early warning system (EWS) in transmission foci, where dengue cases occur almost every year to prevent outbreaks (Fuadzy et al., 2020; Achmadi, 2012)

Method

This study used a descriptive design, carried out in July 2018 for four months, with the type of descriptive research with a cross-sectional study design, namely to prove the existence of transovarial Virden transmission

in dengue-endemic villages, consisting of 2 outputs, namely dengue-endemic villages. Determination of population The sample was carried out by purposive sampling of Aedes aegypti and Aedes albopictus mosquitoes from 200 houses from 2 research locations, namely Batu Layang Village and Sungai Jawi Dalam Village (Saepudin, 2011). The research samples were Aedes aegypti and Aedes albopictus eggs taken from two locations, then colonized into adult mosquitoes with an average age of 7 days, not yet sucking blood, full of 10% sugar solution.

Laboratory research starts from the pre-adult stage to become an adult mosquito. Each village took 1000 mosquitoes that met the criteria for the test mosquitoes. The total number is 2,000. The method used to identify dengue virus infection in mosquitoes. Examination of dengue virus by immunocytochemical methods streptavidin-biotin peroxidase complex (ISBPC) and Reverse-Transcription Polymerase Chain Reaction (RT-PCR). The materials and tools used in this RT-PCR test are as follows:

a. Object glass, Cover slip, Phosphate Buffer Saline (PBS), absolute methanol, H₂O₂ (hydrogen peroxide), primary antibody (DSSC7 monoclonate antibody).

b. Starr Trek Detection Kit (Biocare medical) which contains five ready-to-use reagents: (i) Background sniper (cat. No. BS966L10) as a protein blocking solution containing non-immune serum; (ii) Trekki Universal Link (cat. No. STU700L10) containing a secondary antibody labeled Biotin; (iii) TrekAvidin-HRP label (cat. No. STHRP700L10), which contains streptavidin peroxidase Conjugate labeled with the enzyme horseradish peroxidase (HRP), (iv) Betazoid Diaminobenzidine tetrahydrochloride (DAB) chromogen (cat. No. BDB900G5), and (v) Betazoid DAB Substrate Buffer (paint NO. DS900L10), Mayer Hematoxylin paint (counterstain), alcohol, entellon, aluminum foil, tissue and immersion oil, the female mosquito Aedes aegypti (egg, larva, pupa, and adult stages).

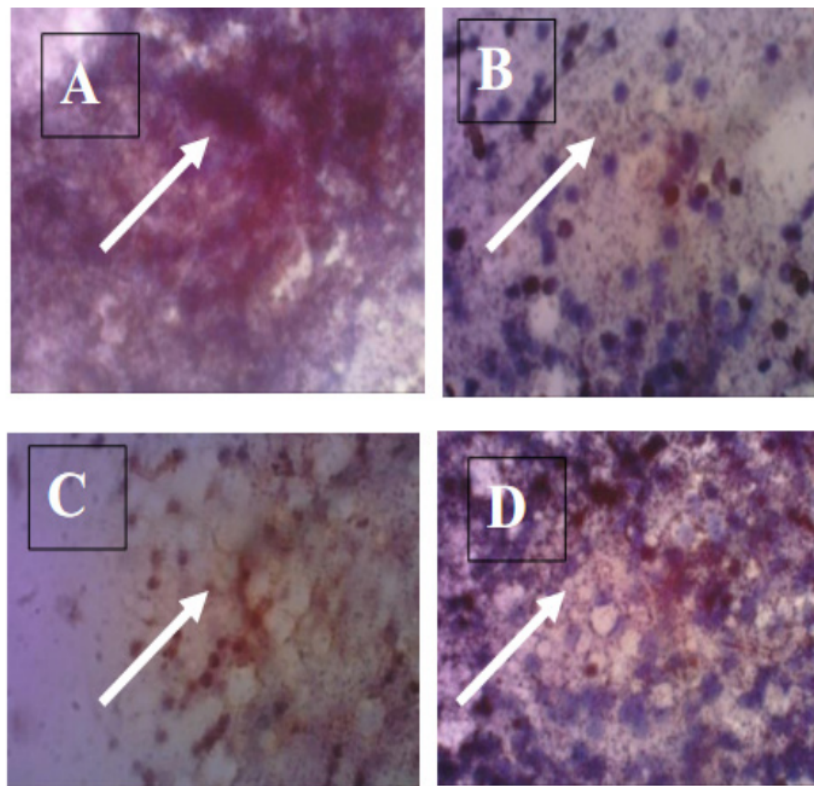
c. Materials Preparation: (i) Peroxidase blocking solution: one part 30% hydrogen peroxide plus nine parts absolute methanol,

(ii) DSSE10 monoclonal antibody 1:10:100 1 DSSE10 antibody plus 900 μ l of PBS, (iii) DAB chromogram substrate: 1 l Betazoid DAB chromogen was diluted with 600 l Betazoid DAB Substrate Buffer, immediately before use.

Results and Discussions

This research has received an ethical permit from the Pontianak Health Polytechnic Research Ethics Committee with certificate number: 019 / KEPT-PK.PKP / VI / 2018. The study was conducted in an endemic area of DHF with a case study in Pontianak City. The measurement results show that the average Ovitrap Index is mostly outside

the house, 41.3% in Batu Layang Village, compared to 38.22% in Sungai Jawi Village. The mosquitoes used were *Aedes aegypti* and *Aedes albopictus* mosquitoes with an average age of 7 days, full of 10% sugar water solution. Each glass slide contains 12 head squash preparations. Specifically, the positive and negative control mosquitoes were taken from the mosquitoes of the Parasitology Laboratory of the Faculty of Medicine, UGM. Following the immunocytochemical streptavidin-biotin peroxidase complex (ISBPC) method, which was compiled and standardized by Umniyati (Sorisi et al., 2014).



Picture. 1 Micrograph photo of head squash preparation

Picture. 1 Micrograph photo of head squash preparation with a magnification of 100x10, which shows positive DEN antigen in the form of brownish hexagonal granules that spread to mosquito brain tissue from Batu Layang sub-district (C) and Sungai Jawi sub-

district (D). Figure A is a negative control of non-*Aedes aegypti* mosquito preparations and Figure B is positive control antigens from mosquitoes infected with Dengue virus with an incubation period of 7 days.

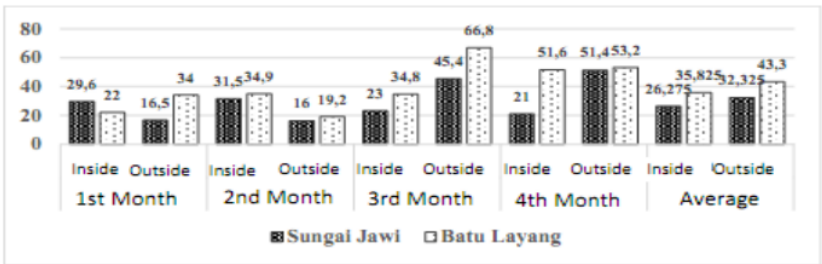
Picture 1. shows the positive (+) infection level, 400x magnification shows brownish-colored sand grains scattered between brain tissue, but almost no cells that show brown color in the cytoplasm. On the positive (++) the sand grains were more spread out, and 1-10 cells showed a brown color in the cytoplasm per field of view at 400x magnification. In positive (+++), the distribution of sand grains is getting wide. The 10-100 cells found show a brown color in the cytoplasm so that the infection appeared at 100x magnification. The description of positive (+++), (++) and (+) infection levels can be found in the preparations from the Sugai Jawi Dalam village. While in Batu Layang, only positive (+) infection rates. The results of dengue virus detection in *Aedes aegypti* mosquitoes from eggs can be seen in

Table 1 below:

Table 1. Results of Microscopic Examination of Positive and Negative Head Squash Preparations in *Aedes aegypti* Mosquitoes

Villages	Numbers			ITT (%)
	Samples	(+)	(-)	
Sungai Jawi Dalam	1000	293	607	29,3
Batu layang	1000	396	604	39,6
Total	2000	789	1.211	60,55

Tabel 1 shows the TTI on Sungai Jawi Dalam is higher, namely 29,3% than Batu Layang with 39,6%. Based on table 1 and Picture 3, the highest TTI on dengue endemic areas is on Batulayang village namely 43,33% outside and 32,32% inside.

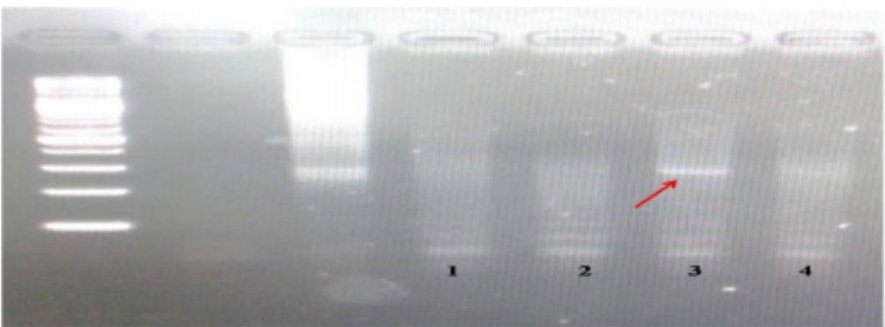


Picture 2. Transovarial Transmission Index in Pontianak

Table 2 Number of Positive Samples Based on the Gender of *Aedes* mosquitoes

Villages	Samples (+)	Female		Male	
		n	%	n	%
Sungai Jawi Dalam	293	268	91	25	9
Batu layang	396	359	90	37	10
Total	789	727	91	62	9

From table 2, in each research location in Sungai Jawi Dalam and Batu Layang Villages, male *Aedes* mosquitoes were positive for Dengue Virus, namely 9% and 10%. The results of the examination of the *Aedes aegypti* mosquito using the Reverse-Transcription Polymerase Chain Reaction (RT-PCR) method found a strain of the dengue virus. More details can be seen in Figure 3 below.



Picture 3, Left to Right: DNA marking, negative control, positive control, sample number 1,2, 3 and 4

Examination of the type of dengue virus in *Aedes aegypti* mosquitoes is by the RT-PCR method. Based on the observations and documentation of the electrophoresis results with Gel Doc, as shown in Figure 3, shows that in sample number 3 it is positive for Dengue strain 3.

Field research was carried out by collecting eggs of *Aedes aegypti* and *Aedes albopictus* carried out four times for four months with ovitrap. Then the positive ovitrap eggs were colonized in the parasitology laboratory of the Faculty of Medicine, Gadjah Mada University. The results of mosquito colonization in the laboratory showed the total population of each mosquito cage. The *Aedes aegypti* was almost the same as *Aedes albopictus*. The results of the Ovitrap Index (OI) calculation are higher outside the home (41.3%) than inside the house (38.22%). It indicates the number of vector mosquitoes in Batu Layang Village is denser. The results of this study are in line with the results of research in several urban villages in Jakarta. OI is higher outside (36.4%) than inside the house (33.5%) because *Aedes albopictus* prefers to lay eggs outside than inside the house. The density of vector mosquitoes also increases contact with the host (humans) in the vicinity. George et al. (2015) stated that *Aedes aegypti* and *Aedes albopictus* mosquitoes like resting areas and indoor and outdoor activities, specifically *Aedes albopictus* in gardens, so they have less contact with humans, also concluded that ovitrap is quite effective as a one way to monitor the density of *Aedes aegypti*.

This study also showed transovarial transmission in Batu Layang Village 39.6% and Sungai Jawi 29.3%. Transovarial transmission of *Aedes aegypti* and *Aedes albopictus* mosquitoes play a role in increasing and maintaining the dengue epidemic in dengue-endemic areas. According to Matangkasombut et al. (2020), female mosquitoes experience a viral infection of their ovarian tissue and are maintained until the next generation genetically and persistently. VirDen will be transmitted transovarially and increase the frequency to filial (F)-7 then persist in the next generation. The same thing was conveyed by Rahayu et al. (2019), stating a transovarial transmission of dengue virus in *Aedes aegypti*

eggs in Malaysia up to the 5th generation of female mosquitoes, but absent from the 6th and 7th generations. The vertical transmission mechanism of arbovirus in the mosquito's body is by female mosquitoes in their eggs (transovarial). It will later become mosquitoes. This infection rate exceeds 80% (da Cruz et al., 2015).

It indicates that transovarial transmission potentially affects the maintenance of dengue endemicity, with the *Aedes aegypti* mosquito as the dengue virus reservoir over time. It proves that in villages with dengue-endemic, there are always cases of DHF every year. Transovarial transmission like this also occurred in several villages of Yogyakarta. Namely, the transovarial transmission rate with an infection rate of 38.5-70.2%, also in several DHF endemic districts in Central Java and Sampit, East Kotawaringin Regency, Central Kalimantan. The possibility continues to spread to other areas in Indonesia transovarial transmission of VirDen will naturally occur. The tests in several urban villages of Yogyakarta were also found similar things. (Rosa and Salmah, 2015).

The same study conducted in Puerto Iguazú, Misi, Argentina showed that 11.6% of positive mosquitoes were lower than TTI in Pontianak (Espinosa et al., 2014). In Malaya and Banjar Negara Districts, there was a transovarial transmission of Dengue virus in *Aedes* mosquitoes, but the results were lower than in Pontianak, namely 6.1%-17.1% and 9.42% (Sorisi et al., 2014). Compared with previous research by Sucipto (2012) in the Pontianak Kota sub-district, it shows a much higher number, namely TTI of 76.6% one month before being declared a DHF outbreak. The results of previous studies and naturally 60% of transovarial transmission occurred in the 1st generation. The studies stated the Dengue virus transovarial transmission as a vital etiological phenomenon responsible for outbreaks. It is due to the maintenance of the virus during the inter-epidemic period of the disease (Hikmawati et al., 2020; Ferreira-De-Lima & Lima-Camara, 2018). This study provides the natural transovarial infection evidence by the Dengue-3 virus in *Aedes aegypti*. Dengue virus-3 is the primary viral strain that is the most virulent (Sunardi et al., 2018). In line with

the results of Utama et al. (2019), infection with any of the four serotypes can lead to subclinical, life-threatening diseases. DENV 1-4 serotypes circulated during the study period, with the highest overall level from January to March, among the strains the most dominant being the Dengue Virus 3 strain, as researched by Halsey et al. (2012) and Soo et al. (2016), showed that severe cases occurred in DHF patients infected with VirDen-3. In contrast, the results of a study in Mato Grosso provided evidence of natural transovarial infection by the Dengue Virus-4 in *Aedes aegypti*. This type of infection may have served as a virus maintenance mechanism during the interepidemic period in Cuiabá, where dengue outbreaks are reported annually. These results emphasize the need for efficient vector population control measures to prevent arbovirus outbreaks in the state (da Cruz et al., 2015).

The difference in type and malignancy in each region is due to variations in topography and socio-demographic seasons. They cause the extrinsic cycle time to fluctuate. Cases that occurred in the study area are tropical climates and population mobility. As well as the optimal season for the extrinsic cycle of dengue strain-3. It is indicated by the data on BDB mortality with the highest number in the two research areas, namely Batu Layang Village, Case Fatality Rate (CFR) of 7.14%, and Jawi Dalam River Output of 4.44% (Dinas Kesehatan Kota Pontianak, 2017). Research using RT-PCR examination is very important. Besides identifying four dengue virus serotypes in larval samples, it can also contribute to the development of early detection systems for virus circulation and predictive models of outbreaks and epidemics of this disease (Da Costa et al., 2017; Da Cruz et al., 2015).

This research has not yet concluded a relationship between the severity of infection between patients with a specific dengue virus. But in the future, further studies can be carried out to ensure the relationship between the agent and the host. As large-scale cross-sectional studies conducted in Latin America are very important, longitudinal studies relating the temporal sequence of serotype-specific dengue infection and clinical development of manifestations are needed to confirm some of

the new findings of this study. In addition, future studies concentrating on clinical differences in serotypes, genotype and lineage-specific serotypes will further elucidate the role of interindividual serotypes and DENV morbidity (Halsey et al., 2012).

This infection rate was also depicted in this study through microscopic images of head squash preparations showing positive (+) infection rate found in Sungai Jawi Dalam sub-district was lower than Batulayang output (+++). It shows that mosquitoes with a heavy infection rate when infecting the host will more easily cause symptoms of DHF because the amount of virus that enters is more. Some virologists say that the cause of the disease is the virulence of the virus. The theory of viral virulence says that for the emergence of dengue fever does not need two infections just once is enough if the virus is virulent. The problem with proving this theory is that there are no laboratory markers for virulence. Until now there is no material, such as monoclonal antibodies, can be used to show virulent or non-virulent Dengue Virus. A Dengue infection will appear with clinical symptoms influenced by host immunity, the amount of virus, and the strain of the virus. However, the transovarial transmission may be a viral mechanism in the spread of DHF. Using RT-PCR, it was possible to identify four DENV serotypes in larval samples (Da Costa et al., 2017; Espinosa et al., 2014).

This study also found that 10% of male *Aedes aegypti* were infected with the virus transovarially in Batu Layang Village and 9% in Sungai Jawi Dalam village. It is in line with the study in Kenya, which detected dengue virus in immature mosquitoes, both male and female sexes. It provided evidence of transovarial transmission of this arbovirus in local mosquitoes. This phenomenon may be driving the maintenance of the underlying virus, highly contributing to its periodic reappearance among humans in Kenya (Heath et al., 2020). This research is vital information that the increase in cases throughout the year occurred in both regions due to the presence of the Dengue virus found in male and female mosquitoes.

Fridolina Mau (2014) emphasized that non-infective female mosquitoes mate with infective male mosquitoes, causing infection

with female mosquitoes. Transmission of the dengue virus through the mating behavior of *Aedes* mosquitoes (transvenereal transmission) is part of the vertical transmission of mosquitoes that is still rarely studied (Da Costa et al., 2017). Recent laboratory studies have proven that male *Aedes aegypti* mosquitoes infected with DENV-3 intrathoracic with an incubation period of 5 days and 14 days can transmit DENV-3 to non-infectious female *Aedes aegypti* mosquitoes. The study also stated that the natural polygamous behavior of male mosquitoes also plays a vital role in the dengue virus spread. So a male mosquito infected with DENV-3 can mate with a certain number of non-infectious female mosquitoes. As a result, the infectious female mosquito will produce infected fertile eggs. Knowledge of mosquito mating behavior is related to some factors. Such as optimal physiology of mosquitoes, physiological mechanisms that regulate mosquito mating, and appropriate environmental conditions. Other factors need to be studied further. This study provides vital information in developing a more effective dengue control strategy in vector mating mechanisms.

The discovery of the Transovarial Transmission Index (TTI) value, the identification of dengue virus serotype 3, and the discovery of dengue virus in male mosquitoes in Batu Layang and Sungai Jawi villages in Pontianak City shows how high the potential for transovarial transmission of dengue virus is. The large number of *Aedes aegypti* and *Aedes albopictus* mosquitoes determines the potential for transovarial transmission of the dengue virus. The presence of housing density conditions in the urban environment can trigger optimal temperature and humidity levels in the Research Area, thus supporting the occurrence of transovarial transmission cycles throughout the year, having the potential for outbreaks in endemic areas of Pontianak City. It is in line with the in-depth study of Amazonian urban areas showing that transovarial transmission is a vital mechanism for the maintenance and spread of disease in the Amazon (Da Costa et al., 2017).

This study concludes that the dengue virus maintains its life in optimal numbers

through the transovarial transmission to a genetically superior mosquito population, vital in dengue transmission. The phenomenon needs special attention. Because these two outputs, apart from endemic outputs, are also the areas with the highest cases and deaths in 2017. Therefore, continuous vector control efforts are needed until the F-8 generation (4 months) to stop the virus circulation by transovarial transmission. The most effective control is carried out on the source and their habitat by engineering the environment as a breeding place using a modified ovitrap plus tool called "Rekaitidiri". It can kill adult female larvae and mosquitoes, thus, effectively reducing the density index of larvae and adult *Aedes aegypti* mosquitoes (Saepudin et al., 2017; Saepudin et al., 2019). Detection of transovarial transmission of dengue virus in vector mosquitoes can be a vital part of the epidemiological survey of dengue fever and is used in the development of an early warning system to anticipate the spread of dengue virus transmission to humans and the emergence of new cases of dengue fever that previously had no cases of dengue.

Conclusion

This study finds evidence of transovarial transmission of the dengue virus in *Aedes* mosquitoes in Pontianak City. Previous research in 2012 showed the value of the dengue virus transovarial index (TTI) was 76.6%. Meanwhile, in this study, in the same area, there was a decrease of 29.3% in the Sungai Jawi Dalam sub-district, West Pontianak sub-district, and 39.6% in Batu Layang sub-district, North Pontianak district. Successfully identified the type of Dengue Virus strain 3.

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ETHICAL CLEARANCE

	<p>KOMISI ETIK PENELITIAN KESEHATAN (KEPK) FAKULTAS KEDOKTERAN UNIVERSITAS DIPONEGORO DAN RSUP dr KARLADI SEMARANG Sekretariat : Kantor Dekanat FK Undip U.S Jl. Dr. Soetomo 18, Semarang Telp/Fax. 004-8318360</p>	
<p>ETHICAL CLEARANCE No. 243/EC/FK-RSDK/2016</p>		
<p>Komisi Etik Penelitian Kesehatan Fakultas Kedokteran Universitas Diponegoro-RSUP, Dr. Karladi Semarang, setelah membaca dan menelaah Usulan Penelitian dengan judul:</p>		
<p>PENGARUH OVITRAP REKATIDIRI TERHADAP DENSITAS LARVA DAN VIRUS DENGUE DI WILAYAH ENDEMIS</p>		
<p>Peneliti Utama : <i>Madik Saepudin, SKM, Id. Kes</i></p>		
<p>Pembimbing : -Prof. Dr. dr. Soetoyo Radisapito, Sp.PD-KPT -Dr. dr. Ari Suwanda, MPH -Dr. dr. Suhartono, M.Kes</p>		
<p>Penelitian : Dilaksanakan di Laboratorium Parasitologi UGM</p>		
<p>Setuju, untuk dilaksanakan, dengan memperhatikan prinsip-prinsip yang dinyatakan dalam Deklarasi Helsinki 1975, yang diemendasi di Seoul 2008 dan Pedoman Nasional Etik Penelitian Kesehatan (PNEPK) Departemen Kesehatan RI 2011</p>		
<p>Pada laporan akhir peneliti harus melampirkan cara pemeliharaan & depopulasi hewan coba dan melampirkan ke KEPK bahwa penelitian sudah selesai disertai Abstrak Penelitian.</p>		
<p>Semarang, 28 MAR 2016</p>		
<p> Ketua Komisi Etik Penelitian Kesehatan Fakultas Kedokteran Undip RS. Dr. Karladi Prof. Dr. dr. Suprihadi, M.Tc, Sp.HT-KL(X) NIP.19400221 197703 2 001</p>		