

Original Research

THE CORRELATION BETWEEN HOUSING SANITATION AND EXISTENCE OF VECTORS IN KENDARI SUB DISTRICTS, INDONESIA

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ABSTRACT

Background: Sanitation is an effort to prevent disease by removing or regulating environmental factors related to the chain of disease transfer. Vector is an Arthropod that can cause and transmit an Infectious agent from an Infection source to vulnerable landlords.

Objective: To find out the relationship between housing sanitation and the presence of vectors in densely populated neighborhoods in the Kendari sub-district of Kendari city in 2019.

Methods: This was a descriptive quantitative study with a cross-sectional approach. The study was conducted between 3 April 2019 and 3 May 2019. Data were collected using Field Learning Experience Report, and analyzed using Chi-Square test.

Results: Findings indicated that there was a statistically significant relationship between housing sanitation and the existence of vectors ($p < .05$).

Conclusion: There was a significant relationship between the physical conditions of the house, the environment with the presence of vectors in the densely populated environment of the population of Kendari District. It is suggested for the community to improve the condition of the house to meet health requirements. The Department of Health of Kendari should continuously conduct environment and housing sanitation programs.

Keywords: sanitation, environmental health, vector, Indonesia

BACKGROUND

Sanitation, as one aspect of development, has an essential position in daily life ([Mara, Lane, Scott, & Trouba, 2010](#)). Environmental sanitation can reflect the way of life of the community ([Asaolu & Ofoezie, 2003](#); [Sidhi, Raharjo, & Dewanti, 2016](#)). Sanitation is an effort to prevent disease by removing or regulating environmental factors related to the chain of disease transfer ([Heller, Colosimo, & Antunes, 2003](#); [R Tosepu, 2016](#)). Sanitation

includes the provision of household water, the use of family latrines, garbage disposal, wastewater disposal, establishing healthy houses, and eradicating disease-spreading animals such as flies, mosquitoes, cockroaches, mice and other diseases ([Shapiro & Barron, 2001](#); [Tyagi, 2003](#)).

Based on the health profile of Southeast Sulawesi (2017), the number of households

with clean and healthy living behavior in the city of Kendari only reached 62.47%. So that when compared to the coverage of national sanitation services, Kendari City has not yet reached the target of Sustainable Development Goals (SDGs) ([Asrun, 2012](#); [Ramadhan Tosepu et al., 2016](#)).

Houses are one of the main focuses on improving environmental sanitation. Home sanitation is a public health effort that focuses on monitoring the physical structure, where people use it as a shelter that affects the degree of human health ([Frank, Engelke, Engelke, & Schmid, 2003](#); [Krieger & Higgins, 2002](#)). Therefore, the existence of healthy housing is a complex fundamental goal, and the availability of a standard for adequate housing for housing must meet the health requirements so that the residents stay healthy ([Lawrence, 2002](#); [Organization, 1989](#)).

According to the Ministry of Health of the Republic of Indonesia, houses are residential buildings that meet health requirements, namely homes that have healthy latrines, clean water facilities, landfills, wastewater disposal facilities, proper ventilation, suitable residential density and floors of houses that are not made of soil ([Health, 2018](#)).

Health problems are very complex problems that are related to other issues outside of their health ([Mol, 2008](#)). One of the most significant factors that affect health is environmental factors ([Smith, Corvalán, & Kjellström, 1999](#)). Optimal environmental conditions can have a positive effect on the realization of optimal health status as well ([Iqbal, Nazar, Khan, Masood, & Khan, 2011](#)).

Data in 2018 in the Kendari sub-district indicate that diseases caused by vectors are still high, one of which is diarrhea. The case in July showed that there were 22 cases, and there were 28 cases of diarrhea in June ([Health, 2018](#)). The purpose of this study was to analyze the relationship between housing sanitation and the existence of the Kendari District vector.

METHODS

Study design

This was a descriptive quantitative study with cross-sectional approach. The study was conducted between 3 April 2019 and 3 May 2019. The independent variables were the physical condition of the house and the environment. The dependent variable was the presence of vectors (rats, cockroaches, flies, and mosquitoes).

Sample

The population was 1051 household located in Kendari district, and the number of respondents in the study was 282 households. The sampling technique was a proportional random sampling. The inclusion criteria of the samples were 1) Head of family who lives in Kendari District, 2) Head of family who was at home during the study, 3) Head of family who could read and write, 4) Head of family who could communicate well, and 5) Head of family who was willing to be a respondent. If there were two heads of family in one house, the one who stayed longer was selected.

Instrument

The research instrument used a questionnaire from the 2015 Faculty of Public Health, Field Learning Experience Report ([Faculty of Public Health, 2015](#)). The contents of the instrument were in the form of house conditions consisting of the presence or absence of wire netting on the ventilation, the presence or absence of ceilings in all or part of the house space, construction of the house walls, cleanliness of the kitchen and bathroom, as well as the surrounding conditions: ditches / sewers, landfills and the presence or absence of livestock pens. The measurement scale used the Guttman scale.

Data collection

The researcher collected data by distributing questionnaires to respondents, and for the physical conditions of the home environment the data collection was in the form of observations using observation guidelines.

Data analysis

Data were analyzed using Chi-square test at the 95% confidence level.

RESULTS

Relationship between Physical Condition of Houses and the Existence of Vectors in

Kendari Caddi Sub-District, Kendari District

Table 1 shows that of the 215 respondents who met the physical conditions of the house there were 160 respondents (74.4%) with vectors; whereas from the 67 respondents who did not fulfill the physical condition of the house there were 65 respondents (97.0%) with vectors.

Table 1 Relationship between Physical Condition of Houses and the Existence of Vectors in Kendari Caddi Sub-District, Kendari District

The physical condition of the house	Vectors				Total		p-value
	No		Yes		n	%	
	n	%	n	%			
Not eligible	65	97.0	2	3.0	67	100	0.000
Eligible	160	74.4	55	25.6	215	100	

Relationship between Environmental Conditions and Vectors in Kendari Caddi District, Kendari District

Table 2 shows that of the 94 respondents who met the conditions of the environment around

the house there were 63 respondents (67.0%) with vectors; whereas out of 188 respondents who did not meet the conditions of the environment around the house there were 162 respondents (86.2%) with vectors.

Table 2 Relationship of Environmental Conditions to Vectors in Kendari Caddi District, Kendari District

Environmental Conditions	Vectors				Total		p-value
	Yes		No		n	%	
	n	%	n	%			
Not eligible	162	86.2	26	13.8	188	100	0.000
Eligible	63	67.0	31	33.0	94	100	

DISCUSSIONS

The physical condition of the house is very closely related to the existence of vectors. People who live in terms of homes that do not meet the requirements or are in a bad environment can attract vectors to live to develop and transmit certain diseases (Satterthwaite, 2003). Home is one of the basic human needs in addition to clothing and shelter, so the house must be healthy so that its residents can work productively (Bratt, 2002). Construction of houses and their environment that do not meet health requirements is a risk factor as a source of transmission of various diseases, especially diseases based on the

environment (Friedewald, Da Costa, Punie, Alahuhta, & Heinonen, 2005; Hartman, 1998).

Based on the results of research in densely populated neighborhoods of Kendari Cad Subdistrict in Kendari Subdistrict, it was shown that, out of 215 respondents who fulfilled the physical condition of the house and there were 160 respondents (74.4%), from 67 respondents who did not meet the physical health of the house and there are vectors as many as 65 respondents (97.0%).

Components of a house that does not meet health requirements become a nesting place for various vector and rodent carriers. The vector

can transmit the disease to humans by carrying seeds of disease, fleas, bacteria, and parasites ([Marshall; Meerburg, Singleton, & Kijlstra, 2009](#)). Some types of diseases or health problems caused by vectors are diarrhea, typhus, cholera, and leptospirosis ([Kouadio, Aljunid, Kamigaki, Hammad, & Oshitani, 2012](#)). These diseases are transmitted through a variety of methods ranging from bites, urine, feces, or those that are transmitted indirectly through food/drink, water, or contaminated objects ([Ramadhani & Yunianto, 2010](#)). Based on data from the top 10 diseases in Kendari Health Center, Kendari Subdistrict, diarrhea was ranked 9th in 2016 and 2017.

From the results of the chi-square test analysis showed that there was a significant relationship between the physical condition of the house and the presence of vectors in densely populated neighborhoods of the Kendari subdistrict in 2019 with (ρ value = 0,000). This research is in line with the Katulistiwa and Lestari research (2015), which is the condition of the house in the presence of mice (p value = 0.030). This is due to the state of the residence that does not meet health requirements ([Katulistiwa & Lestari, 2016](#)).

In the Kendari subdistrict, a vector is found in the house. Cockroach vectors in bathrooms and home kitchens, fly vectors are found with low density of the 5 found on the floor of the house and non-covered bins in the kitchen, mosquito vectors are found in mosquito larvae in water reservoirs in homes such as water reservoirs and bathtubs and mouse vectors found in the home kitchen using mouse traps to see the presence of house mouse vectors. This is due to the physical condition of the house that does not fulfill healthy home conditions such as lack of house lighting, and then the absence of a house ceiling makes it easier for the vector to enter the house.

In this study, the availability of land also dramatically influences the realization of healthy homes. Given the limited area and high population density in Kendari Sub-District, Kendari Caddi Sub-District, then building and creating a healthy home is very

difficult. An example is the existence of a home window. The presence of the window cannot be managed because the distance between houses is very close, even the walls between houses are huddled together. With such conditions, building a house with enough windows cannot be done.

Sanitation facilities that do not meet the requirements, namely the trash can in the respondent's house, mostly do not meet the criteria. Proper sanitation facilities, namely clean water facilities that meet health requirements (odorless, tasteless, colorless, and transparent), gooseneck latrines or not goosenecks and cover, there are sewerage channels that are channeled into the ditch (better to ditch closed), and waterproof and closed waste disposal facilities. Fecal contamination of the environment must be prevented and reduced by removing feces into latrines that meet health requirements ([Fletcher, Stark, Harkness, & Ellis, 2012](#); [Pruss-Ustun & Organization, 2008](#)).

The Chi-Square statistical test results obtained ρ value = 0.000, (ρ Value < 0.05), indicating that there is a significant relationship between the environmental conditions around the house and the presence of vectors in densely populated areas of Kendari District in 2019. This research is in line with previous research, which unhealthy outdoor environments can still affect fly density ([Wispriyono & Afrilia, 2017](#)).

Waste disposal that does not meet health requirements can be a breeding ground for mice and bacteria ([Canter & Wood, 1996](#); [Dunne, 2002](#)). Vector diseases such as flies and rats quickly breed in less well-managed waste ([Satterthwaite, 2003](#)). From the results of interviews and observations, it was shown that the condition of the respondent's waste disposal facilities was between the waste disposal facilities that met the requirements and did not meet the criteria, thus the waste disposal facilities that did not meet needs such as not waterproof and closed could cause flies to enter the house. A good garbage collection that is to hold garbage in a closed trash can so

that it can avoid landfills that can become nesting mice. This is in line with the Collinet-Adler et al. (2015) study, which states that 61% of fly density is higher in homes with trash dumping open inside and outside the neighborhood. Then the sewage sewer does not meet the health requirements, where the channel creates a pool of water that can be used for mosquito nets, causing odor. The open sewage channel and the flow of water that is not smooth are the nesting place for mice, especially mice, got carriers of *Leptospira* bacteria (Collinet-Adler et al., 2015).

Wastewater drainage is a building that is used to dispose of wastewater from bathrooms, washing places, kitchens, and others and not from latrines, where healthy should meet healthy requirements, including not polluting sources of clean water, does not cause stagnant water that can be used for mosquito nets, does not cause odor and does not cause muddy water. The open sewage channel and the flow of water that is not smooth are the nesting place for mice, especially mice, got carriers of *Leptospira* bacteria (Ramadhani & Yuniyanto, 2010). This is by the results of Fadzilah's (2014) study that there is a relationship between sewerage channels in the presence of rats ($p = 0.001$) (Fadzilah, 2014).

CONCLUSION

There was a significant relationship between the physical condition of the house and the presence of vectors in Kendari District, Southeast Sulawesi province. Housing sanitation is a condition of healthy housing conditions. It is suggested for the community to improve the condition of the house to meet health requirements. Furthermore, the Health Department should continuously conduct environmental sanitation programs such as health education on housing sanitation.

REFERENCES

Asaolu, S., & Ofoezie, I. (2003). The role of health education and sanitation in the control of

helminth infections. *Acta tropica*, 86(2-3), 283-294.

- Asrun. (2012). Buku Putih Sanitasi Kota Kendari. Sekretariat Pokja Sanitasi dan Air Minum Kota Kendari, BAPPEDA dan PM Kota Kendari.
- Bratt, R. G. (2002). Housing and family well-being. *Housing studies*, 17(1), 13-26.
- Canter, L. W., & Wood, C. (1996). Environmental impact assessment.
- Collinet-Adler, S., Babji, S., Francis, M., Kattula, D., Premkumar, P. S., Sarkar, R., . . . Balraj, V. (2015). Environmental factors associated with high fly densities and diarrhea in Vellore, India. *Appl. Environ. Microbiol.*, 81(17), 6053-6058.
- Dunne, W. M. (2002). Bacterial adhesion: seen any good biofilms lately? *Clinical microbiology reviews*, 15(2), 155-166.
- Faculty of Public Health. (2015). Field Learning Experience Report, University of Halu Oleo, Kendari.
- Fadzilah, V. Q. N. (2014). *Hubungan perilaku masyarakat tentang kebersihan lingkungan dengan keberadaan tikus di desa lencoh kecamatan selo kabupaten boyolali*. Universitas Muhammadiyah Surakarta.
- Fletcher, S. M., Stark, D., Harkness, J., & Ellis, J. (2012). Enteric protozoa in the developed world: a public health perspective. *Clinical microbiology reviews*, 25(3), 420-449.
- Frank, L., Engelke, P., Engelke, S. F. P., & Schmid, T. (2003). *Health and community design: The impact of the built environment on physical activity*: Island Press.
- Friedewald, M., Da Costa, O., Punie, Y., Alahuhta, P., & Heinonen, S. (2005). Perspectives of ambient intelligence in the home environment. *Telematics and informatics*, 22(3), 221-238.
- Hartman, C. (1998). The case for a right to housing.
- Health, M. o. (2018). Health profile.
- Heller, L., Colosimo, E. A., & Antunes, C. M. d. F. (2003). Environmental sanitation conditions and health impact: a case-control study. *Revista da Sociedade Brasileira de Medicina Tropical*, 36(1), 41-50.
- Iqbal, N., Nazar, R., Khan, M. I. R., Masood, A., & Khan, N. A. (2011). Role of gibberellins in regulation of source-sink relations under optimal and limiting environmental conditions. *Current Science(Bangalore)*, 100(7), 998-1007.
- Katulistiwa, N. A., & Lestari, K. S. (2016). Analyze of House Conditions and The Rat Existence Affected to The Leptospirosis Cases in Klaten District. *Jurnal Kesehatan Lingkungan*, 8(1), 1-13.
- Kouadio, I. K., Aljunid, S., Kamigaki, T., Hammad, K., & Oshitani, H. (2012). Infectious diseases following natural disasters: prevention and control measures. *Expert review of anti-infective therapy*, 10(1), 95-104.

- Krieger, J., & Higgins, D. L. (2002). Housing and health: time again for public health action. *American journal of public health*, 92(5), 758-768.
- Lawrence, R. J. (2002). Healthy residential environments. *Handbook of environmental psychology*, 394-412.
- Mara, D., Lane, J., Scott, B., & Trouba, D. (2010). Sanitation and health. *PLoS medicine*, 7(11), e1000363.
- Marshall, C. L. Disease Vectors and Pests.
- Meerburg, B. G., Singleton, G. R., & Kijlstra, A. (2009). Rodent-borne diseases and their risks for public health. *Critical reviews in microbiology*, 35(3), 221-270.
- Mol, A. (2008). *The logic of care: Health and the problem of patient choice*: Routledge.
- Organization, W. H. (1989). Health principles of housing.
- Pruss-Ustun, A., & Organization, W. H. (2008). Safer water, better health: costs, benefits and sustainability of interventions to protect and promote health.
- Ramadhani, T., & Yuniyanto, B. (2010). Kondisi Lingkungan Pemukiman yang Tidak Sehat Berisiko terhadap Kejadian Leptospirosis (Studikasu di Kota Semarang). *Media Penelitian dan Pengembangan Kesehatan*, 20(3).
- Satterthwaite, D. (2003). The links between poverty and the environment in urban areas of Africa, Asia, and Latin America. *The Annals of the American Academy of Political and Social Science*, 590(1), 73-92.
- Shapiro, M. A., & Barron, G. M. (2001). Environmental Control In the Workplace: Water, Food, Insects, and Rodents. *Patty's Industrial Hygiene*.
- Sidhi, A. N., Raharjo, M., & Dewanti, N. A. Y. (2016). Hubungan Kualitas Sanitasi Lingkungan dan Bakteriologis Air Bersih terhadap Kejadian Diare pada Balita di Wilayah Kerja Puskesmas Adiwerna Kabupaten Tegal. *Jurnal Kesehatan Masyarakat (e-Journal)*, 4(3), 665-676.
- Smith, K. R., Corvalán, C. F., & Kjellström, T. (1999). How much global ill health is attributable to environmental factors? *Epidemiology*, 573-584.
- Tosepu, R. (2016). Epidemiologi Lingkungan Teori dan Aplikasi. *Bumi Medika Group, Jakarta*.
- Tosepu, R., Effendy, D. S., Bahar, H., Sakka, A., Asfian, P., & Lestari, H. (2016). Did Indonesia achieve the MDGs goals by 2015? *Public Health of Indonesia*, 2(1), 1-9.
- Tyagi, B. (2003). *Medical Entomology*: Scientific Publishers.
- Wispriyono, B., & Afrilia, E. N. (2017). Hubungan Kondisi Rumah dan Kepadatan Lalat di Sekitar Tempat Pembuangan Akhir Sampah. *Kes Mas: Jurnal Fakultas Kesehatan Masyarakat*, 11(2), 101-106.

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