



The climate influence on the way and place of childcare and its impact on children's health[☆]

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ABSTRACT

Objective: The aim of the study is to look at the effects of climate on the way and place of childcare and their impact on children's health.

Method: The method used is field exploration by observing how parents take care of their children, and measuring the temperature and humidity of the caregiver, besides looking for secondary data at the local health center regarding the level of health of infants (health center visits for treatment and types of diseases that are mainly affected by climate).

Result: Soil as a reservoir for germs occurs because the residential environment is not clean due to a poor drainage system which results in dirty water not being channeled properly, being absorbed into the soil and stagnant. In addition, high wind speeds also have an impact on household displacement from endemic places into settlements. It takes non-physical and physical efforts to prevent children from contracting the disease. Non-physical efforts through good behavior, and physically by making playtime comfortable and safe for children.

Conclusion: Children who play in nature using soil media are at risk of causing disease. Soil as a reservoir for germs occurs because the residential environment is not clean due to a poor drainage system, resulting in dirty water not being channeled properly, absorbed into the soil and stagnant.

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Introduction

Coastal areas have a hot climate, this has an impact on the behavior of the community, including children, in choosing places for activities. Children also want a comfortable atmosphere for their activities, the condition of the house that is hot during the day is one aspect of children who prefer to do activities outside the home. In addition, children generally follow their parents, especially mothers, where the mother is located, the children will also be not far from her. Generally, women are outside the house (under) for activities during the day.¹ The coastal area is one of the marine environments in tropical areas that is easily affected by the disposal of waste from land. The disposal of this waste pollutes the residential environment.

In tropical areas the spread of agents causing "soil-borne diseases" can occur in the rainy season due to flooding or in the dry season due to strong winds, so that dust and disease-causing agents are blown from endemic areas to other areas.^{2–4} The environment, in this case the soil, can directly affect health in the form of soil-borne diseases.

Soil can directly affect health in the form of soil-borne diseases. Most of the living organisms are microbes that are found in the soil. Several microbes in the soil are pathogenic to humans, including Protozoa, Fungi, Bacteria, and also viruses. Some of these microor-

ganisms require a host/host for their survival.^{2,5} Soil is a reservoir of human pathogens and parasites. Soil, which is the recipient of all types of waste, can contain microorganisms such as worms, bacteria, viruses and pathogenic fungi in high concentrations. Most of the coastal communities are susceptible to diarrhea. This is of course caused by dirty water, dirty environment, and many more.²

Children in settlements generally play outside, around the house. They play using soil media. The settlement does not have a planned children's play area with various supporting facilities in it, and it is based on information from residents that the diseases that mostly affect children are worms, diarrhea, and itching.

Based on the location of the children's activities, a study was conducted which aims to determine the effect of climate on the choice of place and the way children play and its impact on children's health.

Research methods. The research uses Phenomenology, with field exploration. The time of the study was carried out during the dry season during the day when the children's parents had finished with their domestic work, lasting from 9.00 am to 4.00 pm. At that time, parents began to spend time in parenting. Observations were made on the type of children's play, the condition of the playground physical environment, and local climate conditions. Besides that, researcher looking for secondary data at the local Community Health centers regarding the level of infant health. The analysis used descriptive analysis.

Research sites

The research was conducted in the Pantai Bahari settlement, Bangkala district, Jeneponto Regency. The settlements are directly

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Fig. 1. Bahari Beach village location.



Fig. 2. Sand becomes a medium for playing for children under five.

adjacent to the Makassar Strait, where the residents generally work as cultivators of seaweed, fishermen and fishers. The following Fig. 1 shows the research location.

Survey result data

Toddlers who are still under parental control carry out play activities in places not far from the parent's (mother) position. Women in settlements generally work under the house, so their toddlers also do activities under the house or in the surrounding area such as the house yard. Children play freely on the ground, generally spending a lot of time playing between 1 and 2 h with their friends, and the others adjust to the time their mother is there. The following is a picture showing children under five playing with soil media in their yard.

The land that is used as a medium for playing is generally dirty (Fig. 2), with trash milling around them. Some of the children did not use footwear when playing, it seemed they were happy playing on the ground.

Water from the service area is allowed to just flow under the house and generally seeps into the ground, but if the soil conditions

are saturated, the water will spill or overflow into under, yards and roads (Fig. 3). The proximity of the well to the septic tank has an impact on the quality of well water. At high tide the water level rises and this is exacerbated in the rainy season, water from sewer holes and septic tanks overflow into the yard of the house and enter the ground causing the soil to be contaminated with various substances that can harm health.

Apart from water (Figs. 3 and 4), the wind is also a medium for carrying germs to the surface of the soil where children play. Wind speeds move between 25 and 39 km/h during the day in settlements. The following is data on wind speed, humidity, and temperature on the maritime coast in general from the application <http://weather.com/stc>.

The wind speed at 10 o'clock reaches 29 km/h, 64% humidity, 12 h 34 km/h, 13 o'clock reaches 37 km/h, and at 2.00 it reaches 39 km/h (Fig. 5). The wind speed between 29 and 39 km/h is included in the Strong Breeze category 22-27 knots which has the character of a large tree branch moving sounding the whir of a telephone wire or others, it is difficult to use an umbrella, if the wind blows at that speed. When the wind with a strong breeze speed, it will raise the sand dust. Dust carried by strong winds contains a



Fig. 3. Conditions of the living environment with a drainage system.



Fig. 4. The beach area that is dirty by local sewage water, organic and inorganic waste also piles up on the beach.

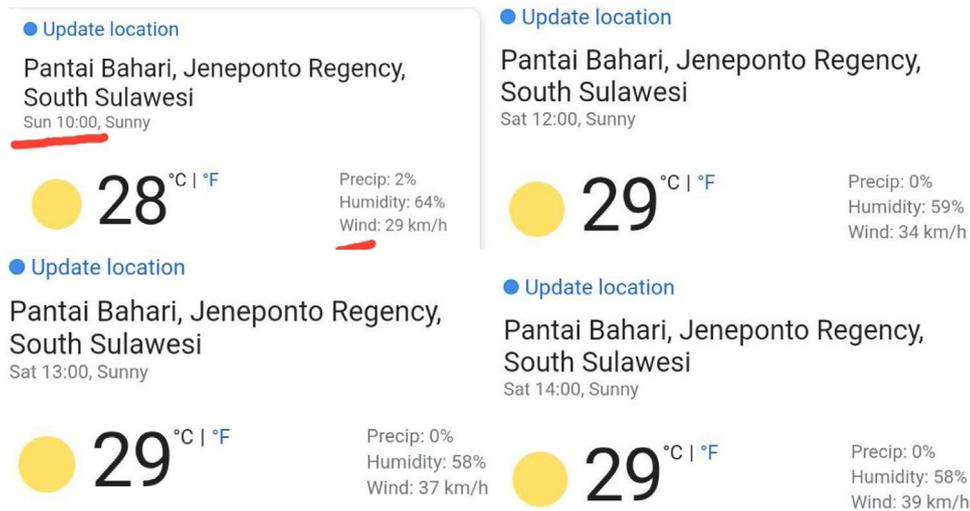


Fig. 5. Temperature, humidity, and wind speed in the coastal area of Jeneponto.

lot of germs and dust can enter the body. That means, if carried by strong winds, the risk of dust getting into the respiratory tract will be even higher. Dust that carries disease germs causes narrowing of the lower respiratory tract, causing symptoms of shortness of breath and coughing.

Analysis and discussion

The influence of the playground on disease transmission

Generally, the children in the settlement play in the open around the house and are under the control of their parents (mother) or siblings. In fishermen settlements, there are no specially planned places for children to play, places that are equipped with various supporting facilities and infrastructure such as children in urban areas, they are more free to play and with the natural nature of play in the wild.

Playing freely in nature using soil media is fun for children. Some experts have explained that playing with sand/soil as a play tool is commonly used by children. Froebel also pointed out the importance of out-door games and natural play equipment obtained from the environment.⁶ Some studies have also raised concerns about the use of outdoor playrooms for schoolchildren. When school-age children are given more opportunities to play outside after school, participation in physical activity increases and sedentary behavior decreases. It is also with Fjørtoft and Sageie, that the main concept of playing in an unstructured environment takes precedence.⁷ Children naturally can observe their environment so that they can provide a sincere understanding to children about environmental awareness. Playing with nature provides benefits for children. Playing with material provided by nature has an added value, which is to help children learn to care about nature.⁸

However, playing in nature using soil media can cause health problems. Soil is a reservoir of human pathogens and parasites. Soil,

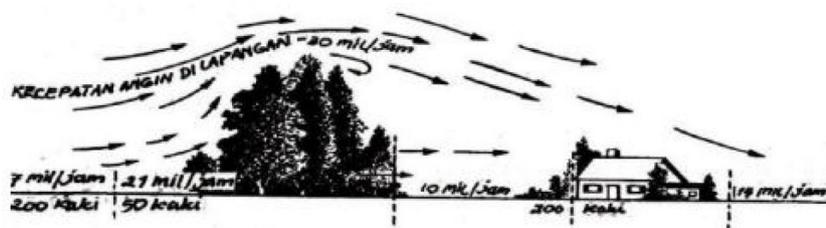


Fig. 6. Trees reduce wind speed.¹⁵

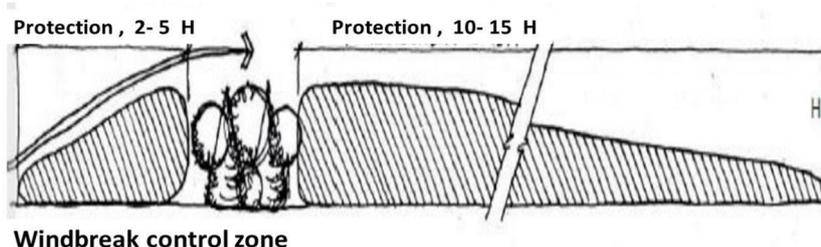


Fig. 7. Length of area covered by wind breakers.¹⁶

which is the recipient of all types of waste, can contain microorganisms such as worms, bacteria, viruses and pathogenic fungi in high concentrations.²

The influence of climate on the spread of disease and its effects on the playground

In tropical areas, the spread of soil-borne diseases can occur during the rainy season due to floods or in the dry season due to strong winds, so that dust and disease-causing agents are blown from endemic areas to other areas.^{3,4} In Nugroho (2014), s an area located in a coastal area which is affected by high tide, when the tide comes, especially in the rainy season, the water will enter the residential area and remember.²

Sewerage found in roads and household service areas will blend with the water so that dirt and germs will float in the settlements, and the soil becomes a reservoir for germs. Various types of diseases can arise and attack children because they are confused with the land, making the ground a place to play, such as worms, diarrhea, coughing, coughing and itching. As an endemic place for various diseases. One of the diseases with a high prevalence is worm infection.⁹ In Indonesia, the most common intestinal worm infections in humans are *Enterobius vermicularis* and soil-transmitted helminths, namely *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms.¹⁰ Another intestinal worm infection is *A. lumbricoides*. The habit of this sufferer is often in contact with the ground and defecating in the river.¹¹

As an endemic place for various diseases. One of the diseases with a high prevalence is worm infection.⁹ In Indonesia, the most common intestinal worm infections in humans are *E. vermicularis* and soil-transmitted Helminths, namely *A. lumbricoides*, *T. trichiura*, and hookworms.¹⁰ Another intestinal worm infection is *A. lumbricoides*. The habit of this sufferer is often in contact with the ground and defecating in the river.¹¹ Diarrheal disease caused by microbes that enter the soil through fecal waste is still a serious concern in developing countries, especially Indonesia. The 2007 Riskesdas report that diarrhea is the number one cause of death in infants (31.4%) and toddlers (25.2%).²

Efforts to prevent disease transmission due to oil in nature

Public health experts generally agree that the quality of environmental health is one of the four factors that affect human health

according to H. The first type of environmental based disease is caused by viruses such as ISPA, pulmonary tuberculosis, diarrhea, polio, measles, and worms. Non-physical efforts that must be made are to have a clean and healthy lifestyle to increase productivity and quality of life as well as resistance to various diseases.

There are 16 key messages of clean and healthy living habits prepared by the Directorate of Child Social Rehabilitation, Directorate General of Social Rehabilitation, Ministry of Social Affairs Supported by UNICEF, two of which are 1) clean and healthy behavior must be done wherever we are 2) implementing and practicing PHBS in households including in other childcare centers, among others, every family member is not susceptible to disease. According to Notoatmodjo (2003),¹² there are several things that need to be taught to children to develop healthy behavior, namely maintaining personal hygiene and environmental hygiene and keeping things that are harmful to health. Environmental cleanliness is the cleanliness of the place to live, work or play, because germs and viruses can survive up to two hours on the surface of the skin.¹³

The physical effort that must be made to maintain and improve children's health without neglecting playtime is to create child names that are safe and comfortable. Important factors in designing a safe and comfortable children's playground are:

1. The aspect of security, aims to provide a sense of security for children who play with their parents or supervising companions.¹⁴ Security aspect components, namely:
 - a. Location, protected by a fence.
 - b. Layout, easy to control; separation of activity zoning; age group and game type.
 - c. Game equipment, safe surface material.
 - d. Construction, play equipment connection securely fixed.
 - e. Materials/materials, materials that are in direct contact with children's skin are soft textured.
2. The aspect of comfort, aims to provide comfort for children to play activities.¹⁴ The components of the comfort aspect, namely:
 - a. Location, has a comfortable micro climate by utilizing the area shaded by vegetation/building structures.
 - b. Layout, children are free to choose the type of game; free to move; shaded and open division of games; availability of rest area facilities.
 - c. Game equipment, can be used comfortably by all children, including those with physical limitations.

- d. Construction, creating aesthetic unity with other play facilities.
- e. Material/materials, have high durability; hygienic and easy to maintain.¹⁴

To prevent strong winds in the Strong Breeze category from blowing dust and sand particles that have been contaminated by dirt in the coastal area, it is better if residential areas and children's playgrounds are barred by plants. Trees will serve as a natural barrier that will prevent or reduce wind speed and also the dust that enters the settlement with them, here is a picture showing the role of trees for settlement security.

The two (Figs. 6 and 7) show a comparison between wind speed, tree height and covered area. The reduction in wind speed is also affected by the density of the wind breaker. The more penetrated the windbreak, the longer the distance of the protection zone will be. Structures in the form of buildings can be placed in a zone protected from the wind. The structure should also be placed in an area that is not too close to the wind breaker in the protected zone because there is a dead air pocket where a little air movement occurs, also not too far away because the reduction in speed is getting lower.¹⁷ The provision of vegetation on children's dwellings and playgrounds as a barrier to the wind because of the results of research conducted by Ashari Rasjid and Nasrianti (2017) that there is a significant relationship between wind speed and the prevalence of dengue hemorrhagic fever.¹⁸

Conclusion

Where children play in nature using soil media is at risk of causing disease. Soil as a reservoir for germs occurs because the residential environment is not clean due to a poor drainage system which results in dirty water not being channeled properly, being absorbed into the soil and stagnant. In addition, high wind speeds also have an impact on household displacement from endemic places into settlements. It takes non-physical and physical efforts to prevent children from contracting the disease. Non-physical efforts through good behavior, and physically by making playtime comfortable and safe for children.

Ethics

All authors have seen and approved the submitted manuscript. The author guarantees that the article is the original work of the author, and guarantees that it has not received prior publication and is not being considered publication elsewhere. The relevant author will be fully responsible for submissions and have

contributed significantly to the work, have read the manuscript, proved the validity and validity of the data and its interpretation, and agreed to be submitted to the Gaceta sanitaria journal.

Conflicts of interest

The authors declare no conflict of interest.

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References

1. Asmal I, Syarif E, Ahmad M. Harmonization of domestic and social life of fishermen women; a positive behavior for quality of life. *Enferm Clin.* 2020;30:518–23.
2. Nugroho A. Peran tanah sebagai reservoir penyakit. *Vektora.* 2014;6:27–32.
3. Robert SH. Diseases of domestic animals in Australia. Part 5. Bacterial diseases. 2nd ed. Canberra: Department of Health; 1964.
4. Seifert HSH. Specific vaccination againts soil-borne infection. *Anim Res Dev.* 1976;5:7–13.
5. Selinus O, Alloway B, Centeno JA, et al. Essential of medical geology, impact of the natural environment on public health, Vol. 13. Burlington: Elsevier Academic Press; 2005. p. 812.
6. Musfiroh T. Bermain sambil belajar dan mengasah kecerdasan. Jakarta: Depdiknas; 2005.
7. Fjørtoft I, Sageie J. The natural environment as a playground for children. Landscape description and analyses of anatural playscape. *Landsc Urban Plan.* 2000;48:83–97.
8. Kiewra C, Veselack E. Playing with nature: supporting preschoolers' creativity in natural outdoor classrooms. *Int J Early Child Environ Educ.* 2016;4:70–95.
9. Soedarto. Parasitologi klinik. Surabaya: Airlangga University Press; 2010.
10. Djarismawati. Diagnostik parasitologi kedokteran. Jakarta: EGC; 2008.
11. Prasetyo HN, Prasetyo H. Prevalence of intestinal helminthiasis in children at North keputran Surabaya at 2017. *J Vocat Heal Stud.* 2018;1:117–20.
12. Notoatmodjo S. Pendidikan dan perilaku kesehatan. Jakarta: PT. Rineka Cipta; 2003.
13. Astuti AK. Pelaksanaan perilaku sehat pada anak usia dini di Paud Purwomukti Desa Batur Kecamatan Getasan. *Sch J Pendidik Dan Kebud.* 2016;6:264.
14. Alamo MR Del. Design for fun: Playgrounds. Barcelona: LINKS International; 2002.
15. De Chiara J, Koppelman LE. In: Hakim J, editor. Site planning standards. Jakarta: Erlangga; 1997.
16. Todd KW. In: Onggodiputro AK, editor. Tapak, ruang, dan struktur. Bandung: Intermatra; 1987.
17. Adjam RMO, Renoat E. Vegetasi lanskap jalan sebagai pereduksi aliran angin di Kota Kupang. *J Lanskap Inonesia.* 2017;9.
18. Nasrianti RA. Hubungan cuaca mikro dengan prevalensi penyakit demam berdarah dengue di Kabupaten Bone tahun 2013–2015. *Media Komunikasi Sivitas Akademik dan Masy.* 2017;17.