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Relationship between Environmental Conditions and Distribution of 10 Most Common Diseases in the Lubuk Alung Health Center Work Area in 2024

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Abstract: Public health reflects a complex and dynamic interaction between various determinants, where environmental conditions play a crucial role in influencing disease distribution patterns. The type of research used is qualitative through a descriptive approach. Data from this study were collected through medical records of patients visiting the Lubuk Alung Health Center during the period January to December 2024. The data collection process was carried out by health center officers by accessing medical records to document the type of disease and the number of cases based on their respective work areas. Furthermore, each case of disease was classified according to the type of disease and the patient's area of residence. This study was conducted in the work area of the Lubuk Alung Health Center, Padang Pariaman Regency, West Sumatra. The results of this study found that the distribution of the ten most common diseases was greatly influenced by local environmental conditions in seven villages, namely Air Tajun, Balah Hilir, Lubuk Alung, Pasir Lawas, Pangkalan Kasiak, Sei Abang, and Singguling. The disease with the highest number of cases was ARI (393 cases), followed by Diabetes Mellitus (355 cases), Hypertension (196 cases), Schizophrenia (168 cases), Dyspepsia (135 cases), Cephalgia (35 cases), Febris (56 cases), Skin Disease (45 cases), Heart Disease/HT (50 cases), and Other Diseases (51 cases). Balah Hilir and Pangkalan Kasiak villages showed the highest prevalence of diseases in general, with Balah Hilir recording the highest cases of ARI (97), Diabetes Mellitus (63), Dyspepsia (30), and Heart Disease/HT (11), while Pangkalan Kasiak dominated cases of Diabetes Mellitus (79), ARI (85), and Hypertension (65). Sei Abang also had high figures for ARI (67), Schizophrenia (17), and Skin Disease (12). In contrast, villages such as Pasir Lawas and Lubuk Alung had relatively lower cases of most diseases. This uneven distribution of disease indicates the strong influence of local environmental factors such as air quality, sanitation, lifestyle, and health infrastructure, so that specific area-based interventions are needed to improve overall public health.

Keywords: Diseases; Environmental conditions; Health Centers

Introduction

Public health is a complex reflection of the dynamic interactions between various determinants, with environmental conditions as a crucial element influencing disease distribution patterns (Rubuga et al., 2024). The World Health Organization (WHO) asserts that approximately 24% of the global disease burden and 23% of premature deaths can be attributed to modifiable environmental factors (Kim et al., 2023). A thorough understanding of the relationship between environmental conditions and disease distribution is a

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fundamental foundation for developing effective and sustainable public health strategies (Olorunsogo et al., 2024).

The concept of environmental determinants of health encompasses a broad spectrum that includes water quality, sanitation, air pollution, climate change, and the physical conditions of the residential environment (Edo et al., 2024). Epidemiological studies have shown that geographic variations in disease distribution are often strongly correlated with local environmental characteristics, creating spatial patterns that can be identified and analyzed for public health interventions (Luz & Masoodian, 2022). An ecological approach to health that integrates environmental, social, and biological factors provides a comprehensive framework for understanding the complexity of these relationships (Gudi-Minderman et al., 2023).

The working area of the Lubuk Alung Health Center covers seven villages, namely Air Tajun, Balah Hilir, Lubuk Alung, Pasir Lawas, Pg. Abang, and Singguling, which provide an interesting geographical context for the study of environmental-health relationships (Ulya & Syafputri, 2022). The diversity of geographical characteristics, topography, and socio-economic conditions between villages in this area creates environmental variations that have the potential to influence disease distribution patterns. The geographic health approach has proven effective in revealing diseases and their relationships with environmental characteristics, providing valuable insights for planning more targeted interventions (Rahaman et al., 2023).

The ten most common diseases recorded in the working area of the Lubuk Alung Health Center in 2024 include cephalgia, diabetes mellitus, dyspepsia, febris, hypertension, acute respiratory infections (ARI), skin diseases, and schizophrenia, reflecting a complex spectrum of health problems. Each of these conditions has unique epidemiological characteristics and different potential relationships with environmental factors. Cephalgia and febris can be influenced by environmental factors such as air quality and weather changes, while ARI has a strong correlation with air pollution and housing density (Mandell et al., 2020).

Non-communicable diseases such as diabetes mellitus and hypertension, which have traditionally been associated with lifestyle factors, are now beginning to be recognized as having a significant environmental dimension (Budreviciute et al., 2020). Recent studies have shown that exposure to environmental pollutants, access to green space, and neighborhood walkability can influence the prevalence of cardiovascular and metabolic diseases (Hu et al., 2022). Skin diseases are often directly related to local water quality, sanitation, and climate conditions, making them sensitive indicators of environmental conditions (Belzer & Parker, 2023).

Dyspepsia as a gastrointestinal disorder can be influenced by the quality of drinking water, sanitation, and hygiene practices that are closely related to environmental infrastructure. Access to clean water and proper sanitation has a strong negative correlation with the prevalence of gastrointestinal diseases, including dyspepsia (Ashrafuzzaman et al., 2023). Schizophrenia is a mental disorder with a strong genetic component, also showing geographic variations that can be associated with environmental factors such as urbanization, pollution, and environmental stress, where prenatal and perinatal environmental factors can increase the risk (Schmitt et al., 2023; Fišar, 2023).

The geographical characteristics of West Sumatra, which is located in the equatorial region with a humid tropical climate, create environmental conditions that are conducive to the development of various disease vectors and pathogenic microorganisms. Health surveillance data shows that disease patterns in Indonesia are experiencing an epidemiological transition, where the burden of infectious diseases is still high while non-infectious diseases are also increasing. (Marthias et al., 2021). High rainfall conditions, high air humidity, and relatively stable temperatures throughout the year can affect the dynamics of infectious disease transmission (Zhang et al., 2024).

Previous studies have shown that natural resource conditions such as water quality, availability of clean water, soil conditions, and air quality have a significant correlation with the incidence of various diseases (Lin et al., 2022). A study by the Balitbangkes Ministry of Health of the Republic of Indonesia showed that areas with poor sanitation conditions had a prevalence of diarrhea 2.5 times higher than areas with good sanitation. Research in coastal areas of West Sumatra also showed that polluted groundwater quality contributed to the high incidence of skin diseases and digestive disorders (Rajan et al., 2024).

This study aims to analyze the relationship between environmental conditions and the distribution of the ten most common diseases in the working area of the Lubuk Alung Health Center in 2024, with a focus on identifying diseases and environmental factors that contribute to variations in distribution. The health ecosystem approach that emphasizes the complex interactions between humans and the environment is very relevant to be applied in the context of this area. The results of the study are expected to provide a strong evidence base for the development of more effective and efficient public health intervention strategies, as well as support evidence-based decision-making in health program planning at the local level.

Method

The type of research used as a research method is qualitative through a descriptive approach. While qualitative research itself can be concluded as research that observes a person's writing, speech, and behavior so as to produce descriptive data. Data collection techniques were obtained from medical records of patients who visited the Lubuk Alung Health Center from January to December 2024. Data collection was carried out by Puskesmas officers accessing patient medical records to record the type of disease and the number of cases in each work area. Then each case of disease is categorized according to the type of disease and the patient's area of residence. The location of the study was in the working area of the Lubuk Alung Health Center, Padang Pariaman Regency, West Sumatra.

Results and Discussion

Overview of Distribution of the 10 Most Common Diseases

Based on data obtained from the Lubuk Alung Health Center in 2024, 10 diseases with the highest prevalence have been identified spread across 7 villages in its working area, namely Air Tajun, Balah Hilir, Lubuk Alung, Pasir Lawas, Pangkalan Kasiak, Sei Abang, and Singguling. The data shows a significant total accumulation of cases with varying distribution patterns between regions, indicating the influence of local environmental factors on disease incidence.

Table 1. Distribution of Disease Cases

Disease	Air Tajun	Balah Hilir	Lubuk Alung	Pasir Lawas	Pg. Kasiak	Sei. Abang	Singguling
Acute Respiratory Infection (ARI)	48	97	35	24	85	67	37
Diabetes Mellitus (DM)	27	63	70	36	79	60	20
Hypertensi	13	37	6	6	65	38	31
Schizophrenia	43	23	16	21	30	17	18
Dyspepsia	21	30	17	10	24	27	6
Febris	7	8	5	5	10	13	8
Skin disease	5	7	3	5	7	12	6
Heart Troubles (HT)	6	11	8	3	4	5	7
Cephalgia	1	2	6	5	3	11	7
Other Diseases	10	8	6	3	8	10	6

The diseases identified include Acute Respiratory Infection (ARI), Diabetes Mellitus (DM), Hypertension, Schizophrenia, Dyspepsia, Febris, Skin Disease, Heart Disease (HT), Cephalgia, and Other Disease categories. The distribution of cases shows the dominance of non-communicable diseases (NCDs) such as Diabetes Mellitus (DM) and Hypertension, as well as infectious diseases such as ARI, which reflects the epidemiological transition that is currently occurring in the region. The distribution of the largest number of diseases can be seen in table 1.

Based on data on the distribution of disease cases in 7 villages within the working area of the Lubuk Alung Health Center in 2024, an uneven distribution pattern was seen between regions. The disease with the highest prevalence was ARI (Acute Respiratory Tract Infection) with a total of 393 cases, followed by Diabetes Mellitus (DM) with 355 cases, and Hypertension with 196 cases. Variations in disease distribution between villages indicate the influence of local environmental factors. Balah Hilir and Pangkalan Kasiak villages showed a relatively high burden of disease for most disease categories, which may indicate environmental conditions that are less supportive of public health (Beech et al., 2021).

ARI (Acute Respiratory Infection)

ARI (Acute Respiratory Infection) is an infectious disease that attacks the respiratory tract from the nose to the lungs, this disease is caused by viruses, bacteria, or other microorganisms that are transmitted through droplets or air (Khambali et al., 2024). Symptoms of this disease range from coughing, runny nose, mild fever to shortness of breath and high fever. This disease more often attacks toddlers, the elderly, and people with weak immune systems, can be prevented by maintaining hand hygiene, using masks, and increasing body immunity, and treated according to the cause with rest, drinking plenty of water, symptomatic drugs, or antibiotics if needed (Paul, 2024). The distribution of ARI (Acute Respiratory Infection) can be seen in Figure 1.

The ARI distribution graph shows a very striking pattern with Balah Hilir Village (97 cases) and Pangkalan Kasiak (85 cases) as the two villages with the highest cases, followed by Sei Abang (67 cases) and Air Tajun (48 cases). The high number of ARI cases in these three villages may be related to less than supportive physical environmental conditions, such as poor air quality due to motor vehicle pollution, household industrial activities, or uncontrolled waste burning (Bupu et al., 2024). The high population density in these villages also facilitates the transmission of respiratory

pathogens through droplets and aerosols (Hasani & Harahap, 2025).

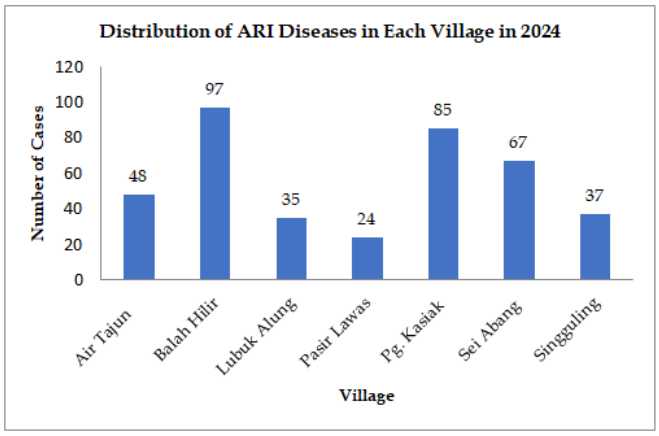

Figure 1. Distribution graph of ARI

Microenvironmental factors such as housing conditions with inadequate ventilation, high humidity, and exposure to cigarette smoke or kitchen smoke can worsen the risk of ARI, especially in vulnerable groups such as children and the elderly. Poor environmental sanitation conditions, including improper domestic waste management, can create an environment conducive to the growth of pathogenic microorganisms that cause ARI. In addition, extreme weather and seasonal changes in tropical areas can affect people's immune systems and increase susceptibility to respiratory infections (Bakchi et al., 2024).

The significant disparity between villages with the highest and lowest cases (Air Tajun with 48 cases and Lubuk Alung with 35 cases) indicates the presence of local-specific environmental factors influencing the distribution of ARI. This suggests the need for different intervention approaches for each village, taking into account the environmental, socio-economic, and health infrastructure characteristics of each region. ARI prevention programs should focus on improving indoor air quality, educating about good home ventilation, and controlling sources of air pollution at the community level (Carducci et al., 2024).

Diabetes Mellitus (DM)

Diabetes Mellitus is a chronic disease, where blood sugar levels are high because the body cannot produce enough insulin (type 1 DM) or cannot use insulin properly (type 2 DM). The main symptoms include frequent urination, frequent thirst and hunger, weight loss, fatigue, and slow-healing wounds. The main risk factors are obesity, family history, lack of physical activity, and unhealthy diet. If not properly controlled, diabetes can lead to serious complications such as heart disease, kidney damage, eye disorders, nerve damage, and foot problems. Diabetes management requires a combination of a healthy diet, regular exercise, medications (including insulin if needed), and regular blood sugar monitoring to prevent complications and maintain quality of life (Shaikh et al., 2022). The distribution of diabetes mellitus can be seen in Figure 2.

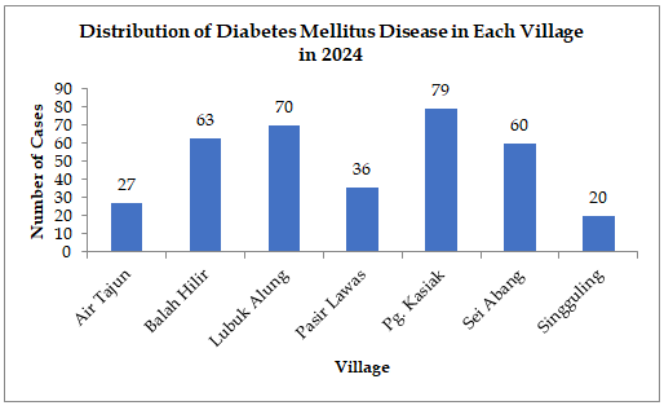

Figure 2. Distribution graph of diabetes mellitus

The distribution of Diabetes Mellitus cases shows a very high concentration in Pangkalan Kasiak (79 cases) and Lubuk Alung (70 cases), followed by Balah Hilir (63 cases) and Sei Abang (60 cases). This distribution pattern reflects the epidemiological transition that occurs in areas experiencing urbanization and modernization, where lifestyle changes become more sedentary and food consumption patterns shift to processed foods with a high glycemic index. Pangkalan Kasiak as the village with the highest cases likely has easier access to fast food and sweet drinks, as well as an environment that is less supportive of physical activity (Silva et al., 2024).

Built environment factors play an important role in developmentDiabetes Mellitus, including the availability of green open spaces for physical activity, environmental walkability, and access to community sports facilities. Villages with high cases of Diabetes Mellitus may have environmental characteristics that encourage a sedentary lifestyle, such as a lack of safe sidewalks for walking, a lack of parks or sports fields, and the dominance of motorized transportation for daily mobility. In addition, environmental stress due to noise, air pollution, and population density can affect glucose metabolism and increase the risk of insulin resistance (Beulens et al., 2022).

The large variation between villages with the highest cases (Pangkalan Kasiak 79 cases) and the lowest (Singguling 20 cases) suggests that environmental and socioeconomic factors play a significant role in the distribution of Diabetes Mellitus. Differences in access to preventive health services, health education, and economic ability to purchase healthy foods can affect the prevalence of Diabetes Mellitus in each village. Effective

interventions should include environmental modifications to support physical activity, community-based nutrition education, and increased access to healthy and affordable foods (Formichi et al., 2022).

Hypertension

Hypertension or high blood pressure is a condition where systolic blood pressure is ≥140 mmHg and/or diastolic ≥90 mmHg persistently, this disease is caused by genetic factors, obesity, excessive salt consumption, lack of physical activity, stress, smoking, and alcohol consumption (Kandil et al., 2023). Prevention and management of hypertension include lifestyle changes such as a low-salt diet, regular exercise, maintaining ideal body weight, managing stress, avoiding cigarettes and alcohol and maintaining quality of life (Charchar et al., 2024). The distribution of hypertension can be seen in Figure 3.

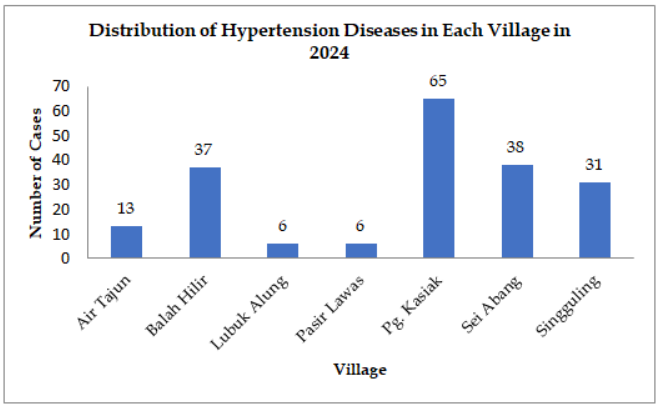

Figure 3. Hypertension distribution graph

The distribution graph of hypertension shows a unique pattern with Pangkalan Kasiak (65 cases) as the village with the highest cases, followed by Sei Abang (38 cases) and Balah Hilir (37 cases). The high prevalence of hypertension in Pangkalan Kasiak may be related to urban environmental factors such as high stress levels, chronic noise exposure from transportation and industrial activities, and poor air quality due to particulate pollution and toxic gases. Dense environmental conditions and lack of green open spaces can increase psychosocial stress which contributes to increased blood pressure (Rioa et al., 2023).

Physical environmental factors such as access to high-sodium foods, availability of clean water, and quality of residential environment affect the prevalence of hypertension. Villages with high cases of hypertension may have easy access to processed foods and junk foods that are high in salt, and lack of access to fresh vegetables and fruits. Air pollution, especially PM2.5 and NO2, can cause systemic inflammation and endothelial dysfunction that contribute to hypertension. In addition, the quality of drinking water containing heavy metals or chemical contaminants can affect kidney function and blood pressure regulation (Naser et al., 2019).

The uneven distribution of hypertension between villages (from 65 cases in Pangkalan Kasiak to 4 cases in Pangkalan Kasiak) indicates the importance of local environmental factors in the pathogenesis of hypertension. Different socioeconomic conditions between villages may affect access to healthy food, sports facilities, and preventive health services. Hypertension control programs should consider the specific environmental characteristics of each village, including interventions to reduce air and noise pollution, increase access to low-sodium foods, and create an environment that supports regular physical activity (Antonelli et al., 2022).

Schizophrenia

Schizophrenia is a serious mental disorder that causes sufferers to experience hallucinations, delusions, chaotic thoughts, and reduced emotional and social abilities. This disease usually appears in late adolescence to young adulthood, caused by a combination of genetic factors, brain chemical imbalances, and environmental factors such as stress or trauma. Schizophrenia can interfere with the ability to work, socialize, and care for oneself, so sufferers need family and community support. Treatment includes antipsychotic drugs to control symptoms, psychological therapy, and social rehabilitation that must be carried out consistently throughout life, where with proper treatment, sufferers can live a better and more productive life (Hikmat et al., 2024). The distribution of schizophrenia can be seen in Figure 4.

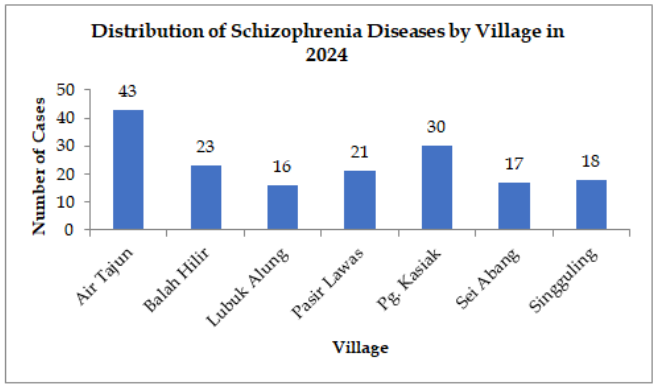

Table 4. Distribution graph of schizophrenia

The distribution of schizophrenia cases shows an interesting pattern with Air Tajun (43 cases) having the highest prevalence, followed by Pangkalan Kasiak (30 cases) and Balah Hilir (23 cases). The high number of schizophrenia cases in Air Tajun may be related to socio-

environmental factors such as geographic isolation, lack of access to mental health services, and strong social stigma against mental disorders that can hinder help-seeking. Although genetic factors play a dominant role in schizophrenia, environmental factors such as social stress, childhood trauma, and poor socio-economic conditions can trigger the onset and worsen symptoms (Ku et al., 2021).

Prenatal and perinatal environmental factors that may influence the development of schizophrenia include maternal malnutrition, infections during pregnancy, complications of childbirth, and exposure to environmental toxins. Unsupportive environmental conditions during brain development, such as lack of cognitive stimulation, exposure to domestic violence, or chaotic environments, may increase the risk of schizophrenia. Air pollution and heavy metal exposure have also been associated with an increased risk of neuropsychiatric disorders, including schizophrenia. In addition, the use of psychoactive substances that can be triggered by unfavorable social environmental conditions can accelerate schizophrenia in vulnerable individuals (Fišar, 2023).

The significant variation in the distribution of schizophrenia between villages (from 43 cases in Air Tajun to 16 cases in Lubuk Alung) suggests the importance of social environmental factors and access to mental health services. Villages with high prevalence may have limited mental health referral systems, a lack of trained mental health workers, and a strong stigma against mental disorders. Intervention programs should include increasing access to mental health services, community education to reduce stigma, and developing strong social support systems for patients and their families.

Dyspepsia

Dyspepsia is a digestive disorder that causes discomfort in the upper abdomen, with symptoms such as bloating, nausea, vomiting, early satiety, heartburn, and frequent belching. This condition can be caused by H. pylori bacterial infection, use of anti-inflammatory drugs, spicy or fatty foods, stress, smoking, or other stomach diseases. Dyspepsia is divided into two types, namely organic (there is a structural abnormality) and functional (there is no clear structural abnormality). Treatment includes changing diet by avoiding trigger foods, eating small portions but often, reducing stress, quitting smoking, and treatment with antacids, stomach acid-reducing drugs, or antibiotics if there is an H. pylori infection, where with proper treatment most cases can improve (Harer & Hasler, 2020). The distribution of dyspepsia can be seen in Figure 5.

The distribution graph of dyspepsia shows the highest concentration of cases in Balah Hilir (30 cases), Sei Abang (27 cases), and Pangkalan Kasiak (24 cases). The high prevalence of dyspepsia in these three villages may be related to the quality of drinking water and inadequate environmental sanitation, which facilitates contamination of food and drinks by enteric pathogens such as Helicobacter pylori. Environmental conditions with poor drainage systems, improper domestic waste management, and limited access to clean water can increase the risk of gastrointestinal infections that manifest as dyspepsia (Almaw et al., 2024).

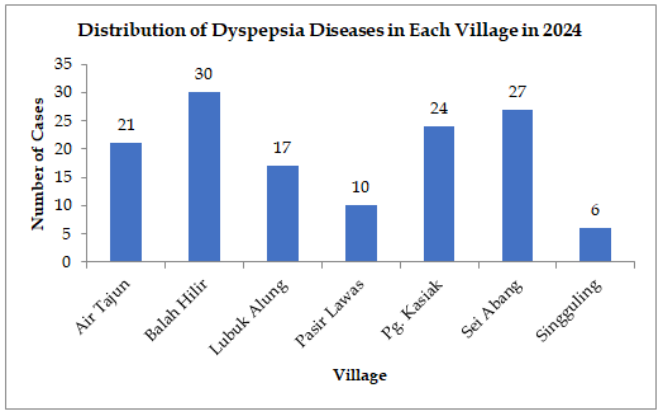

Figure 5. Distribution graph of dyspepsia

Other environmental factors that influence dyspepsia include stress.*e*psychosocial ss due to difficult economic conditions, environmental noise, and high population density. Chronic stress can affect gastric motility and gastric acid secretion, which contributes to dyspepsia symptoms. Exposure to pesticides and agricultural chemicals that are often found in rural areas can irritate the gastric mucosa and cause digestive disorders. In addition, changes in dietary patterns due to urbanization, including consumption of spicy, sour, and fatty foods, and irregular eating habits can worsen dyspepsia symptoms (Rueda-Ruzafa et al., 2023).

The varying distribution of dyspepsia between villages (from 30 cases in Balah Hilir to 6 cases in Singguling) indicates the presence of specific environmental risk factors that differ in each region. Villages with high prevalence may have inadequate sanitation infrastructure, limited access to hygienic food, and higher levels of environmental stress. Dyspepsia prevention programs should focus on improving environmental sanitation, education about food and beverage hygiene, and community-based stress management to reduce psychosocial risk factors (Kibira & Tungu, 2025).

Febris

Fever or fever is an increase in body temperature above normal (>37.5°C) as a natural response of the immune system to fight infection or disease, which is

regulated by the brain to help the body fight microorganisms that cause disease. Fever can be caused by viral, bacterial, parasitic infections, drug reactions, or other diseases, with accompanying symptoms such as chills, headache, muscle pain, weakness, and loss of appetite. Fever is classified into mild (37.5-38°C), moderate (38-39°C), high (39-40°C), and very high (>40°C). Treatment for fever includes adequate rest, drinking plenty of fluids, warm compresses, antipyretics (paracetamol or ibuprofen), and treatment according to the cause such as antibiotics for bacterial infections, where fever will usually decrease as the underlying disease heals (Ma et al., 2021). The distribution of febrile disease can be seen in Figure 6.

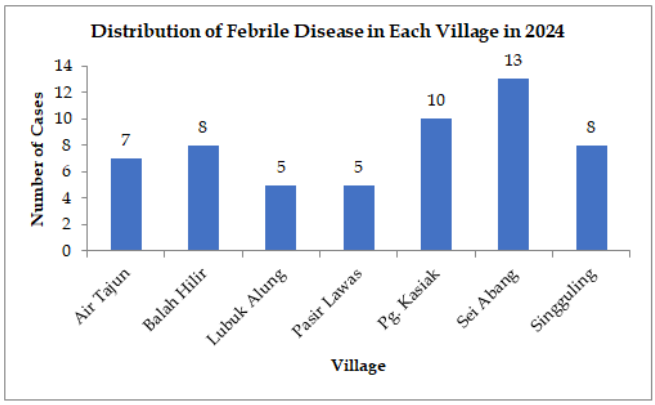

Figure 6. Febris distribution graph

The distribution of febrile cases showed a relatively even pattern between villages with Sei Abang (13 cases) and Pangkalan Kasiak (10 cases) having the highest cases. Febrile as a manifestation of various infectious diseases can reflect environmental sanitation conditions, water quality, and waste management systems in each village. The high number of febrile cases in Sei Abang may be related to environmental conditions that support breeding sites for disease vectors such as the Aedes aegypti mosquito that causes dengue fever, or poor sanitation conditions that facilitate the spread of enteric infectious diseases (Pascoe et al., 2023).

Environmental factors that influence febrile illness include drinking water quality, drainage systems, waste management, and availability of handwashing facilities. Stagnant water due to poor drainage systems can become breeding grounds for mosquitoes and other vectors, increasing the risk of vector-borne diseases that often manifest with febrile illness. Contamination of water sources by domestic or industrial waste can cause water-borne diseases that often present with fever. In addition, high population density and poor home ventilation can facilitate the transmission of airborne infectious diseases that manifest with febrile illness (Boakye Okyere et al., 2024).

Although the distribution of febrile cases is relatively even, the variations (from 13 cases in Sei Abang to 5 cases in Lubuk Alung and Pasir Lawas) still indicate differences in environmental risk factors between villages. Villages with high febrile cases may have specific challenges in vector control, access to clean water, or community immunization systems. Febrile prevention programs should include integrated vector control, improving environmental sanitation, and strengthening infectious disease surveillance systems for early detection and rapid response (Zhang et al., 2023).

Skin Disease

Skin diseases are various disorders that attack the skin as a protective organ of the body, caused by infections (bacteria, viruses, fungi, parasites), allergies, genetic factors, hormones, or environmental exposure such as sunlight and chemicals. Types of skin diseases vary widely from acne, eczema, dermatitis, ringworm, scabies, psoriasis, vitiligo, to skin cancer, with symptoms such as itching, redness, rashes, spots, lumps, or changes in skin color. Risk factors include poor hygiene, weak immune system, family history, exposure to allergens, and stress. Prevention can be done by maintaining skin cleanliness, using moisturizers and sunscreens, avoiding allergens, and maintaining a healthy lifestyle. Treatment is adjusted to the type of disease using creams or ointments (corticosteroids, antifungals, antibiotics), oral medications, or special therapies, where most skin diseases can be cured or controlled well if treated promptly (Felgueiras, 2021). The distribution of skin diseases can be seen in Figure 7.

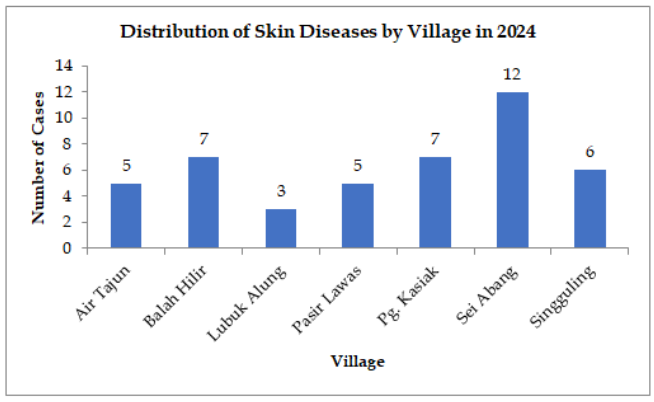

Figure 7. Skin disease distribution graph

The distribution of skin diseases showed the highest concentration in Sei Abang (12 cases), followed by Balah Hilir and Pangkalan Kasiak (7 cases). The high prevalence of skin diseases in Sei Abang may be related to environmental conditions that support the growth of skin pathogenic microorganisms, such as high humidity, inadequate personal sanitation, or poor water quality for

bathing and washing. Tropical environmental conditions with high temperatures and humidity create ideal conditions for the growth of fungi and bacteria that cause skin infections.

Other environmental factors that influence skin disease include exposure to irritant chemicals or allergens in well water or other water sources, use of low-quality detergents or soaps, and damp, poorly ventilated housing conditions. Occupational exposure to agricultural chemicals, dust, or organic matter can cause occupational contact dermatitis or eczema. In addition, poor environmental sanitation can facilitate the transmission of contagious skin diseases such as scabies or impetigo, especially in high-density conditions.

The significant variation in the distribution of skin diseases (from 12 cases in Sei Abang to 3 cases in Lubuk Alung) suggests the presence of specific environmental risk factors that differ between villages. Villages with high prevalence may face challenges in access to good quality clean water, adequate sanitation facilities, or education on personal hygiene. Skin disease prevention programs should include improving access to clean water, education on personal and environmental hygiene, and identification and elimination of sources of environmental contaminants that can cause skin irritation (Akinsulie et al., 2024).

HT (Heart Troubles)

Heart disease is a variety of disorders that affect the function of the heart as a blood pump, including coronary heart disease (blockage of blood vessels), heart failure (weak heart), heart rhythm disorders, and heart valve disease. The main causes are plaque buildup in blood vessels, hypertension, diabetes, high cholesterol, smoking, obesity, lack of exercise, stress, and heredity. Symptoms include chest pain, shortness of breath, fatigue, palpitations, dizziness, to heart attacks with severe chest pain that radiates to the arms or jaw. Prevention can be done with a healthy diet, regular exercise, quitting smoking, managing stress, maintaining weight, and controlling blood pressure and blood sugar. Treatment includes heart medications, medical procedures such as stenting or bypass surgery if necessary, and cardiac rehabilitation, where early detection and appropriate treatment can prevent serious complications and improve quality of life (Severino et al., 2020). The distribution of heart disease can be seen in Figure 7.

The distribution graph of heart disease shows Balah Hilir (11 cases) as the village with the highest prevalence, followed by Lubuk Alung (8 cases) and Singguling (7 cases). The high number of heart disease cases in Balah Hilir may be related to environmental cardiovascular risk factors such as particulate air pollution which can cause systemic inflammation and accelerated atherogenesis (Kim et al., 2023). Long-term exposure to PM2.5, NO2, and other air pollutants has been shown to increase the risk of coronary heart disease, arrhythmia, and heart failure.

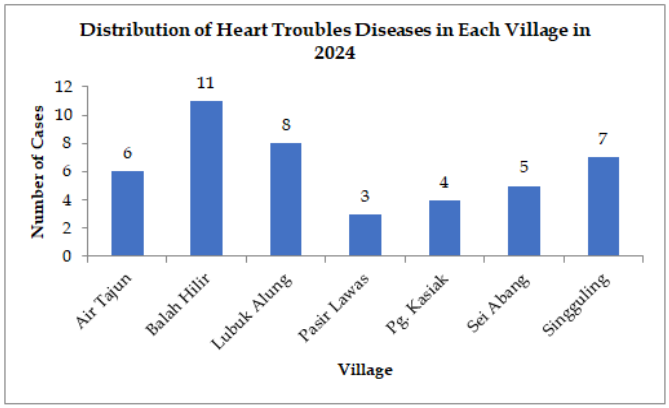

Figure 8. Distribution graph of heart troubles disease

Other environmental factors that affect cardiovascular health include chronic noise, which can lead to activation of the stress system and increased blood pressure, and access to foods high in saturated and trans fats. Environmental conditions that are not conducive to physical activity, such as lack of green space, unsafe sidewalks, or limited sports facilities, can contribute to a sedentary lifestyle, a major risk factor for heart disease. In addition, psychosocial stress due to difficult economic conditions or unstable social environments can affect cardiovascular health through neuroendocrine pathways.

The varying distribution of heart disease across villages (from 11 cases in Balah Hilir to 3 cases in Pasir Lawas) suggests differences in exposure to environmental cardiovascular risk factors. Villages with high prevalence may have higher levels of air pollution, limited access to healthy foods, or more stressful socioeconomic conditions. Heart disease prevention programs should include controlling air pollution, creating environments that support physical activity, and educating about heart-healthy diets and stress management (Gupta & Wood, 2019).

Cephalgia (Headache)

Cephalgia or headache is pain that occurs in the head, face, or upper neck area which is divided into two main types: primary headaches (migraine, tension headache, cluster headache) that stand alone, and secondary headaches caused by other conditions such as hypertension or infection. Symptoms can range from mild to severe pain that is throbbing, stabbing, or pressing, often accompanied by nausea, vomiting, or sensitivity to light and sound. Triggers include stress, lack of sleep, dehydration, hormonal changes, and

certain foods. Treatment varies from lifestyle modification and mild analgesics such as paracetamol for mild cases, to specific drugs and preventive therapy for severe cases, but headaches with serious symptoms such as high fever or stiff neck require immediate medical evaluation (Eroğlu et al., 2023). the distribution of cephalgia disease can be seen in Figure 9.

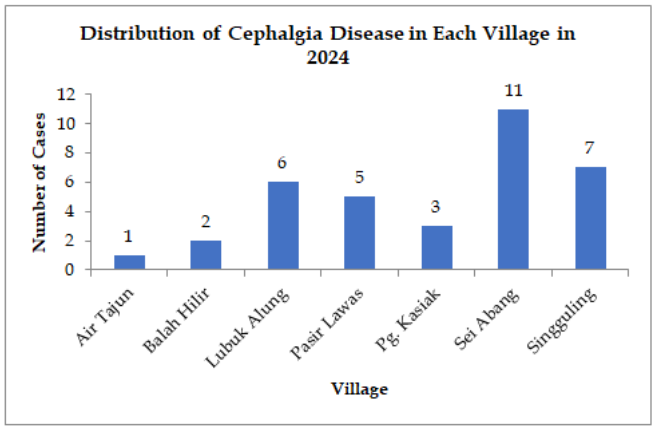

Table 9. Cephalgia distribution chart

The distribution of cephalgia shows a pattern with Sei Abang (11 cases) and Singguling (7 cases) as the villages with the highest cases. The high prevalence of cephalgia in Sei Abang may be related to multiple environmental triggers such as poor air quality, excessive noise exposure, barometric pressure fluctuations, or exposure to volatile chemicals from industrial or agricultural activities (Wilson et al., 2021). Air pollution, especially ozone and particulates, can trigger headaches through neurogenic inflammation and cerebral vasoconstriction mechanisms.

Other physical environmental factors that can trigger cephalgia include inadequate or excessive lighting (glare), flicker from fluorescent lights, and extreme changes in temperature or humidity. Environmental stressors such as traffic noise, construction, or industrial activity can cause tension headaches and migraines. Drinking water quality containing contaminants such as nitrates, pesticides, or heavy metals can also contribute to chronic headaches. In addition, exposure to electromagnetic fields from power lines or electronic equipment can trigger headaches in sensitive individuals.

Variations in the distribution of cephalgia (from 11 cases in Sei Abang to 1 case in Air Tajun) suggest the presence of environmental triggers specific to each village. Villages with high prevalence may have more intensive exposure to air pollutants, noise, or other environmental stressors. Community-based cephalgia management programs should include identification and elimination of environmental triggers, education on lifestyle modifications, and increased access to environments that support neurological health such as green spaces and quiet areas for relaxation (Stevenson et al., 2024).

Other Diseases

The category "Other Diseases" in the context of public health epidemiology refers to a range of health conditions that do not fall into the major disease classifications, including musculoskeletal disorders, eye and ear diseases, and other chronic conditions that may be influenced by specific local environmental factors. (Barnett et al., 2024). The distribution of other diseases can be seen in Figure 10.

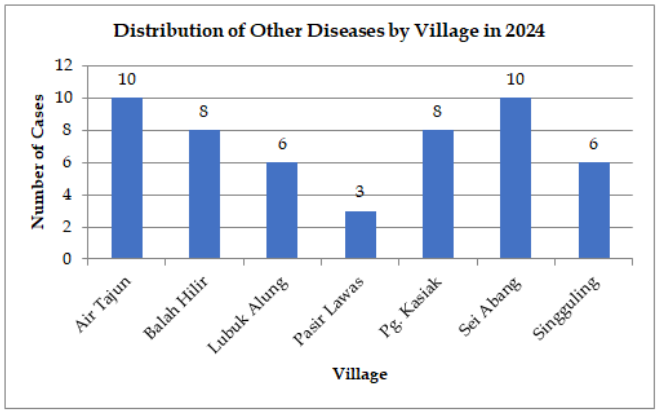

Figure 10. Distribution graph of other diseases

The "Other Diseases" category shows a fairly even distribution with Sei Abang and Air Tajun having the highest cases (10 cases), followed by Pangkalan Kasiak (8 cases). This category likely includes a variety of health conditions not included in the 9 main categories, such as musculoskeletal diseases, eye, ear disorders, or other chronic conditions that may be influenced by local specific environmental factors. The high incidence in Sei Abang and Air Tajun may reflect exposure to unique environmental risk factors, such as local industrial pollutants, agricultural pesticides, or specific geographic conditions.

Environmental factors that can influence "Other Diseases" vary widely depending on the type of disease included in this category. Exposure to occupational hazards in the agricultural or home industry sectors can cause various health conditions that are not classified in the main disease categories. Physical environmental quality such as poor lighting can affect eye health, while chronic noise can cause hearing loss. Water and air pollution can contribute to a variety of chronic conditions that manifest as non-specific complaints (Sharma et al., 2021).

The relatively even distribution of this category (ranging from 3-10 cases) suggests that risk factors for various minor diseases may be fairly homogeneous

across the Puskesmas work areas. However, the differences that exist still indicate variations in environmental risk exposure or access to preventive health services. Management of the "Other Diseases" category requires a comprehensive approach with specific identification of the dominant types of diseases in each village and the contributing environmental risk factors.

Discussion

The results of the study showed an uneven disease distribution pattern in 7 villages in the Lubuk Alung Health Center working area in 2024, dominated by non-communicable diseases (NCDs) such as Diabetes Mellitus (355 cases) and Hypertension (196 cases), as well as infectious diseases such as ARI (393 cases). This pattern reflects the epidemiological transition that is currently occurring in the region, where the burden of disease is shifting from infectious diseases to non-communicable diseases due to changes in lifestyle and environmental conditions. Balah Hilir and Pangkalan Kasiak villages consistently showed a relatively high disease burden for most disease categories, indicating systemic environmental factors that are less supportive of public health in both regions. Significant variations in distribution between villages indicate the importance of a location-specific health intervention approach by considering the environmental, socio-economic, and health infrastructure characteristics of each region (Bhatti et al., 2024).

The highest distribution of ARI in Balah Hilir (97 cases) and Pangkalan Kasiak (85 cases) shows a strong correlation with less supportive physical environmental conditions, such as poor air quality due to motor vehicle pollution, household industrial activities, and uncontrolled waste burning. Micro-environmental factors such as housing conditions with inadequate ventilation, high air humidity, and exposure to cigarette or kitchen smoke can exacerbate the risk of ARI, especially in vulnerable groups (Ana et al., 2015). Skin diseases with the highest prevalence in Sei Abang (12 cases) also show the influence of tropical environmental conditions with high humidity which create ideal conditions for the growth of skin pathogenic microorganisms. Poor environmental sanitation conditions, including improper domestic waste management and limited access to quality clean water, contribute significantly to the high prevalence of infectious diseases in certain areas (Guarnieri et al., 2023).

The very high concentration of Diabetes Mellitus cases in Pangkalan Kasiak (79 cases) and Lubuk Alung (70 cases) reflects the influence of the built environment on the development of the disease, including the lack of green open space for physical activity, low environmental walkability, and easy access to fast food with a high glycemic index (Rosenberg et al., 2024). The dominant distribution of hypertension in Pangkalan Kasiak (65 cases) is closely related to urban environmental factors such as high stress levels, chronic noise exposure, and poor air quality due to particulate pollution. Dense environmental conditions with a lack of green open space increase psychosocial stress which contributes to increased blood pressure. Environmental factors such as access to high-sodium foods, quality drinking water containing contaminants, and air pollution (especially PM2.5 and NO2) can cause systemic inflammation and endothelial dysfunction that contribute to hypertension and cardiovascular disease (Münzel et al., 2025).

The striking distribution of schizophrenia in Air Tajun (43 cases) indicates the influence of social environmental factors such as geographic isolation, lack of access to mental health services, and strong social stigma against mental disorders. Although genetic factors play a dominant role, environmental conditions such as social stress, childhood trauma, poor socioeconomic conditions, and exposure to environmental toxins can trigger the onset and worsen the symptoms of schizophrenia (González-Rodríguez et al., 2023). The high distribution of cephalgia in Sei Abang (11 cases) may be related to multiple environmental triggers such as poor air quality, excessive noise exposure, and exposure to volatile chemicals from industrial or agricultural activities. Significant variations in the distribution of mental disorders between villages indicate the importance of social environmental factors, access to mental health services, and social support systems in influencing the prevalence of mental health disorders in the community (Kirkbride et al., 2024).

The findings of this study emphasize the importance of a One Health approach that integrates human, environmental, and social health in community-level disease prevention programs. Significant variations in disease distribution between villages require the implementation of site-specific interventions, ranging from improving environmental sanitation and air quality to reduce infectious diseases, to creating a built environment that supports physical activity to prevent disease. Disease control programs must include environmental components such as integrated vector control, improving access to clean water, proper waste management, and creating green open spaces. In addition, strengthening of the environment-based surveillance system is needed for early detection and rapid response to emerging health threats, as well as community capacity development in environmental health literacy to support the

sustainability of environmental health intervention programs in the Lubuk Alung Health Center work area.

Conclusion

Based on research in the working area of the Lubuk Alung Health Center in 2024, it was found that the distribution of the ten most common diseases was greatly influenced by local environmental conditions in seven villages, namely Air Tajun, Balah Hilir, Lubuk Alung, Pasir Lawas, Pangkalan Kasiak, Sei Abang, and Singguling. The disease with the highest number of cases was ARI (393 cases), followed by Diabetes Mellitus (355 cases), Hypertension (196 cases), Schizophrenia (168 cases), Dyspepsia (135 cases), Cephalgia (35 cases), Febris (56 cases), Skin Disease (45 cases), Heart Disease/HT (50 cases), and Other Diseases (51 cases). Balah Hilir and Pangkalan Kasiak villages showed the highest prevalence of diseases in general, with Balah Hilir recording the highest cases of ARI (97), DM (63), Dyspepsia (30), and HT (11), while Pangkalan Kasiak dominated cases of DM (79), ARI (85), and Hypertension (65). Sei Abang also had high figures for ARI (67), Schizophrenia (17), and Skin Diseases (12). In contrast, villages such as Pasir Lawas and Lubuk Alung had relatively lower cases of most diseases. This uneven distribution of diseases indicates the strong influence of local environmental factors such as air quality, sanitation, lifestyle, and health infrastructure, so that specific area-based interventions are needed to improve community health as a whole.

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F. S, M. D, A. Z: preparation of original draft, results, discussion, methodology, conclusion; N. S, M. G and I. D: analysis, review, proofreading and editing.

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Conflicts of Interest
The authors declare that there is no conflict of interest regarding the publication of this paper.

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