



Analysis of Leptospirosis Incidence Based on Occupation and Knowledge in the Work Area of the Tulakan Community Health Center, Pacitan Regency in 2025

Agung Trianto^{1*}, Arief Hargono², Ratih Dwi Arini³

¹Master Program of Epidemiology, Faculty of Public Health, University Airlangga, Surabaya, East Java, Indonesia

²Departments Epidemiology, Biostatistics, And Health Promotion, Faculty of Public Health, Airlangga University, Surabaya, East Java, Indonesia

³Tulakan Community Health Center, Pacitan Regency, Pacitan, Java East, Indonesia

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ABSTRACT

Background: Leptospirosis is a zoonotic disease caused by the bacteria *Leptospira interrogans* and which is transmitted from animals to humans through direct contact with the urine of infected animals or contaminated environments, the main transmitting animals are rats. This study aimed to analyze the risk factors of sex, age, occupation, and knowledge and whether they influenced the incidence of leptospirosis. in the working area of the Tulakan Community Health Center, Pacitan Regency in 2025.

Methods: This type of research is a quantitative analytical research with a *cross-sectional design*. The sample in this study comprised the entire population of 152 participant. Data were collected using secondary data observation techniques, leptospirosis case data, and primary data, including sex, age, occupation, and knowledge. Further data analysis was performed using univariate (frequency distribution) and bivariate (*chi-square* test) analyses.

Result: The results of the bivariate analysis show only occupation variables is associated with the incidence of leptospirosis (p -value= 0.000 PR= 15.054; 95% CI= 5.763-39.323) and also the knowledge variable is statistically significant with the incidence of leptospirosis (p -value= 0.005 PR= 3.689; 95% CI= 1.432-9.504). Age and sex did not significantly influence the incidence of leptospirosis.

Conclusion: Occupation and knowledge significantly influenced the incidence of leptospirosis in the area served by the Tulakan Community Health Center, Pacitan Regency in 2025.

Keywords: analysis ; health center ; leptospirosis ; Occupation ; Knowledge

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*Corresponding author, agungtrianto07@gmail.com

Introduction

Leptospirosis is a zoonotic infection caused by *Leptospira interrogans*, transmitted from animals to humans through direct exposure to the urine of infected animals or contaminated surroundings. Rats serve as the main source of infection, although dogs, cattle, and pigs can also act as reservoirs. The World Health Organization (WHO) notes that leptospirosis is frequently underreported because its clinical signs are similar to those of other illnesses, such as typhoid fever, malaria, and dengue, leading to frequent misdiagnosis. WHO estimates that over 1 million leptospirosis cases occur globally each year, with approximately 58,900 deaths annually. The case fatality rate (CFR) ranges from 5% to 15%, particularly in severe conditions like Weil's disease (characterized by kidney failure and hemorrhage) and leptospirosis accompanied by pulmonary hemorrhagic syndrome¹.

According to the Indonesian Ministry of Health 2020, eight provinces reported leptospirosis cases, with a total of 1,170 cases and 106 deaths (CFR 9.1%). The provinces include Jakarta, West Java, Central Java, Yogyakarta, East Java, Banten, North Kalimantan, and South Sulawesi. Several factors contribute to the high incidence of leptospirosis in Indonesia, including heavy rainfall, frequent flooding, inadequate environmental sanitation, large rat populations, and widespread exposure among individuals working in agriculture. These circumstances place leptospirosis as a priority infectious disease that demands focused efforts through rigorous surveillance, early detection, reservoir (rat) control, and community education².

Case Leptospirosis in Java East, from Year 2020-2022 Keep going experience improvement that is on 2020 there are 273 case, Year 2021 there is 312 case And Year 2022 there is 606 Cases. In 2023, the Pacitan Regency recorded 918 cases of leptospirosis³. In addition to environmental factors, sex, age, occupation, and knowledge influence leptospirosis occurrence. Men are reported to have a higher risk than that of women. This pattern is influenced by differences in daily activities, as men are more commonly involved in occupations or tasks that pose a high risk of exposure to contaminated

water or soil, such as farming, livestock work, rice field labor, irrigation, and other outdoor activities. Studies conducted in Indonesia and various other endemic regions have shown that male leptospirosis cases can account for 70–80% of all reported infections. Besides sex, individuals in the productive age range (15–55 years) are noted as the group most frequently infected. This is linked to higher environmental exposure and participation in work-related activities. People in this age bracket tend to spend more time in rice fields or other outdoor settings, increasing their likelihood of encountering *Leptospira* bacteria. Older adults (>50 years) are at greater risk of developing severe forms of leptospirosis, such as Weil's disease, which contributes to a higher mortality rate in this population⁴. Research further reported that males were more affected than females, with men making up 51.1% and women 48.9% of the 47 recorded cases, while individuals under 30 years old represented the majority of infections (55.3% of the 47 cases)⁵. Furthermore, the results of research stated that there is a relationship between work that is at risk of contracting the virus that causes Leptospirosis and the incidence of Leptospirosis⁶. This is in line with previous research which states that there is a relationship between occupations that carry a risk of contracting the virus that causes leptospirosis, such as farming and gardening, and the incidence of Leptospirosis⁶.

This study took the Tulakan Community Health Center (Puskesmas) in Pacitan Regency as its work area, with 918 cases in 2023, the highest in East Java³. In 2025, 41 cases of leptospirosis were found in the Tulakan Community Health Center's work area, making it one of the health centers with the highest number of leptospirosis cases compared to other health centers in the Pacitan Regency⁷.

Based on the background description above, this study aimed to analyze the risk factors of sex, age, occupation, and knowledge to determine whether they influence the incidence of leptospirosis. in the working area of the Tulakan Community Health Center, Pacitan Regency in 2025.

Methods

This was a descriptive quantitative analytical study with a cross-sectional design. The population in this study comprised 152 individuals aged ≥14 years, obtained from the registered data of suspected and confirmed leptospirosis diagnoses from January to August 2025 in the working area of the Tulakan Health Center, Pacitan Regency. The sample in this study was entire population from the registered data of suspected and confirmed leptospirosis diagnoses from January to August 2025 in the working area of Tulakan Health Center, aged ≥ 14 years, amounting to 152 people. The inclusion criteria were patients diagnosed with suspected leptospirosis. (fever, diarrhea, and flu) at the Tulakan Health Center in Tulakan District from January to August 2025, aged ≥14 years. The exclusion criterion was age <14 years. The variables in this study were independent variables consisting of sex, categorized as male and female, and age, categorized as 14 to 40 and >40 years. There are two categories for age: 14 to 40 years (code 1)

and >40 years (code 2); work, categorized as risky (gardening/farming) and not risky (other than gardening/farming); and knowledge, categorized as bad and good. The dependent variable was the incidence of leptospirosis, which was categorized as yes or no. Data collection was performed using secondary data observation techniques, leptospirosis case data in the working area of the Tulakan Health Center, Pacitan Regency, and primary data including sex, age, occupation, and knowledge. Further data analysis in this study was performed using univariate analysis (frequency distribution) and, bivariate analysis (*chi-square* test). This study obtained ethical clearance from the Health Research Ethical Clearance Commission, Faculty of Dental Medicine, Universitas Airlangga (No. 1120/HRECC.FODM/X/2025) for the research entitled ‘*Analysis of Leptospirosis Incidence Based on Occupation and Knowledge in the Work Area of the Tulakan Community Health Center, Pacitan Regency, in 2025*’.

Result

A. Univariate Analysis

Table 1. Characteristics of Subjects

Subject Characteristics	Confirmed		Suspect	
	(n=41)	(%)	(n=111)	(%)
Sex				
Male	25	61	53	47.7
Female	16	39	58	52.3
Age (Years)				
14-40	15	36.6	43	38.7
>40	26	63.4	68	61.3
Occupation				
At Risk	35	85.4	31	27.9
Not at Risk	6	14.6	80	72.1
Knowledge				
Bad	35	85.4	68	61.3
Good	6	14.6	43	38.7

Table 1 shows that based on sex, the *confirmed group* was dominated by males, namely 25 (61%), while in the suspect group, the majority were females, namely 58 (52.3%). Based on age, the *confirmed group* was dominated by age >40 years namely 26 (63.4%), while the suspect group was dominated by age >40 years namely 68

(61.3%). Furthermore, based on risky jobs in the *confirmed group*, the group with the highest risk was 35 (85.4%), and the group with the highest risk was 80 (72.1%). In the *confirmed group*, poor knowledge was dominant 35 (85.4%), while in the suspect group, poor knowledge was also dominant, 68 (61.3%).

B. Bivariate Analysis

Table 2. Risk Factors of Leptospirosis
Leptospirosis Incidences

Risk Factors	Yes		No		Total		p-value	PR (95% CI)
	%	n	%	n	%	n		
Sex								
Male	32.1	25	67.9	53	100	78	0.148	1.710 (0.824-3.547)
Female	21.6	16	78.4	58	100	74		
Age (Years)								
14 – 40	25.9	15	74.1	43	100	58	0.808	0.912 (0.435-1.915)
>40	27.7	26	72.3	68	100	94		
Occupation								
At Risk	53.0	35	47.0	31	100	66	0.000	15.054 (5.763-39.323)
Not at Risk	7.0	6	93.0	80	100	86		
Knowledge								
Bad	34	35	66	68	100	103	0.005	3.689 (1.435-9.504)
Good	12.2	6	87.8	43	100	49		

Based on table 2 above, the results of the bivariate analysis show only occupation variables is associated with the incidence of leptospirosis (*p-value*= 0.000 PR= 15.054; 95% CI= 5.763-39.323) and also the knowledge variable is statistically significant with the incidence of leptospirosis (*p-value*= 0.005 PR= 3.689 ; 95% CI= 1.432-9.504).

Discussion

A. Gender Factor

p-value was 0.148 and RP *value* was 1.710 (0.824-3.547), indicating that there was no significant effect of sex on the incidence of leptospirosis in the work area of the Tulakan Community Health Center, Pacitan Regency in 2025, as evidenced by the CI value exceeding 1. Thus, sex was not significantly associated

with the incidence of leptospirosis. This is in line with previous research, which found that sex has no relationship with the incidence of leptospirosis in Semarang (P = 1.000)⁸. The comparable level of exposure among men and women in the Tulakan Community Health Center’s service area is due to both groups working or engaging in activities within high-risk environments, such as farming, livestock activities, or living near rice fields and rivers, since most residents are involved in agricultural and garden-based activities.

Therefore, there is no notable difference in exposure to infection sources, as environmental and behavioral factors play a greater role than biological ones. In addition, socio-economic conditions in endemic regions cause both men and women, as well as different age groups, to face similar levels of risk. Supporting this,

previous research reported that sex was not associated with leptospirosis incidence in Jakarta ($P = 0.770$)⁹. Likewise, other studies found no relationship between sex and leptospirosis cases in Semarang ($P = 0.052$)¹⁰.

B. Age Factor

The *p-value* was 0.808, and the RP value was 0.912 (0.435-1.915), This indicates that age does not have a significant influence on the incidence of leptospirosis in the Tulakan Community Health Center's working area, Pacitan Regency, in 2025, as shown by the confidence interval (CI) value exceeding 1, meaning age is not a significant factor. These findings are consistent with previous research, who reported that age was not associated with leptospirosis incidence in Semarang ($P = 1.000$)⁸. Likewise, other studies found no relationship between age and leptospirosis cases in Jakarta ($P = 0.663$)⁹. The results of this study also align with those of previous research, who concluded that age was not a significant factor in leptospirosis incidence in Yogyakarta, with a *p-value* of 0.51¹¹. The similarity between younger and older individuals is that both groups frequently work in rice fields or plantations, assist with harvesting, or share similar environmental exposures. Additionally, previous research stated that age had no association with leptospirosis incidence in Semarang ($P = 0.057$)¹⁰.

This leads to a relatively similar risk pattern between younger and older age groups. Other, more influential risk factors particularly behavioral factors such as not wearing protective boots, working in rice fields during flooding, or living near rivers tend to have a greater impact on leptospirosis incidence than age itself. These results align with previous studies, which highlights that environmental exposures, such as regularly working in rice fields with stagnant, contaminated water, serve as key pathways for leptospirosis transmission¹².

C. Occupation Factors

The *p-value* was 0.000, and the PR value was 15.054 (5.763-39.323), indicating that occupation had a significant influence on the occurrence of leptospirosis in the Tulakan Community Health Center's work area, Pacitan Regency, in 2025. Individuals engaged in high-

risk jobs were found to have a 15-fold greater likelihood of developing leptospirosis compared to those working in low-risk or non-hazardous occupations. This is because based on information from the Tulakan Community Health Center surveillance officers, Pacitan Regency, most of the population in the Pacitan District work as farmers and gardeners, where work is risky for contracting the virus that causes leptospirosis because it is often contaminated with water.

Farming and gardening are occupational risk factors for leptospirosis because these activities often involve direct contact with environments potentially contaminated by rodent urine (rats), which is the primary source of *Leptospira*. Farmers and gardeners often work in wetlands, rice fields, or flooded gardens, especially during the rainy season, and are therefore at risk of direct contact with contaminated soil and water. If water or soil is contaminated by rat urine containing *Leptospira*, the bacteria can enter the body through small wounds in the skin or mucous membranes such as (eyes, nose, and mouth). Furthermore, high rat populations in agricultural and plantation areas often provide ideal habitats because of their abundant food sources, such as rice, tubers, and fruit. This increases the likelihood of environmental contamination by *Rattus* urine. Farmers and gardeners often work without personal protective equipment (PPE), often without footwear or gloves, increasing the risk of direct contact with contaminated water or mud. Farming and gardening activities are generally conducted in areas with high rainfall and poor-drainage systems. These conditions favor the survival of *Leptospira* bacteria in the environment¹³.

Consistent with previous research, there is a relationship between occupations that carry a risk of contracting the virus that causes leptospirosis, such as farming and gardening, and the incidence of leptospirosis⁶. Another factor is not wearing personal protective equipment such as boots, sandals, and gloves while farming, which makes them highly susceptible to exposure to the virus that causes leptospirosis, especially if there are wounds or abrasions on the feet and hands. This explanation is in accordance with previous

research, which states that high-risk occupations related to water, such as farming, have a 1.79 times greater risk of leptospirosis than low-risk occupations¹⁴. Furthermore, the results of this study are also in line with previous research, who stated that jobs related to contact with water such as farming significantly affect the incidence of leptospirosis¹⁵. The results of previous research, stated that there is a significant relationship between risky jobs such as farming and the incidence of leptospirosis in Boyolali Regency with a value ($p = 0.02 < 0.05$)¹⁶.

D. Knowledge Factor

The *p-value* was 0.000, and the *PR value* was 3.689 (1.432-9.504) means that knowledge has a significant effect on the incidence of leptospirosis in the work area of the Tulakan Community Health Center, Pacitan Regency in 2025, and poor knowledge has a 3.6 times greater risk of leptospirosis in the work area of the Tulakan Community Health Center, Pacitan Regency in 2025 compared to good knowledge. Knowledge is an important determinant of leptospirosis incidence in high-risk areas. Low knowledge increases the risk of exposure because individuals do not implement appropriate preventive strategies. Good knowledge encourages individuals to implement clean and healthy living behaviors (PHBS), such as avoiding playing or working without protection in puddles that may be contaminated with rat urine. Low knowledge causes individuals to be unaware of the dangers of dirty environments, not maintain the cleanliness of their homes or waterways, and not use personal protective equipment when working in high-risk environments (e.g., farmers, gardeners, sewer workers, and fishermen). This is consistent with the results of previous research, who found a significant relationship between knowledge and leptospirosis prevention behavior ($p < 0.05$)¹⁷.

The results of previous research, stated that there is a significant relationship between the level of knowledge and the incidence of leptospirosis in Boyolali Regency with a value ($p = 0.004 < 0.05$)¹⁶.

Conclusion

Based on the results of the bivariate analysis, it was found that the variables of occupation and knowledge significantly influenced the

incidence of leptospirosis in the work area of the Tulakan Community Health Center, Pacitan Regency in 2025, with a *p-value* of 0.000 and a *PR value* of 15.054 for the occupation variable and a *p-value* of 0.005 and 3.689 for the knowledge variable.

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