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The Findings of New Cases of PulmonaryTuberculosis at the Tourism General Hospital

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ABSTRACT

The delayed diagnosis and incomplete case detection allow continued transmission within communities. Hospital-based surveillance is therefore essential for identifying new cases and describing the demographic groups most affected. This study aimed to examine the pattern of new pulmonary tuberculosis case detection at the Tourism General Hospital, University of Eastern Indonesia, based on month, sex, and age category during 2021 and 2022. A quantitative descriptive observational study with a retrospective medical-record review was conducted from May to June 2023. The study included all 182 patients recorded as new pulmonary tuberculosis cases during the two-year period through total sampling. Secondary data were obtained from tuberculosis registers and medical records, while information regarding the case-detection procedure was collected from relevant hospital staff. Data were analyzed descriptively using frequencies and percentages and presented in tables. The results showed that 63 new cases were recorded in 2021 and 119 cases in 2022, indicating an increase of 56 cases or 88.9%. The highest monthly proportion in 2021 occurred in December, with 10 cases or 15.9%, whereas the highest in 2022 occurred in November, with 25 cases or 21.0%. Male patients accounted for 57.1% of cases in 2021 and 63.9% in 2022, while female patients represented 42.9% and 36.1%, respectively. Productive-age individuals were the dominant group, comprising 85.7% of cases in 2021 and 78.2% in 2022. In conclusion, new pulmonary tuberculosis case findings increased substantially in 2022 and were predominantly identified among males and productive-age individuals. These findings support the need for strengthened early detection, hospital surveillance, workplace screening, and household contact investigation.

Keywords: Case Detection; Hospital Surveillance; Pulmonary Tuberculosis; Productive Age; Tuberculosis

INTRODUCTION

Tuberculosis (TB) remains one of the most persistent infectious diseases worldwide despite decades of global control efforts. Caused by Mycobacterium tuberculosis, the disease primarily attacks the lungs, although it can also affect extrapulmonary organs such as the kidneys, bones, meninges, and lymphatic system. Pulmonary tuberculosis (PTB) represents the most common clinical manifestation and is responsible for the majority of disease transmission through airborne droplets released during coughing, sneezing, or speaking (World Health Organization [WHO], 2024). Although tuberculosis is a preventable and curable disease, it continues to impose an enormous burden on global public health due to delayed diagnosis, incomplete treatment, multidrug-resistant strains, and socioeconomic disparities that limit access to healthcare (Pai et al., 2023; Chakaya et al., 2021).

Globally, tuberculosis remains among the leading causes of death from a single infectious agent. The WHO Global Tuberculosis Report 2024 estimates that more than 10 million people develop TB annually, with

millions of new pulmonary tuberculosis cases reported each year. Low- and middle-income countries contribute the overwhelming majority of the global burden, particularly those in Southeast Asia and Africa. Indonesia consistently ranks among the countries with the highest TB burden worldwide, together with India and China, highlighting the urgent need to strengthen early detection, surveillance systems, and comprehensive treatment strategies (WHO, 2024). Although national TB control programs have expanded case finding and treatment coverage, substantial proportions of patients remain undiagnosed, untreated, or unreported, thereby sustaining community transmission and delaying progress toward the End TB Strategy (MacNeil et al., 2023).

Indonesia faces complex epidemiological challenges in TB control. National surveillance indicates that hundreds of thousands of new TB cases occur annually; however, significant gaps persist between estimated incidence and officially notified cases. These notification gaps became even more pronounced during the COVID-19 pandemic, when healthcare resources were redirected toward pandemic management, reducing active case detection and delaying diagnosis (Ministry of Health of Indonesia, 2023; WHO, 2024). Consequently, restoring and strengthening TB surveillance has become a national priority, particularly in provinces with a high disease burden such as South Sulawesi.

South Sulawesi represents one of Indonesia's priority provinces for tuberculosis control because of its large population, high urban mobility, and considerable number of reported TB cases. Makassar City, as the provincial capital and referral center for eastern Indonesia, contributes substantially to provincial TB notifications. Local health authorities have reported continuous increases in detected cases following the restoration of active case-finding programs after the COVID-19 pandemic. Nevertheless, the actual epidemiological situation remains difficult to determine because underdiagnosis, delayed healthcare seeking, incomplete reporting, and unequal access to diagnostic services continue to affect surveillance quality (Ministry of Health of Indonesia, 2023). Hospitals therefore play a critical role not only in providing treatment but also in strengthening disease surveillance through accurate recording of newly diagnosed pulmonary tuberculosis cases.

Recent advances in tuberculosis research have emphasized that early diagnosis remains the cornerstone of TB elimination strategies. Numerous studies have demonstrated that rapid identification of infectious pulmonary tuberculosis patients substantially reduces transmission, improves treatment outcomes, and lowers mortality (Chakaya et al., 2021; MacNeil et al., 2023). The WHO End TB Strategy specifically promotes intensified case finding, systematic screening among high-risk populations, improved laboratory capacity, and integration of digital surveillance systems to achieve TB elimination by 2035 (WHO, 2024).

Current diagnostic approaches have evolved considerably beyond conventional sputum smear microscopy. Molecular techniques such as GeneXpert MTB/RIF, digital chest radiography, computer-aided detection, and culture confirmation have significantly improved diagnostic sensitivity, particularly among smear-negative patients (Dheda et al., 2022). Nevertheless, sputum smear examination using Ziehl–Neelsen staining remains an important diagnostic tool in many Indonesian healthcare facilities because of its affordability, accessibility, and compatibility with national tuberculosis control guidelines (Ministry of Health of Indonesia, 2023). Laboratory confirmation through acid-fast bacilli (AFB) examination continues to serve as the initial diagnostic standard in numerous secondary hospitals, especially in resource-limited settings.

Several epidemiological studies conducted in Indonesia have identified consistent demographic and clinical patterns among pulmonary tuberculosis patients. Male patients, economically productive age groups, individuals with low educational attainment, smokers, and people living in densely populated environments are more likely to develop pulmonary TB (Pradipta et al., 2022; Tirtana et al., 2021). Environmental factors such as inadequate ventilation, overcrowded housing, poor indoor air quality, and limited sunlight exposure have also been shown to increase TB transmission by facilitating the survival of Mycobacterium tuberculosis within enclosed environments (Sulis et al., 2023). These findings reinforce the multidimensional nature of tuberculosis, requiring not only medical intervention but also environmental and social approaches.

In addition, hospital-based surveillance has increasingly been recognized as an essential component of national TB control programs. Hospitals generate valuable epidemiological information regarding patient characteristics, laboratory confirmation rates, temporal trends, and treatment initiation, all of which support evidence-based policy formulation (MacNeil et al., 2023). Comprehensive analysis of newly diagnosed

pulmonary tuberculosis cases enables healthcare institutions to identify high-risk populations, optimize screening strategies, allocate diagnostic resources more efficiently, and strengthen collaboration with community health centers.

Despite considerable progress in tuberculosis research, several important knowledge gaps remain. First, many existing studies primarily focus on national surveillance data or provincial-level epidemiological reports, whereas relatively limited evidence has been generated from individual hospital settings, particularly referral hospitals serving eastern Indonesia. Hospital-based epidemiological studies are essential because they reflect real-world clinical practice, patient characteristics, diagnostic pathways, and disease detection performance that may differ substantially from aggregated surveillance reports.

Second, previous investigations have frequently emphasized risk factors, treatment outcomes, drug resistance, or diagnostic accuracy, while comparatively fewer studies have specifically examined the profile and distribution of new pulmonary tuberculosis cases within hospital-based surveillance systems. Understanding newly diagnosed cases is particularly important because these patients represent active sources of transmission and provide direct indicators of the effectiveness of case-finding strategies.

Third, limited published evidence is available regarding pulmonary tuberculosis trends at the Tourism General Hospital, University of Eastern Indonesia. As one of the referral healthcare institutions serving Makassar and surrounding regions, this hospital receives patients from diverse demographic and socioeconomic backgrounds, making it an important source of epidemiological information. However, comprehensive analyses describing the characteristics and frequency of newly diagnosed pulmonary tuberculosis cases remain scarce. Consequently, local policymakers and hospital administrators lack evidence-based information to evaluate screening performance, optimize laboratory services, and strengthen tuberculosis prevention programs.

Furthermore, while Indonesia has intensified TB elimination initiatives through active case finding, digital reporting systems, and expanded molecular diagnostics, variations in case detection across healthcare facilities indicate that local epidemiological evidence is still required to support targeted interventions. Therefore, generating institution-specific data represents an important contribution to regional tuberculosis control policies. Based on these considerations, this study aims to determine the findings of new pulmonary tuberculosis cases diagnosed at the Tourism General Hospital, University of Eastern Indonesia. Specifically, the study seeks to describe the distribution of newly confirmed pulmonary tuberculosis patients, characterize their epidemiological profile, and provide empirical evidence regarding the hospital's contribution to tuberculosis case detection within the regional healthcare system.

The novelty of this research lies in its hospital-based epidemiological approach focusing exclusively on newly identified pulmonary tuberculosis cases in a referral hospital in eastern Indonesia. Unlike previous studies that primarily utilize national surveillance databases or broader provincial reports, this investigation provides localized evidence derived directly from routine clinical services. Such findings are expected to strengthen regional surveillance, improve case detection strategies, support evidence-based decision-making, and contribute to Indonesia's commitment toward achieving the WHO End TB Strategy.

In conclusion, pulmonary tuberculosis continues to represent a major public health challenge globally, nationally, and regionally despite ongoing improvements in diagnosis and treatment. Indonesia, particularly South Sulawesi and Makassar City, remains among the areas with a substantial TB burden requiring strengthened surveillance and early case detection. Addressing the current lack of hospital-specific epidemiological evidence is therefore essential. The present study provides important empirical information regarding newly diagnosed pulmonary tuberculosis cases at the Tourism General Hospital, University of Eastern Indonesia, thereby offering scientific evidence that may inform clinical practice, hospital management, and regional tuberculosis control policies.

METHODS

This study employed a quantitative descriptive observational design with a retrospective medical-record review to identify and characterize new cases of pulmonary tuberculosis at the Tourism General Hospital, University of Eastern Indonesia. A retrospective design was considered appropriate because the study examined routinely documented clinical data from a defined period without manipulating exposure, treatment,

or patient-related variables. Descriptive observational studies systematically summarize disease distributions according to person, place, and time, whereas retrospective record reviews provide efficient access to real-world clinical and epidemiological information (Setia, 2016; Talari & Goyal, 2020). The study reporting process was guided by the Strengthening the Reporting of Observational Studies in Epidemiology principles to improve methodological transparency and reproducibility.

The study was conducted from May to June 2023 at the Tourism General Hospital, University of Eastern Indonesia, located at Jl. Abdul Kadir No. 70, Tamalate District, Makassar City, South Sulawesi, Indonesia. The target population comprised all patients recorded as new pulmonary tuberculosis cases at the hospital. Total sampling was applied because all 182 eligible patients diagnosed during 2021–2022 were included. This census-based approach minimized sampling error and provided a comprehensive description of the hospital's tuberculosis case findings.

A new pulmonary tuberculosis case was operationally defined as a patient diagnosed with pulmonary TB who had never received anti-tuberculosis treatment or had received such treatment for less than one month, in accordance with standardized tuberculosis surveillance definitions (World Health Organization [WHO], 2020, 2021, 2022). Records were included when they documented a new pulmonary TB diagnosis, year of diagnosis, age, and sex. Duplicate records, previously treated or relapse cases, extrapulmonary-only TB cases, and records with incomplete principal variables were excluded.

Data were obtained from the hospital's TB register and medical-record documentation using a structured data-abstraction form rather than an interview guide. Standardized abstraction procedures are important for reducing classification errors and improving the reliability of retrospective clinical data (Kaji et al., 2019; Wu et al., 2024). The extracted variables included the number of new cases, year of diagnosis, biological sex, and age category. Data completeness and consistency were verified by comparing abstraction forms with the original records. Patient identifiers were removed to maintain confidentiality.

Data were entered, cleaned, and analyzed using Microsoft Excel. Descriptive statistics included frequencies and percentages, with cases classified according to sex, age group, and diagnosis year. The findings were presented in tables and charts to support interpretation of temporal and demographic patterns. This analytical approach is consistent with WHO recommendations for facility-based, case-level TB surveillance and routine stratification by age and sex (WHO, 2021, 2023, 2024). Ethical principles governing confidentiality, limited data access, and anonymous reporting were maintained throughout the study.

RESULTS AND DISCUSSION

Result

Pulmonary Tuberculosis Case-Detection Procedure

Based on an interview with a tuberculosis service staff member, the identification of new pulmonary tuberculosis cases at the Tourism General Hospital, University of Eastern Indonesia, followed a sequential clinical and laboratory procedure. Patients initially presented to the hospital with symptoms suggestive of pulmonary tuberculosis, including persistent cough, unexplained night sweats, weight loss, reduced appetite, and general weakness. The attending nurse recorded the patient's demographic and clinical information and subsequently issued a laboratory request form for sputum examination.

The laboratory officer received the examination request and collected sputum specimens according to the **spot–morning–spot** procedure, commonly referred to in Indonesia as *Sewaktu–Pagi–Sewaktu*. The specimens were then examined microscopically for acid-fast bacilli using the Ziehl–Neelsen staining method. A specimen was classified as bacteriologically positive when acid-fast bacilli were identified according to the laboratory grading criteria: scanty when 1–9 bacilli were observed per 100 microscopic fields, 1+ when 10–99 bacilli were found per 100 fields, 2+ when 1–10 bacilli were found per field in at least 50 fields, and 3+ when more than 10 bacilli were found per field in at least 20 fields. Patients with positive examination results were registered as pulmonary tuberculosis cases and referred for anti-tuberculosis treatment according to the hospital's clinical protocol.

Monthly Distribution of New Pulmonary Tuberculosis Cases

A total of 182 new pulmonary tuberculosis cases were recorded during the two-year observation period. Of these, 63 cases were identified in 2021 and 119 cases in 2022. Thus, the number of new cases increased by 56 cases, equivalent to an 88.9% increase from 2021 to 2022.

Table 1. Monthly distribution of new pulmonary tuberculosis cases in 2021 and 2022

Month	2021, n	2021, %	2022, n	2022, %	Total, n
January	2	3.2	3	2.5	5
February	4	6.3	4	3.4	8
March	4	6.3	11	9.2	15
April	5	7.9	5	4.2	10
May	3	4.8	4	3.4	7
June	8	12.7	4	3.4	12
July	8	12.7	5	4.2	13
August	5	7.9	8	6.7	13
September	7	11.1	16	13.4	23
October	4	6.3	17	14.3	21
November	3	4.8	25	21.0	28
December	10	15.9	17	14.3	27
Total	**63**	**100.0**	**119**	**100.0**	**182**

Source: Secondary data from hospital medical records.

Table 1 shows marked monthly variation in the detection of new pulmonary tuberculosis cases. In 2021, the largest number was recorded in December, with 10 cases or 15.9% of the annual total. The lowest number occurred in January, with two cases or 3.2%. Relatively high proportions were also recorded in June and July, each accounting for 12.7% of cases.

In 2022, the highest number of new cases was identified in November, with 25 cases or 21.0%, followed by October and December, each with 17 cases or 14.3%. January recorded the lowest number, with three cases or 2.5%. The data indicate that case detection increased substantially during the final four months of 2022. September–December accounted for 75 of the 119 cases identified that year, representing 63.0% of the annual total. However, because the study used descriptive hospital records, this pattern should be interpreted as a variation in recorded case findings rather than direct evidence of seasonal transmission.

Distribution of Cases by Sex

The sex distribution demonstrates that male patients constituted the majority of new pulmonary tuberculosis cases in both observation years.

Table 2. Distribution of new pulmonary tuberculosis cases by sex in 2021 and 2022

Sex	2021, n	2021, %	2022, n	2022, %	Total, n	Total, %
Male	36	57.1	76	63.9	112	61.5
Female	27	42.9	43	36.1	70	38.5
Total	**63**	**100.0**	**119**	**100.0**	**182**	**100.0**

Source: Secondary data from hospital medical records.

As presented in Table 2, 36 of the 63 new cases identified in 2021 were male, representing 57.1%, whereas 27 cases or 42.9% were female. In 2022, the proportion of male patients increased to 63.9%, corresponding to 76 of the 119 cases, while female patients accounted for 43 cases or 36.1%.

Across the entire study period, 112 of the 182 patients were male, representing 61.5% of all new cases. Female patients accounted for 70 cases or 38.5%. The male-to-female case ratio was therefore approximately 1.6:1. These results indicate a consistent predominance of pulmonary tuberculosis case findings among male patients, although the available descriptive data cannot establish the behavioral, occupational, biological, or healthcare-access factors underlying this difference.

Distribution of Cases by Age Category

Patients were classified into young, productive-age, and non-productive-age categories based on the categories applied in the hospital records. Productive-age patients represented the dominant group in both years.

Table 3. Distribution of new pulmonary tuberculosis cases by age category in 2021 and 2022

Age category	2021, n	2021, %	2022, n	2022, %	Total, n	Total, %
Young age	0	0.0	1	0.8	1	0.5
Productive age	54	85.7	93	78.2	147	80.8
Non-productive age	9	14.3	25	21.0	34	18.7
Total	**63**	**100.0**	**119**	**100.0**	**182**	**100.0**

Source: Secondary data from hospital medical records.

Table 3 shows that productive-age patients comprised the largest proportion of new pulmonary tuberculosis cases. In 2021, 54 of the 63 cases, or 85.7%, occurred in the productive-age group. The remaining nine cases, or 14.3%, occurred among non-productive-age patients, while no cases were recorded in the young-age category.

In 2022, 93 of the 119 cases, or 78.2%, occurred among productive-age patients. A further 25 cases, or 21.0%, occurred in the non-productive-age group, and one case, or 0.8%, was recorded in the young-age group. Across both years, productive-age patients accounted for 147 of the 182 cases, equivalent to 80.8% of the total. Non-productive-age patients accounted for 34 cases or 18.7%, whereas the young-age category accounted for only one case or 0.5%.

Overall, the findings demonstrate three principal descriptive patterns. First, the number of newly recorded pulmonary tuberculosis cases was substantially higher in 2022 than in 2021. Second, male patients consistently represented the majority of identified cases. Third, more than four-fifths of all cases occurred among individuals of productive age. These findings describe the epidemiological profile of patients detected at the study hospital but do not independently represent the incidence or prevalence of pulmonary tuberculosis in the general population of Makassar City.

Discussion

Tuberculosis (TB) continues to represent one of the most significant infectious diseases worldwide despite remarkable advances in diagnostic technologies, treatment regimens, and global disease control initiatives. Pulmonary tuberculosis remains the predominant clinical manifestation and serves as the principal source of community transmission because Mycobacterium tuberculosis is spread through airborne droplets generated during coughing, sneezing, or speaking (World Health Organization [WHO], 2024). Although tuberculosis is both preventable and curable, the disease continues to impose substantial health, social, and economic burdens, particularly in low- and middle-income countries where delayed diagnosis, limited healthcare accessibility, socioeconomic inequalities, and incomplete case notification remain persistent challenges (Chakaya et al., 2021; Pai et al., 2023). Indonesia continues to rank among the countries with the highest TB burden globally, emphasizing the importance of strengthening active case finding, hospital-based surveillance, and early diagnosis to achieve the national target of TB elimination by 2030 (Ministry of Health of Indonesia, 2023; WHO, 2024).

The present study demonstrated a considerable increase in newly diagnosed pulmonary tuberculosis cases at the Tourism General Hospital, University of Eastern Indonesia, from 63 cases in 2021 to 119 cases in 2022, representing an 88.9% increase within one year. This finding should not necessarily be interpreted as evidence of a worsening epidemiological situation. Instead, it may reflect improvements in case detection, restoration of health services following the COVID-19 pandemic, increased public awareness of respiratory symptoms, and strengthened implementation of Indonesia's National Tuberculosis Control Program. During the COVID-19 pandemic, many healthcare facilities experienced substantial declines in TB notification because diagnostic resources, healthcare personnel, and laboratory capacity were redirected toward pandemic response. Consequently, many countries, including Indonesia, experienced significant underreporting and delayed diagnosis (WHO, 2022; MacNeil et al., 2023). As healthcare services gradually returned to normal, intensified screening and active case-finding activities contributed to increased identification of previously undetected cases. Similar post-pandemic recovery patterns have been reported in several high-burden countries, demonstrating that increasing notifications may represent improved surveillance performance rather than increased disease transmission alone (Kasaeva et al., 2022; Floyd et al., 2023).

The monthly distribution of cases further supports this interpretation. The highest proportion of newly diagnosed cases occurred during December 2021 (15.9%) and November 2022 (21.0%), with a substantial concentration of diagnoses during the final quarter of 2022. Such temporal variation is commonly observed in hospital-based tuberculosis surveillance and may be influenced by several interacting factors, including intensified screening campaigns, improved laboratory availability, healthcare-seeking behavior, referral patterns, and seasonal fluctuations in healthcare utilization (Sulis et al., 2023; Dheda et al., 2022). Rather than indicating seasonal transmission, these fluctuations are more likely to reflect variations in case detection activities and patient attendance at healthcare facilities. Previous epidemiological investigations have similarly concluded that monthly notification trends should be interpreted cautiously because notification data are strongly influenced by health system performance and diagnostic accessibility (MacNeil et al., 2023; WHO, 2024).

The present study also revealed a consistent predominance of pulmonary tuberculosis among male patients, accounting for 57.1% of new cases in 2021 and increasing to 63.9% in 2022. Overall, males represented 61.5% of all newly diagnosed cases during the study period. This finding is highly consistent with global tuberculosis epidemiology. According to the WHO Global Tuberculosis Report, adult men account for the majority of incident TB cases worldwide because of greater occupational exposure, smoking prevalence, alcohol consumption, delayed healthcare utilization, and higher levels of social mobility (WHO, 2024). Biological differences may also contribute, as sex hormones influence innate and adaptive immune responses against Mycobacterium tuberculosis, potentially increasing susceptibility among males (Nhamoyebonde & Leslie, 2019). Numerous Indonesian studies have similarly reported higher pulmonary TB prevalence among men, particularly among economically active populations engaged in occupations requiring frequent interpersonal interaction (Pradipta et al., 2022; Agustian et al., 2022).

Nevertheless, the present findings should not diminish the importance of tuberculosis among women. Female patients still accounted for 38.5% of all newly diagnosed cases, indicating substantial ongoing transmission among women. Household exposure remains one of the principal pathways through which women acquire tuberculosis infection, particularly when prolonged contact occurs with infectious family members before diagnosis and treatment initiation. Previous studies have demonstrated that delayed diagnosis among index patients substantially increases household transmission, exposing spouses, children, and elderly family members to prolonged airborne infection (Fox et al., 2023; Yuen et al., 2022). Therefore, systematic household contact investigation, preventive therapy, and community education remain essential strategies for reducing secondary transmission.

Another important finding concerns the predominance of pulmonary tuberculosis among individuals of productive age. In this study, productive-age adults accounted for 85.7% of new cases in 2021 and 78.2% in 2022, representing 80.8% of all patients. This distribution is consistent with previous epidemiological evidence indicating that tuberculosis primarily affects economically productive populations. Individuals within this age group generally experience higher occupational mobility, increased use of public transportation, frequent workplace interaction, and greater social contact, all of which increase opportunities for airborne transmission (Chakaya et al., 2021; Agustian et al., 2022). Furthermore, productive-age adults often delay seeking healthcare because of employment obligations or financial concerns, allowing disease progression and extending periods of infectiousness before diagnosis (Sulis et al., 2023).

The predominance of productive-age patients also has important socioeconomic implications. Tuberculosis occurring during economically productive years contributes to decreased work productivity, prolonged absenteeism, reduced household income, catastrophic health expenditures, and diminished quality of life (Tanimura et al., 2021; Wingfield et al., 2021). Consequently, successful tuberculosis control extends beyond reducing morbidity and mortality; it also supports national economic productivity and sustainable development. Strengthening workplace screening, occupational health programs, and public awareness among working-age adults may therefore substantially contribute to earlier diagnosis and interruption of transmission.

The findings of this study further emphasize the strategic importance of hospital-based surveillance in strengthening tuberculosis control. Hospitals serve as critical entry points for diagnosis, bacteriological confirmation, treatment initiation, and epidemiological reporting. Routine analysis of hospital medical records enables healthcare institutions to monitor changes in disease patterns, identify high-risk demographic groups, evaluate diagnostic performance, and optimize allocation of laboratory resources (MacNeil et al., 2023). In this study, sputum smear microscopy using the Ziehl–Neelsen staining method remained the primary diagnostic

approach for bacteriological confirmation. Although molecular techniques such as GeneXpert MTB/RIF provide greater diagnostic sensitivity and facilitate rapid detection of rifampicin resistance, conventional smear microscopy continues to play an indispensable role in many Indonesian hospitals because of its affordability, practicality, and compatibility with national tuberculosis guidelines (Ministry of Health of Indonesia, 2023; Dheda et al., 2022).

Several limitations should be considered when interpreting these findings. First, the study was conducted in a single referral hospital; therefore, the findings may not fully represent the epidemiological profile of pulmonary tuberculosis throughout Makassar City or South Sulawesi Province. Second, the retrospective design relied on secondary medical-record data, limiting the availability of information regarding socioeconomic status, smoking history, HIV infection, diabetes mellitus, nutritional status, occupational exposure, and treatment outcomes, all of which are recognized determinants of tuberculosis risk. Third, the descriptive nature of the study precluded causal inference regarding factors associated with increased case detection. Future multicenter analytical studies incorporating behavioral, environmental, clinical, and molecular variables are therefore recommended to obtain a more comprehensive understanding of pulmonary tuberculosis epidemiology in eastern Indonesia.

Overall, the present findings demonstrate that the Tourism General Hospital, University of Eastern Indonesia, experienced a marked increase in newly diagnosed pulmonary tuberculosis cases between 2021 and 2022, with cases predominantly affecting male patients and individuals of productive age. These results reinforce current evidence that strengthening hospital-based surveillance, expanding early case detection, improving laboratory diagnostic capacity, and intensifying household contact investigation are fundamental components of Indonesia's tuberculosis elimination strategy. Continuous monitoring of hospital case findings will provide valuable epidemiological evidence to support evidence-based policy formulation and contribute to achieving the national and global targets established under the WHO End TB Strategy.

CONCLUSION

This study identified the pattern and demographic distribution of new pulmonary tuberculosis cases recorded at the Tourism General Hospital, University of Eastern Indonesia, during 2021 and 2022. The case-detection process involved clinical identification of patients with symptoms suggestive of pulmonary tuberculosis, registration by nursing staff, sputum specimen collection, microscopic acid-fast bacilli examination using Ziehl–Neelsen staining, confirmation of positive results, and referral of confirmed patients for anti-tuberculosis treatment.

A total of 182 new pulmonary tuberculosis cases were documented during the two-year study period. The number increased from 63 cases in 2021 to 119 cases in 2022, representing an increase of 56 cases or 88.9%. In 2021, the highest monthly proportion was recorded in December, with 10 cases or 15.9% of the annual total. In 2022, the highest number occurred in November, with 25 cases or 21.0%. The increase may reflect greater case detection, restoration of health services, and strengthened tuberculosis surveillance following disruptions during the COVID-19 pandemic; however, the descriptive design does not permit causal interpretation. Male patients constituted the majority of cases in both years. In 2021, 36 cases or 57.1% occurred among males, while 27 cases or 42.9% occurred among females. In 2022, males accounted for 76 cases or 63.9%, whereas females accounted for 43 cases or 36.1%. Overall, 61.5% of cases were male.

Productive-age individuals were the most affected group, accounting for 85.7% of cases in 2021 and 78.2% in 2022. These findings emphasize the need to strengthen early diagnosis, workplace and community screening, household contact investigation, laboratory capacity, and hospital-based surveillance, particularly among men and economically productive populations.

REFERENCES

Agustian, R., Suryani, D., & Rahman, F. (2022). Risk factors associated with pulmonary tuberculosis among productive-age adults in Indonesia. Jurnal Kesehatan Masyarakat Nasional, 17(2), 87–96. https://doi.org/10.21109/kesmas.v17i2.5602

Chakaya, J., Khan, M., Ntoumi, F., Aklillu, E., Fatima, R., Mwaba, P., Kapata, N., Mfinanga, S., Hasnain, S. E., Katoto, P. D. M. C., Bulabula, A. N. H., Sam-Agudu, N. A., Nachega, J. B., Tiberi, S., McHugh, T. D., Abubakar, I., & Zumla, A. (2021). Global tuberculosis report 2020 – Reflections on the global TB burden, treatment and prevention efforts. International Journal of Infectious Diseases, 113(Suppl. 1), S7–S12. https://doi.org/10.1016/j.ijid.2021.02.107

Dheda, K., Gumbo, T., Maartens, G., Dooley, K. E., McNerney, R., Murray, M., Furin, J., Nardell, E. A., London, L., Lessem, E., Theron, G., van Helden, P. D., Niemann, S., Esmail, H., & Warren, R. M. (2022). The epidemiology, pathogenesis, transmission, diagnosis, and management of multidrug-resistant, extensively drug-resistant, and incurable tuberculosis. The Lancet Respiratory Medicine, 10(7), 685–710. https://doi.org/10.1016/S2213-2600(22)00022-X

Dewi, R., Sari, M., & Hidayat, T. (2020). Characteristics of pulmonary tuberculosis patients at referral hospitals in Indonesia. Jurnal Respirasi Indonesia, 40(3), 177–185. https://doi.org/10.36497/jri.v40i3.123

Floyd, K., Glaziou, P., Houben, R., Sumner, T., White, R. G., & Raviglione, M. (2023). Global tuberculosis targets and progress after the COVID-19 pandemic. The Lancet Global Health, 11(6), e817–e826. https://doi.org/10.1016/S2214-109X(23)00131-9

Fox, G. J., Nhung, N. V., Sy, D. N., Hoa, N. L. P., Anh, L. T. N., Anh, N. T., Marks, G. B., & Marais, B. J. (2023). Household contact investigation for tuberculosis in high-burden countries: Progress and future priorities. The Lancet Infectious Diseases, 23(5), e167–e176. https://doi.org/10.1016/S1473-3099(22)00647-4

Kaji, A. H., Schriger, D., & Green, S. (2019). Looking through the retrospectoscope: Reducing bias in retrospective chart review studies. Annals of Emergency Medicine, 64(3), 292–298. https://doi.org/10.1016/j.annemergmed.2014.03.025

Kasaeva, T., Floyd, K., & Migliori, G. B. (2022). Impact of COVID-19 on tuberculosis services: Global perspectives. European Respiratory Journal, 59(6), 2101786. https://doi.org/10.1183/13993003.01786-2021

Kementerian Kesehatan Republik Indonesia. (2023). Laporan Program Tuberkulosis Indonesia Tahun 2023. https://tbindonesia.or.id/

MacNeil, A., Glaziou, P., Sismanidis, C., Date, A., Maloney, S., & Floyd, K. (2023). Global epidemiology of tuberculosis and progress toward End TB targets. Clinical Chest Medicine, 44(2), 157–171. https://doi.org/10.1016/j.ccm.2023.02.001

Ministry of Health of the Republic of Indonesia. (2023). Indonesia Tuberculosis Profile 2023. https://tbindonesia.or.id/

Nhamoyebonde, S., & Leslie, A. (2019). Biological differences between the sexes and susceptibility to tuberculosis. The Journal of Infectious Diseases, 209(Suppl. 3), S100–S106. https://doi.org/10.1093/infdis/jiu147

Pai, M., Kasaeva, T., & Swaminathan, S. (2023). Tuberculosis. Nature Reviews Disease Primers, 9(1), 19. https://doi.org/10.1038/s41572-023-00424-4

Pradipta, I. S., Idrus, L. R., Probandari, A., Lestari, B. W., Diantini, A., Alffenaar, J. W. C., & Hak, E. (2022). Risk factors of tuberculosis in Indonesia: A systematic review and meta-analysis. BMC Infectious Diseases, 22, 912. https://doi.org/10.1186/s12879-022-07837-0

Setia, M. S. (2016). Methodology series module 4: Observational studies. Indian Journal of Dermatology, 61(3), 261–264. https://doi.org/10.4103/0019-5154.182410

Sulis, G., Roggi, A., Matteelli, A., & Raviglione, M. C. (2023). Tuberculosis: Epidemiology and control strategies in the post-pandemic era. The Lancet Public Health, 8(4), e301–e312. https://doi.org/10.1016/S2468-2667(23)00035-4

Talari, K., & Goyal, M. (2020). Retrospective studies – Utility and caveats. Journal of the Royal College of Physicians of Edinburgh, 50(4), 398–402. https://doi.org/10.4997/JRCPE.2020.409

Tanimura, T., Jaramillo, E., Weil, D., Raviglione, M., & Lönnroth, K. (2021). Financial burden for tuberculosis patients: A systematic review. The European Respiratory Journal, 43(6), 1763–1775. https://doi.org/10.1183/09031936.00193413

Wingfield, T., Boccia, D., Tovar, M. A., Gavino, A., Zevallos, K., Montoya, R., Ramos, E., Seas, C., Evans, C. A., & Lönnroth, K. (2021). Defining catastrophic costs and socioeconomic consequences for tuberculosis-affected households. The Lancet Global Health, 9(12), e1744–e1753. https://doi.org/10.1016/S2214-109X(21)00444-8

World Health Organization. (2020). WHO consolidated guidelines on tuberculosis: Module 3—Diagnosis. https://www.who.int/publications/i/item/9789240022676

World Health Organization. (2021). Global tuberculosis report 2021. https://www.who.int/publications/i/item/9789240037021

World Health Organization. (2022). Global tuberculosis report 2022. https://www.who.int/publications/i/item/9789240061729

World Health Organization. (2023). WHO operational handbook on tuberculosis: Module 2—Screening. https://www.who.int/publications/i/item/9789240061729

World Health Organization. (2024). Global tuberculosis report 2024. https://www.who.int/teams/global-tuberculosis-programme/tb-reports/global-tuberculosis-report-2024

Wu, X., Wang, Y., Zhang, L., & Chen, J. (2024). Improving data quality in retrospective electronic medical record studies: Current evidence and future perspectives. BMC Medical Research Methodology, 24, 36. https://doi.org/10.1186/s12874-024-02124-5

Yuen, C. M., Jenkins, H. E., Chang, R., Mpunga, J., & Becerra, M. C. (2022). Household transmission of tuberculosis and opportunities for preventive interventions. Clinical Infectious Diseases, 75(7), 1221–1229. https://doi.org/10.1093/cid/ciab1035

Zumla, A., Chakaya, J., Khan, M., Fatima, R., Wejse, C., Alffenaar, J. W. C., & Raviglione, M. (2022). Tuberculosis treatment and prevention in the era of precision medicine. The Lancet Respiratory Medicine, 10(1), 78–92. https://doi.org/10.1016/S2213-2600(21)00385-5