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Forecasting Dropout Pulmonary TB Control Through the Swot Program and Mapping of at-Risk Areas in Batang District

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A B S T R A C T

Pulmonary Tuberculosis in Indonesia is still a target for intervention, especially after the Indonesian State launched a TB-free Indonesia program by 2030. This has had a lot of opposition, especially in the treatment process and there are still many TB patients who drop out and even have MDR (Multidrug Resistance TB) status. TB cases in Batang Regency in 2023 increased to 1332 cases, higher than in 2022 which was 1192 cases. This research aims to carry out Forecasting for Controlling drop-out pulmonary TB through the SWOT Program and Mapping of Risk Areas in Batang Regency. This research is a descriptive study with SWOT analysis and Forecasting for Controlling drop-out pulmonary TB, collecting initial data by mapping drop-out TB cases. The research subjects were TB program holders, Head of P2PM, and Technical Implementers at Community Health Centers and Hospitals as well as Triangulation informants, namely Drop Out TB patients. The research results showed that the number of pulmonary TB cases that dropped out in Batang Regency was 111 cases. Drop Pulmonary TB cases were dominant in the age range 51-60 years with 29 cases (26.1%), 72 cases (64.9%) of male gender and 106 drop-out TB sufferers who went to the hospital for treatment. (95.5%). The distribution of Drop Out Pulmonary TB Cases is in the Batang sub-district with 34 cases. Based on the SWOT matrix analysis, it was found that strategies for controlling pulmonary TB dropout in Batang Regency that could be implemented were adding TCM tools, adding network bandwidth to the system, carrying out Information and Education Communication (KIE) to patients, families and the community, ensuring the PMO carried out its duties well

INTRODUCTION

According to WHO in the 2020 Global Tuberculosis Report, 10 million people in the world suffer from tuberculosis (TB) and it causes 1.2 million people to die every year. The trend of TB prevalence continues to increase and has not been resolved optimally until now there are still many cases of TB relapse or relapse and even death. The large number of cases of TB relapse or recurrence and even death is because many TB sufferers stop taking TB medication (OAT) or drop out (Ministry of Health, 2022).

The incidence of deaths caused by TB is 93 thousand out of the total number of TB cases of 824 thousand in 2021. So Indonesia ranks third in the world in terms of TB infections after India and China (Ministry of Health, 2022). Some TB cases in Indonesia are TB cases with positive BTA which require a long time to be treated, namely a minimum of 6 months to 12 months. The length of treatment is what causes many patients to not complete TB treatment (drop out) and even have MDR (Multidrug Resistance TB) status. This is what causes TB treatment to fail, which makes TB sufferers worse and even die (Carolia & Mardhiyyah, 2016).

Batang Regency has the highest TB prevalence in Central Java. TB cases in Batang Regency in 2023 will increase by 1332 cases, higher than in 2022 which was 1192 cases (Batang District Health Office, 2024). With the increasing number of TB cases in Batang Regency, appropriate strategies are needed to overcome this problem, plus the large number of TB dropout cases which is one of the causes of the large number of deaths caused by TB disease (Irawan, 2023).

Therefore, researchers are interested in conducting a research entitled "Forecasting for Controlling Drop Out Pulmonary TB through SWOT Programs and Mapping Risk Areas in Batang Regency"

LITERATURE REVIEW

The government has launched several TB control programs including TB dropout cases such as providing IEC related to TB control, TB TOSS, PMO (Medicine Taking Companion) up to TB elimination (USAID 2019). The TB Elimination program requires an acceleration strategy through 6 steps, namely strengthening the role and leadership of district/city-based programs, increasing access to quality services, controlling risk factors for TB transmission, increasing partnerships, increasing community independence, strengthening program management, and strengthening TB systems and management through various efforts including research and development (RI Ministry of Health. 2019)

METHODOLOGY

This research is a descriptive study using SWOT analysis which contains Internal analysis (Weaknesses and Strengths) and External Analysis (Threats and Opportunities) as well as Forecasting analysis for Controlling Drop Pulmonary TB in Batang Regency. This research also carried out a spatial analysis to determine the mapping of TB dropout cases in the Batang Regency.

The subjects for mapping in this research were pulmonary TB sufferers and pulmonary TB dropouts in Batang Regency and the subjects for qualitative data were TB program holders, Head of P2PM, and Technical Implementers at Community Health Centers and Hospitals as well as Triangulation informants,

namely Drop Out TB patients. This research data analysis uses three methods, namely Descriptive Analysis, Spatial Analysis, and SWOT Analysis.

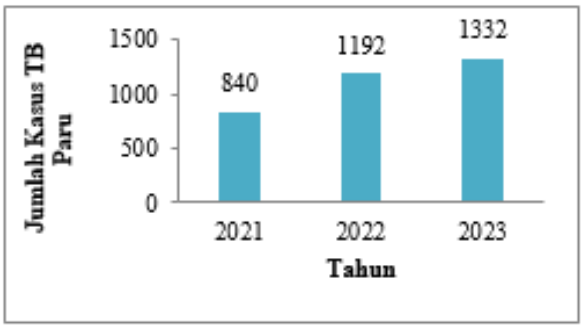
RESULTS AND DISCUSSION

A. Overview of Pulmonary TB Cases in Batang Regency

1. TB Cases in the Last 3 Years (2021, 2022 and 2023)

Pulmonary TB cases in Batang Regency increase every year, from data from the Batang Regency Health Service it is known that in 2021 there were 840 cases, increasing in 2022 by 1192 cases, and in 2023 it will increase again to 1332 cases.

Figure 1. TB Cases in the Last 3 Years (2021, 2022 and 2023)

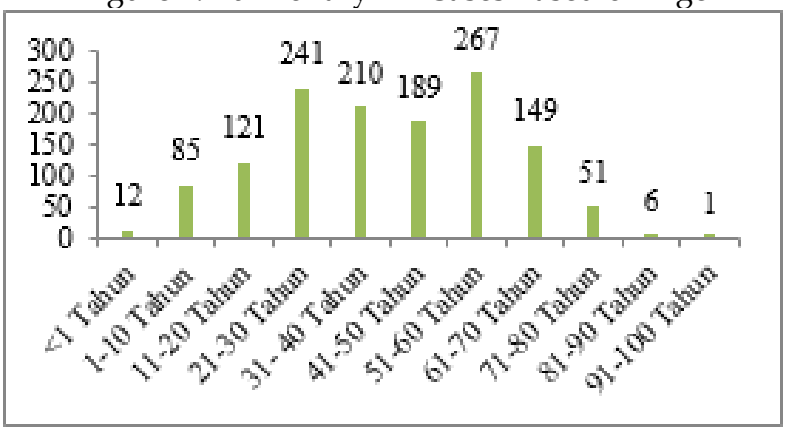


Pulmonary TB cases in Batang Regency increase every year. Therefore, it is important to map pulmonary TB cases to find out which areas are endemic for pulmonary TB so that pulmonary TB control activities will focus on the right areas. Apart from that, it is necessary to carry out internal and external analysis as a first step in formulating an effective and efficient strategy for dealing with pulmonary TB cases in Batang Regency (Irawan, 2023).

1. Pulmonary TB Cases Based on Age

Pulmonary TB cases in Batang Regency are mostly found in the age range of 21-60 years. Based on data from the Batang Health Office, it is known that there were 241 cases of pulmonary TB in the age range 21-30 years (18.1%), 210 cases aged 31-40 years (15.8%), 189 cases aged 41-50 years (189 years). 14.2%), and aged 51-60 years were 267 cases (20.0%). In Batang Regency, TB cases were also found in children, namely 85 cases aged 1-10 years (6.4%), and 12 cases (0.9%) were found in those aged less than 1 year.

Figure 2. Pulmonary TB Cases Based on Age

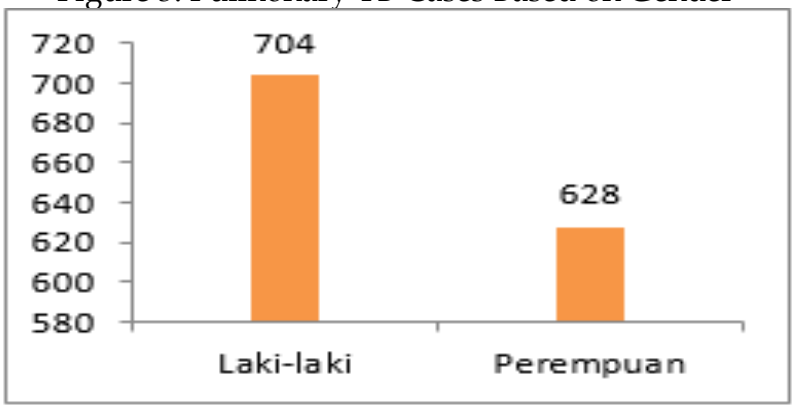


In Batang Regency, the highest number of pulmonary TB cases is in the productive age group. Productive age is the age when people are still active in doing work and interacting with other people. This research is in line with the research of Nopita et al, (2023), from the results of this study it was found that 68.4% of pulmonary TB sufferers were of productive age (Nopita, 2023)

2. Pulmonary TB Cases Based on Gender

The majority of pulmonary TB sufferers in Batang district are men. From data from the Batang Health Office, it is known that there were 704 cases of pulmonary TB in men (52.9%) and 628 cases in women (47.1%).

Figure 3. Pulmonary TB Cases Based on Gender

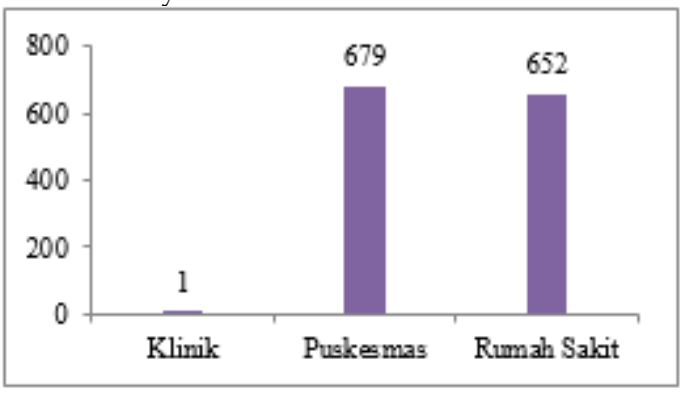


In Batang Regency, more men are diagnosed with pulmonary TB than women. Men spend most of their time outside the home working and interacting with other people. This is the reason why men are more susceptible to contracting pulmonary TB than women. Apart from that, the large number of men who smoke can reduce the body's immunity so that they are more likely to get pulmonary TB (Noerfitra, 2023).

3. Pulmonary TB Cases Based on Health Service Facilities

Based on data from the Batang Regency Health Office, it is known that 679 people (51.0%) of pulmonary TB sufferers received treatment at the community health center, 652 people (48.9%) at the hospital, and only 1 person (0.1%) did it. TB treatment at the clinic.

Figure 4. Pulmonary TB Cases Based on Health Service Facilities

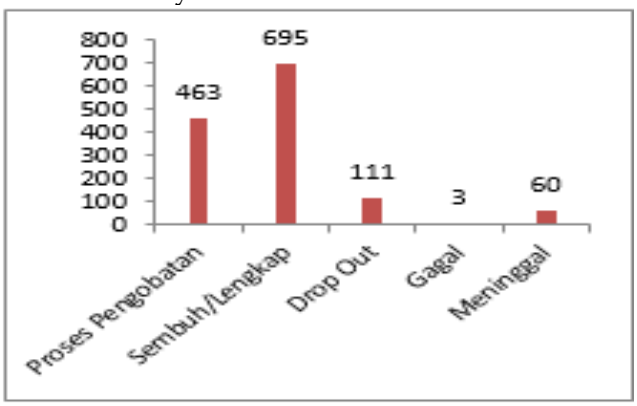


Many pulmonary TB sufferers in Batang Regency choose to seek treatment at the Community Health Center. Apart from being easily accessible because the location is not far from home, the availability or consistent and free supply of medicines can contribute to the success of TB treatment. Pulmonary TB sufferers will comply with treatment if health facilities are consistent in providing good services (Setyanur, 2023).

4. TB Cases Based on Treatment Success

Based on data from the Batang Regency Health Office, it is known that 463 people (34.9%) were still undergoing treatment for pulmonary TB, 695 people were declared cured or had complete treatment (52.2%), 111 people (8) dropped out of treatment or dropped out. .3%), 3 people (0.2%) failed and 60 people (4.5%) died.

Figure 5. Pulmonary TB Cases Based on Treatment Success



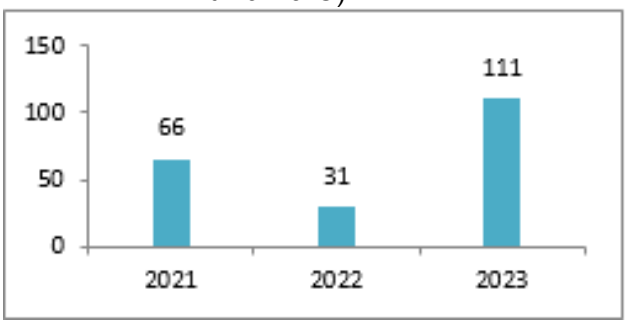
Based on the results of the data analysis, it can be seen that the success rate for pulmonary TB treatment in Batang Regency was 79.98%. The achievement of pulmonary TB treatment in Batang Regency has not met the target set by the Indonesian Ministry of Health, namely 95%. Many factors cause the success target for TB treatment in Batang Regency to not be achieved, both internal and external factors. Internal factors include a lack of personnel implementing the pulmonary TB elimination program, late disbursement of funds for the pulmonary TB program due to the complexity of the disbursement system, and limited TB drugs (OAT) for pulmonary TB sufferers in children. External factors, namely that sufferers cannot accept that they have been diagnosed with TB, there is still a negative stigma about TB in society, public knowledge about pulmonary TB is still low and the side effects of TB drugs are further reducing the condition of pulmonary TB sufferers.

B. Overview of Drop Out Pulmonary TB Cases In Batang Regency

1. Pulmonary TB Cases Dropped Out in the Last 3 Years (2021, 2022 and 2023)

Based on data from the Batang Regency Health Office, it is known that there were 66 cases of Drop Out Pulmonary TB in 2021, decreasing in 2022 to 31 cases, but increasing sharply in 2023 to 111 cases.

Figure 6. Drop Out Pulmonary TB Cases in the Last 3 Years (2021, 2022 and 2023)

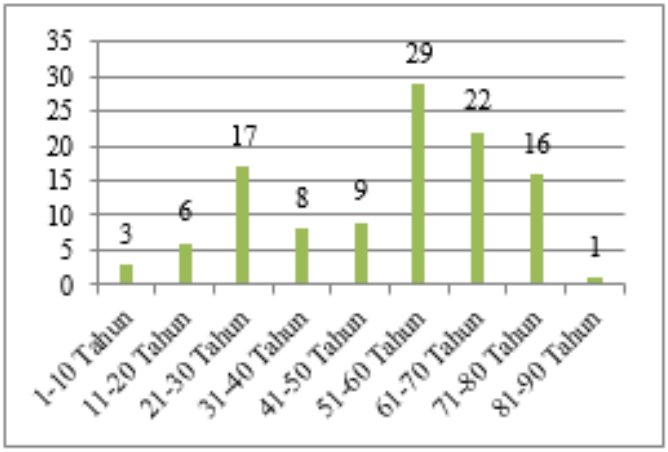


Pulmonary TB dropout cases in Batang Regency will increase sharply in 2023. This requires special attention from the health service, community health centers, and hospitals in Batang Regency because it can cause new problems, namely resistant TB cases which are more difficult to overcome. The high dropout rate for pulmonary TB is caused by sufferers who do not want to continue treatment because the treatment time is at least 6 months. Many factors can cause sufferers to stop taking pulmonary TB treatment, including low motivation of pulmonary TB sufferers, lack of knowledge of sufferers about TB treatment, side effects of drugs that they feel are quite severe, a living environment being less supportive, lack of family support, perceptions of pulmonary TB sufferers towards Health services are not good and there is a lack of assistance to sufferers in taking medication (Sholihah, 2018).

2. Pulmonary TB Cases Drop Out Based on Age

Drop Pulmonary TB cases in Batang Regency are mostly found in the age range of 51-70 years. Based on data from the Batang Health Office, it is known that pulmonary TB cases dropped out in the age range 51-60 years as many as 29 cases (26.1%), and aged 61-70 years as many as 22 cases (19.8%).

Figure 7. Drop-Out Pulmonary TB Cases Based on Age



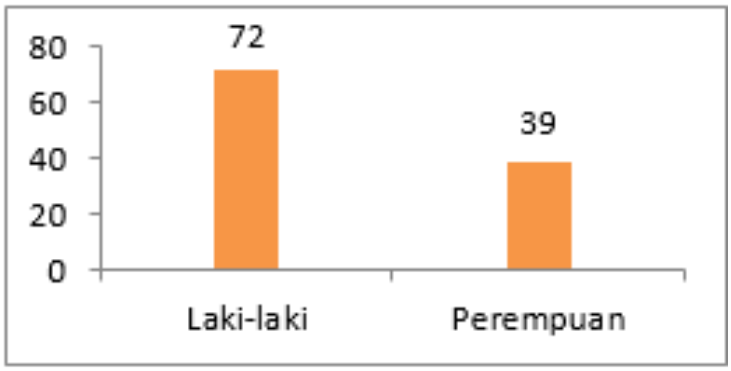
In Batang Regency, most cases of Drop Out Pulmonary TB are in the elderly age group, namely in the 51-70-year age group. Most cases of pulmonary TB dropout occur in the elderly. The elderly have less active lesion reactivation. This is due to a decrease in the immune system due to increasing age (aging). Several research results indicate that the elderly have poor tolerance to pulmonary TB

drugs. Non-compliance with pulmonary TB treatment in the elderly has a higher risk of treatment failure (Caraux-Paz, 2021)

3. Pulmonary TB Cases Drop Out Based on Gender

Most of the pulmonary TB sufferers who dropped out in the Batang district were men. From data from the Batang Health Office, it is known that 72 cases of pulmonary TB dropout occurred in men (64.9%) and 39 cases in women (35.1%).

Figure 8. Drop-Out Pulmonary TB Cases Based on Gender

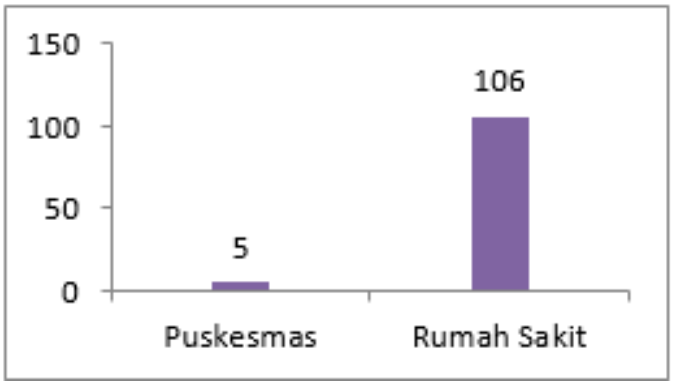


The majority of pulmonary TB sufferers who drop out of treatment are male. As heads of families who have the responsibility to earn a living to support the family, men tend to have high levels of activity and mobility. This is one of the reasons why male pulmonary TB sufferers are negligent or do not regularly take their medication. The results of this study are in line with research by Sukatemin, et al (2022) which stated that the majority of pulmonary TB sufferers who dropped out were male, namely 66% (Sukatemin, 2022).

4. Drop Out Pulmonary TB Cases Based on Health Facilities

Based on data from the Batang Regency Health Office, it is known that almost all pulmonary TB sufferers who dropped out were pulmonary TB sufferers who were treated at the hospital, namely 106 people (95.5%). Meanwhile, 5 people (4.5%) of pulmonary TB cases who dropped out were pulmonary TB sufferers who sought treatment at the Community Health Center.

Figure 9. Drop-Out Pulmonary TB Cases Based on Health Facilities



The large number of dropout cases in pulmonary TB sufferers who seek treatment in hospitals requires special attention. There are many reasons for the high number of pulmonary TB cases dropping out among pulmonary TB sufferers who seek treatment in hospitals, including The lack of assistance in taking medication by the hospital, the distance between home and hospital is quite far, the perception of pulmonary TB sufferers about hospital services is not good and the costs involved. When going to the hospital. Even though pulmonary TB treatment costs are free or borne by the government, there are still indirect costs that pulmonary TB sufferers must incur when seeking treatment, such as transport costs, admin fees or levies, and drug costs for accompanying symptoms (fever and cough). The large costs that pulmonary TB sufferers have to incur when seeking treatment at the hospital are one of the causes of pulmonary TB sufferers not complying with treatment and dropping out (Amala, 2021)

C. Spatial Analysis

The results of the spatial analysis of pulmonary TB cases and dropout pulmonary TB cases in Batang Regency are as follows:

1. Spatial Analysis of Pulmonary TB Cases In 2023 in Batang Regency

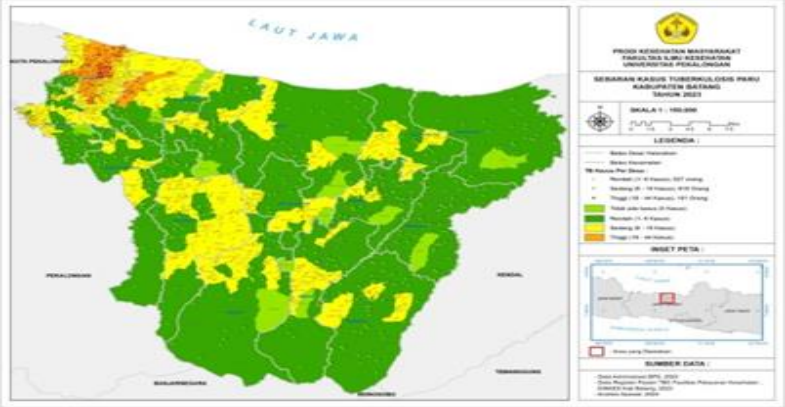


Figure 1. Map of the Distribution of Pulmonary TB Cases in 2023 in Batang Regency

Based on the mapping results, the distribution of pulmonary TB cases in Batang Regency can be seen that the most cases are in the Batang sub-district, namely the orange map with a total of 313 cases. In second place is the Bandar sub-district with 132 cases, followed by third place, namely the Warungasem sub-district with 106 cases. Pulmonary TB cases in Batang District are mostly spread in North Karangasem village, namely 44 cases, and in Kasepuhan village, namely 37 cases.

Looking at the distribution of points on the map, pulmonary TB cases in Batang Regency are mostly found in densely populated lowland areas. Looking at the orange map, the Batang sub-district and Bandar sub-district are areas with quite high population density. The high risk of transmission of pulmonary TB in densely populated areas is due to the high interaction with other people who have a greater chance of direct contact with pulmonary TB sufferers. Overcrowded housing, sunlight that cannot enter the house, and inadequate ventilation can facilitate the transmission of pulmonary TB (Hartanto, 2019)

2. Spatial Analysis of Drop Out Pulmonary TB Cases in 2023 in Batang Regency

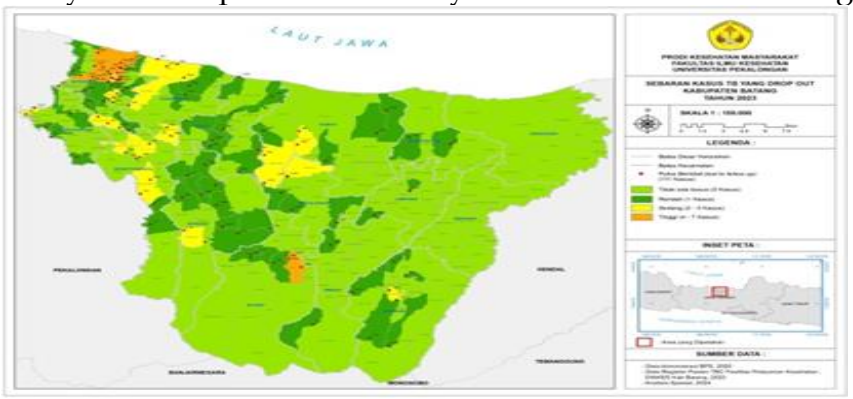


Figure 2. Map of Distribution of Drop Pulmonary TB Cases in 2023 in Batang

Distribution of dropout pulmonary TB cases in Batang Regency, based on the mapping results, it can be seen that most cases are in the Batang sub-district, namely the orange map with a total of 34 cases. Followed by the Bandar sub-district with 11 dropout TB cases. Based on the distribution by village, the highest number of drop-out pulmonary TB cases in Batang District were in Kasepuhan village, namely 7 cases. Followed by the villages of North Karangasem and South Karangasem, each of which had 5 cases of pulmonary TB dropout. The pattern of distribution of pulmonary TB dropout incidents in Batang Regency is in groups. From mapping it is known that the incidence of pulmonary TB dropout is high in lowland areas with dense populations. This shows that lowland and densely populated areas are areas that have a high risk of transmitting pulmonary TB. A dense population is one of the causes of high disease transmission, especially diseases transmitted through air/droplets. Therefore, densely populated lowland areas must be made priority areas for pulmonary TB control programs, especially pulmonary TB dropout (Lestari, 2023).

3. In-Depth Interview Results

Based on the results of interviews conducted with patients who experienced dropout, it was concluded that all patients had good knowledge regarding Tuberculosis treatment, namely for 6 months regularly. However, the problem that occurs is related to the side effects that occur after the patient consumes OAT. The side effects that many suffer from are nausea, vomiting, difficulty sleeping, difficulty defecating, and joint pain.

4. SWOT Program

Based on the results of the research conducted, the results of the SWOT analysis below were obtained:

1. SO Strategy (Strength- Opportunities)

a. Formation and training of TB Cadres

b. Appoint Family as PMO

c. Added TCM Tools

d. Funding continues to provide medicines and support cadres

2. WO Strategy (Weakness – Opportunities)
a. Addition of Special Health Personnel to treat Pulmonary TB
b. Fulfillment of OAT for adults and children
c. Adding TCM tools to agencies outside Government Agencies
d. Fulfillment of TB Cadres with Greater Incentives
3. ST Strategy (Strength – Threats)
a. Socialization of anti-tuberculosis drugs (OAT) to sufferers and families involves cadres
b. Educate the public regarding the side effects of consuming OAT
c. Conduct training for PMOs so they can accompany patients well
4. WT Strategy (Weakness – Threats)
a. Recruit more TB cadres
b. Education regarding pulmonary TB in children and the risk of transmission
c. System improvements to increase bandwidth and ease the operationalization of the reporting system

	Kekuatan (S)	**Kelemahan (W)**
	1. Terdapat kader TB 2. Obat anti tuberkolosis (OAT) Gratis 3. Alat TCM yang berfungsi normal 4. Dana Funding Dari Global Fund untuk kader TB 5. Petugas kesehatan Giat melakukan homevisit	1. Tenaga Kesehatan Pada Program Penanggulangan TB Paru Terbatas 2. Obat anti tuberkolosis (OAT) pada anak terbatas 3. Pencairan dana kegiatan lama 4. Antrian sputum cukup banyak 5. Kader TB susah di cari 6. Efeksamping obat TB keras
Peluang (O) 1. Dukungan dari lintas sector 2. Keluarga penderita mendukung pengobatan TB 3. Stok Obat TB Paru lancar 4. Institusi Yankes mendukung (RS, Klinik, Dokter Praktek Swasta) 5. Kader memiliki komitmen	**Strategi SO** 1. Pembentukan dan pelatihan Kader TB 2. Menunjuk Keluarga sebagai PMO 3. Menambah Alat TCM 4. Dana funding dilanjutkan untuk penyediaan obat dan support kader 5. Perumusan strategi antara kader dan Programer terkait advokasi pasien TB	**Strategi WO** 1. Penambahan Tenaga Kesehatan Khusus untuk menangani TB Paru 2. Pemenuhan OAT dewasa dan anak 3. Menambah alat TCM pada instansi diluar Instansi Pemerintah 4. Pemenuhan Kader TB dengan Insentif lebih besar 5. Menurunkan resiko efeksamping obat atau memberikan tips untuk menanggulangi efeksamping obat
Ancaman (T) 1. Penderita belum bisa menerima kalau terdiagnosa TB 2. Masih ada stigma negatif tentang TB di masyarakat 3. Pengetahuan masyarakat tentang TB Paru Masih rendah 4. Sistem baru yang susah dan tidak responsif 5. Efek samping obat TB yang semakin menurunkan kondisi penderita TB Paru. 6. PMO tidak melakukan tugas dengan baik	**Strategi ST** 1. Sosialisasi Obat anti tuberkolosis (OAT) kepada penderita dan keluarga melibatkan kader 2. Edukasi kepada masyarakat terkait efeksamping konsumsi OAT 3. Melakukan pelatihan terhadap PMO agar dapat mendampingi pasien dengan baik	**Strategi WT** 1. Merekrut Kader TB lebih banyak 2. Edukasi terkait TB Paru pada anak dan resiko penularannya 3. Perbaikan sistem agar menambah bandwitch serta kemudahan operasionalisasi sistem pelaporan

Figure 3. SWOT Analysis Related to the Tuberculosis Control Program in Batang Regency

CONCLUSIONS

Based on the research results, it can be concluded:

1. Drop Out Pulmonary TB cases in 2021 were 66 cases, decreasing in 2022 to 31 cases, but increasing sharply in 2023 to 111 cases.
2. The highest number of Drop Out Pulmonary TB cases were in the 51-60 year age range with 29 cases (26.1%), 72 cases (64.9%) of male gender and drop-out TB sufferers who went to the hospital for treatment. as many as 106 people (95.5%).
3. The distribution of Drop Out Pulmonary TB Cases is highest in the Batang sub-district with a total of 34 cases. The distribution by village of pulmonary TB cases dropping out in Batang District was mostly in Kasepuhan village, namely 7 cases.
4. Based on the SWOT matrix analysis, it was found that strategies for controlling pulmonary TB dropout in Batang Regency that could be implemented were adding TCM tools, adding network bandwidth to the system, carrying out Information and Education Communication (KIE) to patients, families and the community, ensuring the PMO carried out its duties. well

RECOMMENDATIONS

1. The Batang District Health Service needs to prioritize dropout pulmonary TB control programs in areas with the highest cases, namely densely populated areas such as Batang District.
2. The Batang District Health Service is considering adding special programmers for pulmonary TB disease, both children and adults.
3. The Batang Regency Health Service needs to form a pulmonary TB cadre to help supervise the medication taking of pulmonary TB sufferers
4. The Batang District Health Service needs to provide incentives to pulmonary TB cadres who succeed in bringing back pulmonary TB sufferers who have dropped out to undergo treatment again.
5. For Health Services, provide tips or suggestions to reduce the risk of side effects related to the consumption of Anti-Tuberculosis Drugs (OAT).

FURTHER STUDY

This research still has limitations, so it is necessary to carry out further research related to the topic of Forecasting Dropout Pulmonary TB Control Through the Swot Program and Mapping of at-Risk Areas in order to improve this research and add insight to readers.

REFERENCES

Amala A dan Cahyati WH. 2021. Drop Out Pengobatan Pada Tuberkulosis Multidrug Resistant (Tb Mdr) Di Kota Semarang. Journal Center of Excellent: Health Assistive Technology (CoE). Poltekkes Kemenkes Jakarta I

Bungin, Burhan. 2015. Metodologi Penelitian Kualitatif Aktualisasi Metodologis kearah Ragam Varian Kontemporer. Jakarta: PT. Raja Grafindo Persada.

Caraux-Paz Pauline, dkk. 2021. Tuberculosis in the Elderly. Journal of Clinical Medicine. Multidisciplinary Digital Publishing Institute (MDPI).

Carolia N & Mardhiyyah A. 2016. Multi Drug Resistant Tuberculosis pada Pasien Drop Out dan Tatalaksana OAT Lini Kedua. Jurnal Kedokteran Majority : Universitas Lampung

Dahlan S. 2011. Statistik untuk Kedokteran dan Kesehatan. 3rd ed. Salemba Medika

Dinas Kesehatan Kabupaten Batang. 2024. Profil Kesehatan Kabupaten Batang Tahun 2023. Batang Jawa Tengah

Hartanto, dkk. 2019. Analisis Spasial Persebaran Kasus Tuberkulosis Paru Di Kota Semarang Tahun 2018. Jurnal Kesehatan Masyarakat, Volume 7, Nomor 4, Oktober 2019.

Irawan Teguh dan Wahyuningsih. 2023. Strategy to Reduce the Incidence of Pulmonary Tuberculosis (TB) Through Spatial Analysis and Literacy Studies in Batang Regency, Indonesia. Open Access Indonesian Journal of Medical Reviews. HM Publisher

Kemenkes RI, 2022, Tahun ini, Kemenkes Rencanakan Skrining TBC Besar-besaran. From: https://sehatnegeriku. kemkes.go.id/baca/rilis-media/2022 0322/4239560/ tahun-ini-kemenkes- rencanakan-skrining-tbc-besar-besaran/.

Kemenkes RI. 2019. Infodatin Tuberkulosis 2019. Jakarta

Lestari AA, dkk. 2023. Analisis Spasial Kepadatan Penduduk Terhadap Kasus Tuberkulosis Di Provinsi Jawa Barat 2019-2021. Jurnal Cahaya Mandalika. Institut Penelitian dan Pengembangan Mandalika (IP2MI)

Noerfitra R, dan Surya A. 2023. Karakteristik Kejadian TB Paru Pada Orang Dewasa Dengan Riwayat Vaksinasi BCG. Jurnal Ilmiah Kohesi, kohesi.sciencemakarioz.org

Nopita E, dkk. 2023. Analisis Kejadian Tuberkulosis (TB) Paru. Jurnal Kesehatan Saelmakers PERDANA, Unika Musi Charitas

Setyanur FR, dan Sunarto. 2023. Pelayanan dan Keberhasilan Pengobatan pada Pasien Tuberkulosis di Puskesmas Bandongan Magelang. Jurnal Formil (Forum Ilmiah) KesMas, Respati

Sholihah Fitriyatus. 2018. Faktor–Faktor Penyebab Drop Out Pengobatan Pada Penderita Tuberculosis Di Kabupaten Sidoarjo. Jurnal Publikasi Penelitian Terapan dan Kebijakan, BPPD Kab Sidoarjo

Sukatemin, dkk. 2022. Faktor-Faktor Yang Berhubungan Dengan Kejadian Drop Out Pengobatan Tuberkulosis Paru Di Kabupaten Nabire Provinsi Papua. Jurnal Riset Media Keperawatan. Stikes Sapta Bakti

Suseno A dan RA. 2012. Penggunaan Quantum GIS dalam Sistem Informasi Geografis. Bogor;