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Factors associated with unsuccessful tuberculosis treatment outcomes among patients in Msukaligwa Sub- District, Mpumalanga Province: 2019–2023 Mafhungo TC

Outline



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Introduction



Tuberculosis (TB) is an airborne infectious disease caused by *Mycobacterium tuberculosis*



~8.2 million new TB cases and 1.25 million deaths were in 2023



Drug resistance and TB–HIV co-infection worsen mortality and complicate treatment



WHO End TB Strategy aims to reduce TB incidence by 80%, deaths by 90%, by 2030



Treatment regimen: two-month intensive phase (Rifampicin, Isoniazid, Pyrazinamide, Ethambutol) plus four-month continuation phase (Rifampicin, Isoniazid)
extended for extrapulmonary/complex cases

Introduction (2)

- WHO End TB Strategy aims for >90% global TB treatment success+-
- Monitoring treatment outcomes is essential for evaluating the effectiveness of TB control programs
 - Identifies risk factors to guide interventions and prevent drug resistance
- Unsuccessful TB treatment outcomes vary widely across countries
 - In Sub-Saharan Africa, the burden is high, with Rwanda reporting 19.9%. Southern Africa, South Africa 39.8%
 - The major contributor outcomes is death, followed by loss to follow-up and treatment failure, with HIV positivity, male sex, older age, and socio-economic factors consistently increasing risk
- Understanding factors associated with unsuccessful treatment outcome is crucial for strengthening TB control programs and preventing escalating drug resistance

Aim and Objectives

Aim

- To assess factors associated with unsuccessful TB treatment outcomes among patients treated in Msukaligwa sub district, from 2019-2023

Objectives

- To determine socio-demographic and clinical characteristics of TB patients
- To determine TB treatment outcomes in Msukaligwa Sub-district from 2019- 2023
- To assess yearly trends in TB treatment outcomes over the period 2019–2023
- To assess factors associated with unsuccessful TB treatment outcomes among patients treated in Msukaligwa Sub-district, from 2019-2023



Methods

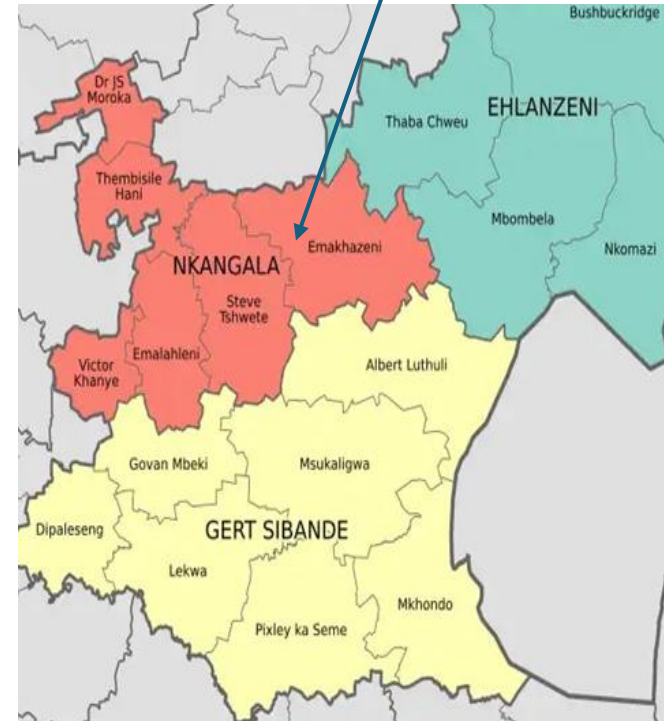
Study design and Setting

Study design

- Retrospective cross-sectional

Setting

- Msukaligwa sub-district, located within the Gert Sibande district of Mpumalanga Province



Study population

TB patients captured in TIER.Net who received treatment at public hospitals and primary healthcare (PHC) facilities in Msukaligwa Sub-District, Mpumalanga Province, from January 2019 to December 2023

Inclusion Criteria:

- Patients registered for TB treatment at the selected facilities during the study period with documented treatment outcomes

Exclusion Criteria:

- Patients who were transferred to other healthcare facilities and those without documented outcome

Data source and variables

- Data extracted from TIER.Net to Microsoft Excel spreadsheet
- Variables:
 - Socio demographics: facility name, facility level, year of diagnosis, gender, age, and age group
 - clinical characteristics such as disease classification, treatment outcome, HIV status, and patient category
- The tool was reviewed continuously to ensure completeness and accuracy during data collection

Operational Definition

- **TB treatment outcome:** are standardized classifications used by global health organizations, to track a patient's response to therapy
- **Successful Treatment Outcome:** Patients recorded as cured or having completed treatment
- **Unsuccessful Treatment Outcome:** Patients recorded as treatment failure, died, or lost to follow-up

Data management and analysis

- Data from TIER.Net was exported to Excel for cleaning, then imported into Stata version 18 for analysis
- Variables were coded and recategorized, and descriptive statistics were generated
- Bivariate and multivariable logistic regression was conducted to assess the association between each independent variable and the outcome
- Variables with $p < 0.20$ in the bivariate analysis were included in the multivariable logistic regression model
- Results were computed with odds ratios (ORs), 95% confidence intervals (CIs), and statistical significance was set at $p < 0.05$



Results

Data flow chart

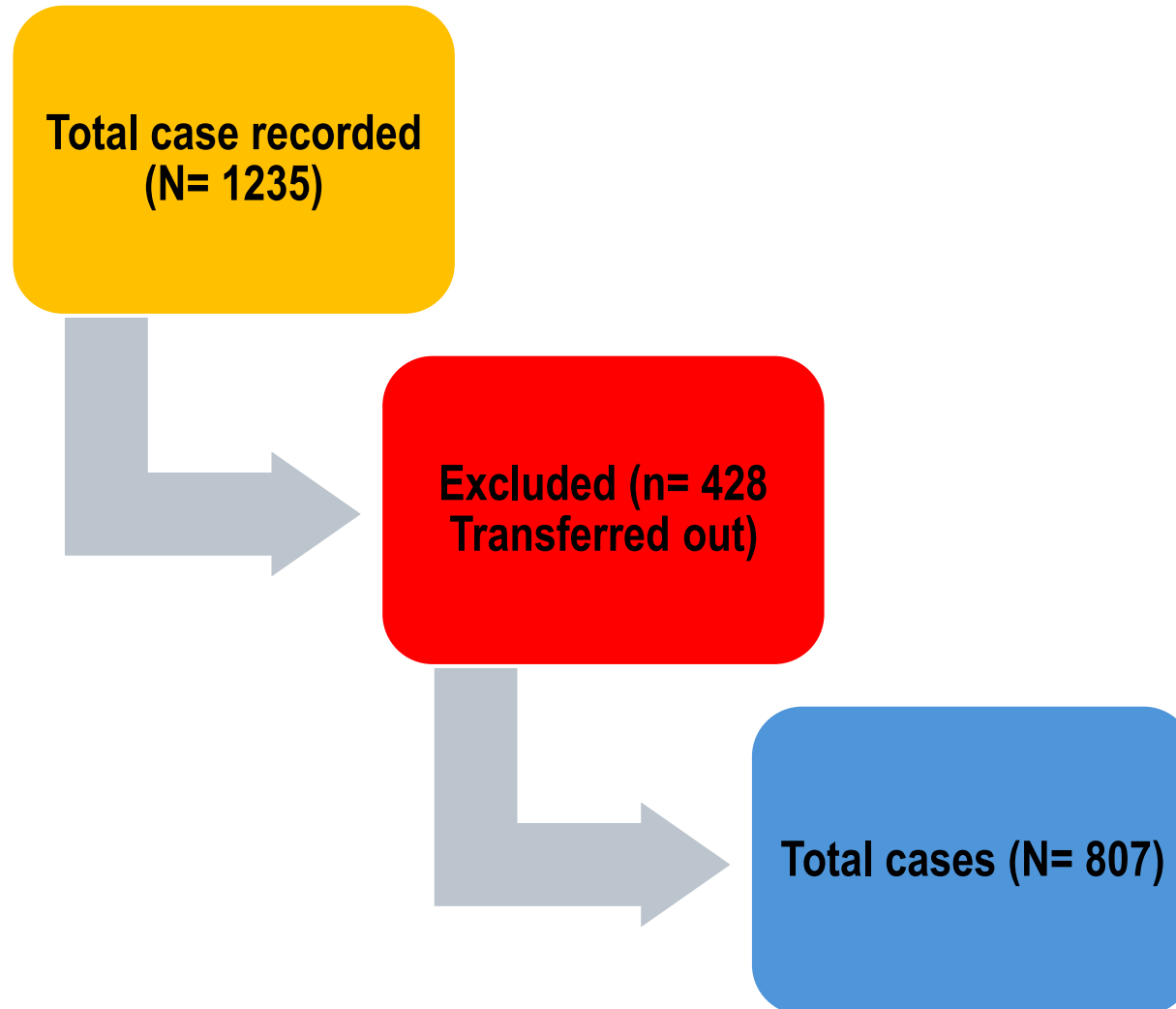
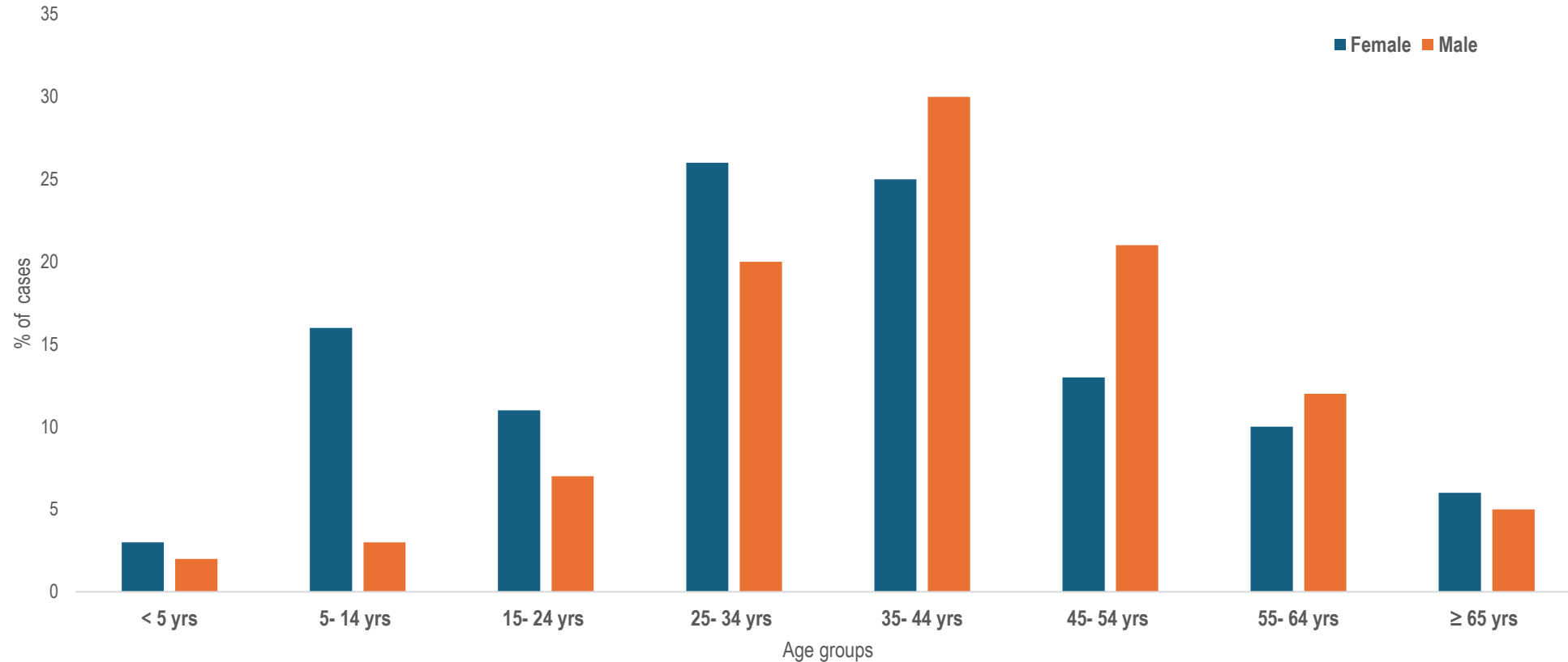


Figure 1: Distribution of TB cases by age group and gender, Msukaligwa sub- district 2019–2023 (N= 807)



Median= 38 years (IQR: 30-49 years)

Table 1: Clinical characteristics of TB patients at Msukaligwa Sub- district
2019- 2023 (N= 807)

Variable	Category	Frequency n (%)
Type of TB	Extra Pulmonary TB	104 (13)
	Pulmonary TB	703 (87)
TB Category	New case	633 (78)
	Retreatment	23 (3)
	Transferred in	147 (18)
	Other	04 (0)
HIV Status	Reactive	510 (63)
	Non-reactive	251 (31)
	unknown	46 (6)
Facility type	PHC	725 (90)
	Hospital	82 (10)

Figure 2: Distribution of treatment outcome in Msukaligwa Sub-District 2019–2023 (N= 807)

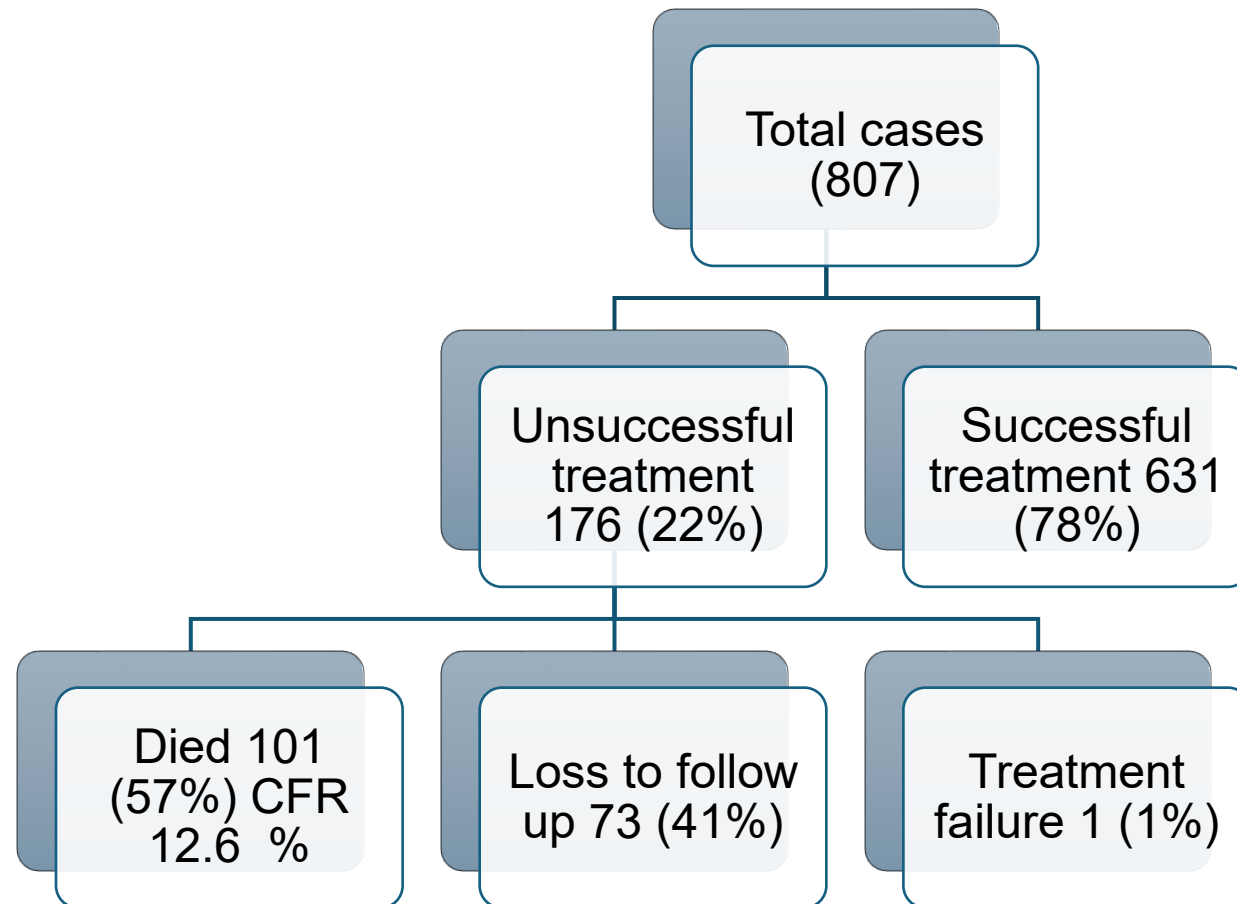


Figure 3: Yearly Proportion of TB Treatment Outcomes in Msukaligwa Sub-District 2019–2023 (N= 807)

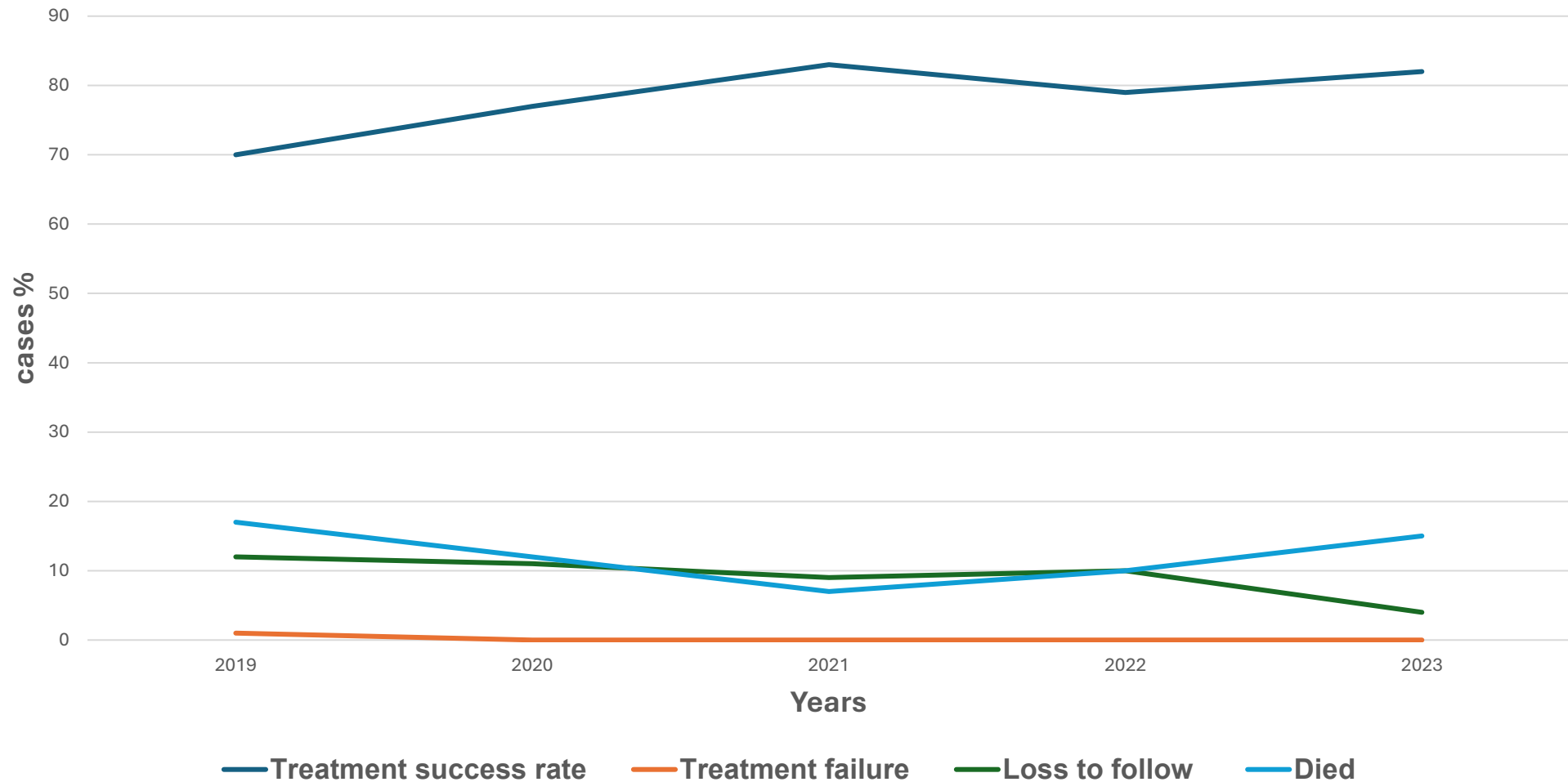


Table 2: Logistic regression of factors associated with unsuccessful TB treatment outcomes, Msukaligwa Sub-District (2019–2023)

Variable	Treatment unsuccess n/N (%)	Univariable analysis		Multivariable analysis	
		OR (95% CI)	P-value	OR (95% CI)	P- value
Years					
2019	56/186 (30)	Reference	-		
2020	27/119 (23)	0.7 (0.4- 1.1)	0.157		
2021	23/137 (17)	0.5 (0.2- 0.8)	0.007		
2022	32/154 (21)	0.6 (0.4- 1.0)	0.052		
2023	38/211 (18)	0.5 (0.3- 0.8)	0.005	0.6 (0.4-0.9)	0.016
Age (years)					
65+	14/46 (30)	Reference	-		
55- 64	21/89 (24)	0.7 (0.3- 1.6)	0.391		
45- 54	26/140 (19)	0.5 (0.2- 1.1)	0.092		
35- 44	48/227 (21)	0.6 (0.3- 1.2)	0.173		
25- 34	46/177 (26)	0.8 (0.3-1.6)	0.545		
15- 24	14/75 (19)	0.5 (0.2- 1.2)	0.139		
0-14	7/53 (22)	0.3 (0.1- 0.9)	0.041		
Gender					
Male	114/492 (23)	Reference	-		
Female	62/315 (20)	0.8 (0.5- 1.1)	0.242		

Table 2 continuation: Logistic regression of factors associated with unsuccessful TB treatment outcomes, Msukaligwa Sub-District (2019–2023)

Variable	Treatment unsuccess n/N (%)	Univariable analysis		Multivariable analysis	
		OR (95% CI)	P-value	OR (95% CI)	P- value
Facility level					
PHC	141/725 (19)	Reference	-		
Hospital	35/82 (43)	3.1 (1.9- 4.9)	0.001	3.1 (1.9- 5.1)	<0.001
Disease classification					
Pulmonary TB	140/703 (20)	Reference	-		
Extra pulmonary TB	36/104 (35)	2.1 (1.4- 3.3)	0.001	1.7 (1.1- 2.8)	0.022
Patient category					
New	135/633 (21)	Reference	-		
Relapse	1/7 (14)	0.6 (0.7- 5.1)	0.654		
Other	0/4 (0.0)				
Transfer in	37/ 147 (25)	1.2 (0.8- 1.9)	0.312		
Treatment after defaulted	3/16 (19)	0.8 (0.2- 3.0)	0.804		
HIV Status					
Non- reactive	46/251 (18)	Reference	-		
Reactive	112/510 (22)	1.2 (0.9- 1.8)	0.246		

Discussion



- TB mainly affected economically active adults (25–44 years), with a median age of 38 years, highlighting its impact on the productive population
 - Gender and age differences were observed, with males more affected in older age groups and females in younger adults
 - This male predominance was also reported in Lesotho and systematic reviews from Low- and Middle-Income Countries
- The contribution of death and loss to follow-up suggests gaps in adherence support and patient tracing systems; similar findings were also reported in Malaysia
- The higher odds among hospital-managed and extra-pulmonary TB patients likely reflect more severe or complicated disease presentations
- Lack of significance for age, sex, HIV status, and treatment category
 - indicates that structural and service-delivery factors may outweigh patient-level characteristics in influencing outcomes

Conclusion



- TB remains concentrated in economically active adults, indicating a strong socio-economic burden
- Most TB patients achieved successful treatment outcomes during the study period
 - Despite this, unsuccessful outcomes such as death, treatment failure, and loss to follow-up remained a public health concern
- Pulmonary TB was the most common form of TB
- Factors associated with TB unsuccessful outcomes were treatment year, facility level, and disease classification, with hospital-managed patients at higher risk

Recommendations



- Promote early treatment-seeking behavior
 - Educate communities on recognizing TB symptoms
- Target high-risk groups: Focus TB prevention, early diagnosis, and treatment efforts on men and adults aged 25- 44 years
- Strengthen TB care at hospitals and for extra-pulmonary TB cases
- Conduct regular file audits to assess TB treatment outcomes
- Targeted interventions:
 - early identification, tracking, and tracing of patients lost to follow-up are crucial to improve outcomes
 - counselling, and adherence support

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THANK YOU