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**Use of Carbapenems to improve outcomes
in DR-TB with limited options in the
Northern Cape**

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PRESENTATION OUTLINE



- Background
- Global DR-TB Burden
- South Africa and provincial Context
- Use of Carbapenems in DR-TB Treatment
- Study Aim and Rationale
- Methodology
- Results
- Implications to Clinicians
- Discussion and Conclusions

Background – Global DR-TB Burden

- Drug-resistant TB remains a major global public health challenge.
- MDR-TB and XDR-TB complicate treatment and reduce success rates.
- Treatment regimens require multiple drugs and prolonged duration.
- Limited treatment options exist for highly resistant TB strains.
- Carbapenems used in complex DR-TB cases in alignment with WHO and national guidelines

Background – South Africa and provincial Context



- South Africa is a high TB and DR-TB burden country, and the TB epidemic poses a huge risk to the health sector as it may lead to increased morbidity and mortality if not effectively managed.
- In NC Province, the incidence of drug-resistant TB has increased by 9% between 2024 and 2025, from 240 to 261 cases. The 2025 DR-TB incidence rate stood at 20 DR-TB cases per 100 000 persons.
- Among 2022 cohort, treatment success rate stood at 64%, however, unfavorable outcomes are a concern, with lost to follow-up at 16% (57 patients) and death rate at 17% (61 patients who died in this cohort)
- National program transitioned to bedaquiline-based all-oral regimens.
- Complex resistance patterns still require salvage therapy options.

Carbapenems in DR-TB Treatment



- Broad-spectrum beta-lactam antibiotics used for severe infections, the carbapenems are indicated for antimicrobial therapy in cases where resistance to first-line agents is expected, as they have a broad spectrum of activity.
- Carbapenems (e.g., meropenem, imipenem and ertapenem) are typically reserved for highly resistant TB cases, including extensively drug-resistant TB (XDR-TB). Evidence from observational studies suggests that carbapenem-containing regimens can improve outcomes, particularly when combined with newer agents such as bedaquiline.
- Demonstrated activity against *Mycobacterium tuberculosis* when combined with clavulanate.
- Used as “Drugs of last resort”

Study Rationale



- Limited provincial evidence describing carbapenem use in DR-TB patients in South Africa and in Province this is the first analysis to determine efficacy among DR-TB patients.
- Need to evaluate treatment outcomes and patient characteristics.
- Results can inform programmatic decisions and future DR-TB guidelines.

Study Aim:

To describe characteristics and treatment outcomes of DR-TB patients enrolled into carbapenem-containing regimens



Methods

- **Study Design:** Retrospective descriptive study
- **Data source:** EDR-Web
- **Period:** 2015–2023
- **Setting:** Northern Cape Province

Sample and Study Population

N = 46 DR-TB patients enrolled on Carbapenem regimens

- Included Rif Resistant, MDR, pre-XDR, XDR-TB

RESULTS

Pt. Characteristic:

Demography

Sex

	No.	%
Female	18	39,13%
Male	28	60,87%

Age Group

15-24	4	8,70%
25-34	15	32,61%
35-44	14	30,43%
45-54	8	17,39%
55-64	4	8,70%
65 years and older	1	2,17%

- Male: 60.9%, Female: 39.1%
- Median age is 38,5 years
- Economically active population affected, majority aged 25–44 years, consistent with the age group TB burden

Characteristic: Profile

Patient Category

	No.	%
New	5	10,87%
Relapse	11	23,91%
Treatment after lost to follow-up	13	28,26%
TF2	16	34,78%
Other	1	2,17%

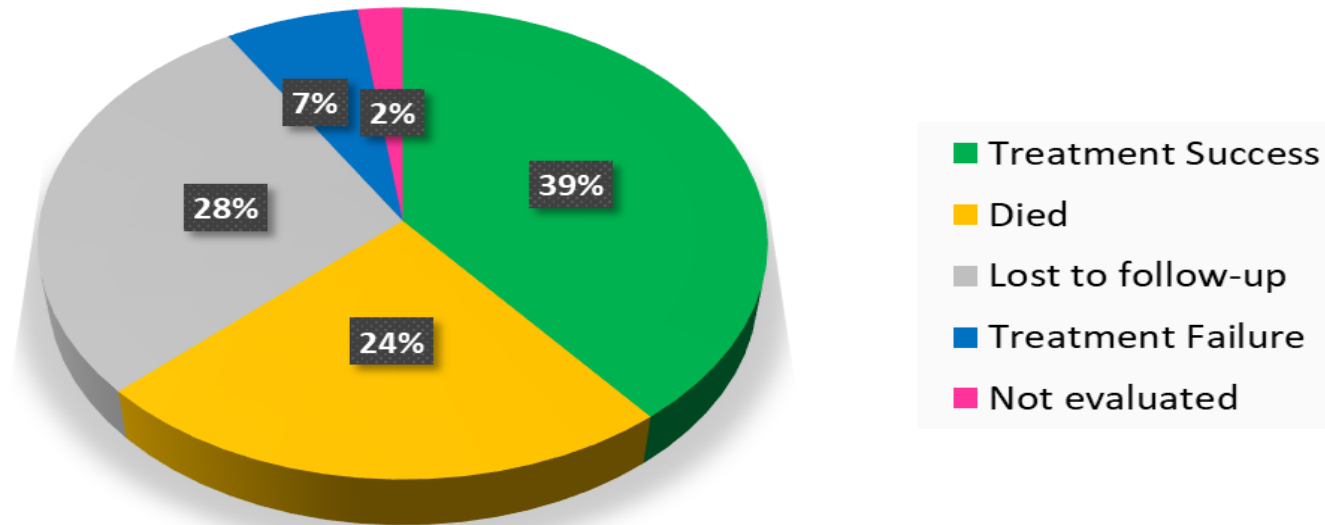
Type of Drug-Resistant TB

Multi-Drug Resistant TB (MDR-TB)	14	30,43%
Pre-XDR	16	34,78%
Rifampicin Resistant	5	10,87%
XDR-TB	11	23,91%

- HIV-positive: 63%
- On ART: 23.9%

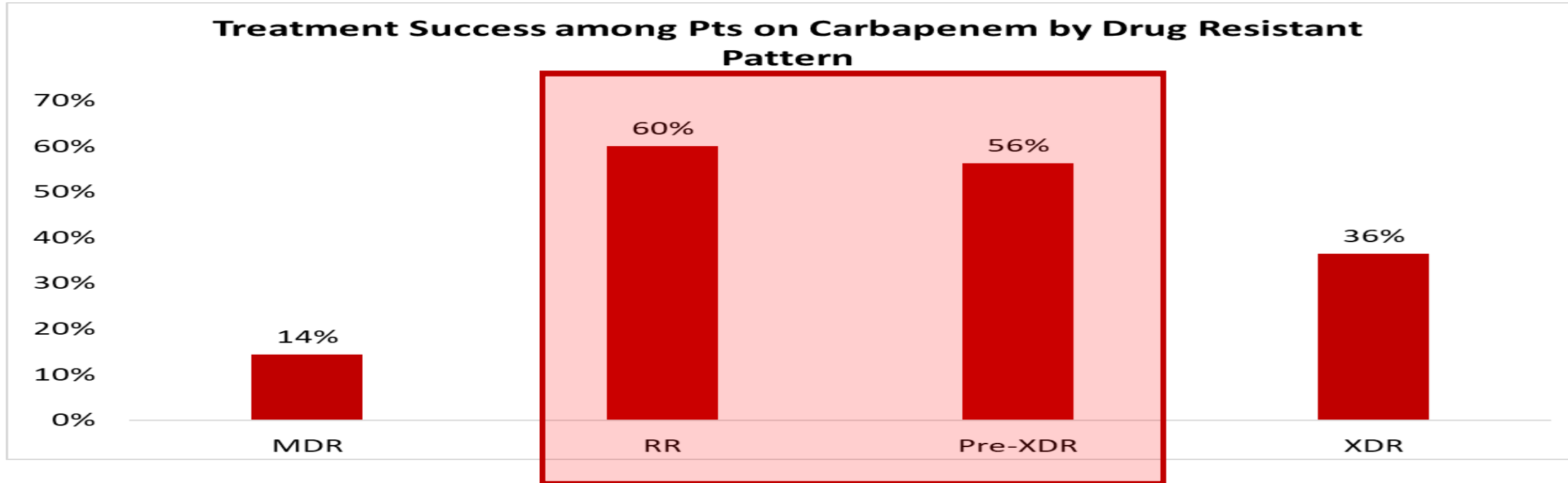
Treatment Outcomes

Treatment Outcomes among patients enrolled on Carbapenem



- Among patients receiving carbapenem-containing regimens, treatment outcomes were modest, with 39.1% achieving favourable outcomes (34.8% cured and 4.4% treatment success).
- Unfavourable outcomes were substantial, including 23.9% mortality and 28.3% lost to follow-up. Treatment failure occurred in 6.5% of patients, while 2.2% were not evaluated at the time of analysis.

TREATMENT OUTCOMES by Drug Resistant Pattern



- ❖ Patients with RR-TB (60%) and pre-XDR-TB (56%) achieved the highest treatment success rates, suggesting that carbapenems may help mitigate the impact of additional resistance beyond rifampicin.
- ❖ In contrast, XDR-TB patients had a lower success rate (36%), highlighting the clinical challenge of managing extensively resistant disease.

Study Limitations

- Retrospective data
- Limited HIV clinical data

Implications for Clinicians

- Improve TB-HIV integration
- Early identification of high-risk patients (Improved clinical monitoring during the first 2–3 months could reduce early mortality).
- Strengthening early diagnosis and rapid initiation and adequate following-up of appropriate DR-TB regimens is critical.
- Integration of carbapenems with newer oral agents (e.g., bedaquiline-based regimens) may improve outcomes.
- Enhanced patient retention and adherence support is essential for long-term survival.

Conclusion

- Carbapenems play a critical role in DR-TB management in patients with limited options, despite the analysis showing overall sub-optimal treatment outcomes in this cohort.
- Integrated care and system strengthening required
- Systematic review conducted using 7 studies showed treatment success was higher than 57% in five studies with culture conversion rates between 60% and 94.8%.
- Published evidence is limited around effectiveness of carbapenems including efficacy, safety and tolerability.
- Carbapenem-containing regimens show greatest benefit in RR and pre-XDR TB, with reduced effectiveness in XDR TB and the poorest outcomes observed in MDR TB, likely influenced by clinical and programmatic factors.
- Are we introducing the carbapenem too late in this category of patients?

References



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