

Outcomes for Adolescents Undergoing Multidrug-Resistant Tuberculosis Treatment in Lima, Peru

Background: Multidrug-resistant tuberculosis (MDR-TB) is understudied among adolescents, a unique subpopulation undergoing emotional maturity, physical development, and transitioning into roles with greater responsibility and time constraints. This adolescent period may have social implications, leading to different health outcomes than adults. We aim to identify whether adolescent MDR-TB treatment outcomes differs from adults, and the predictors for these outcomes.

Methods: We conducted a retrospective cohort study to assess whether adolescence was associated with MDR-TB treatment outcomes. Predictors included demographics, disease severity indicators, and comorbidities. Outcomes were separately assessed for adolescents (10-19) and adults (≥ 20). Chi-squared tests, Fisher's exact tests, or t-tests were used to identify significant differences between adolescents and adults. Univariate cox proportional hazards models were used to assess the effects of baseline covariates on time-to-death. Univariate associations with a p-value of ≤ 0.15 were considered for the final adjusted model. Sex was included in the final model due to previous history of being an important predictor for TB treatment outcomes. Multiple imputation was used to handle missing data for the multivariate cox proportional hazards model.

Results: We identified 90 adolescents and 577 adults in the cohort. Successful outcomes were observed in 76% adolescents and 64% adults ($p:0.0362$). Further, 11% adolescents and 22% adults died ($p:0.0159$). Significant differences in baseline characteristics between adolescents and adults included previous receipt of 2 or less regimens (51% versus 21%, respectively; $p:<0.0001$), bilateral and cavitory findings on chest x-ray (44% versus 57%, respectively; $p:0.0252$), and low hematocrit (57% versus 86%, respectively; $p:<0.0001$). Univariate cox proportional hazards analysis in adolescents found that having taken an aggressive treatment regimen (HR: 0.115, 95% CI 0.024, 0.546), tachycardia (HR: 17.128, 95% CI 2.141, 137.001), and having extrapulmonary TB (HR: 13.380, 95% CI 2.743, 65.275) were significant predictors of time to death at the 0.05 level. The final multivariate model found the following were associated with time to death: aggressive regimen (HR: 0.028, $p:0.0016$), female (HR: 2.602, $p:0.2392$), tachycardia (HR: 19.551, $p:0.0077$), and having at least one comorbidity (HR: 5.228, $p:0.0357$).

Conclusion: Adolescents showed more successful outcomes, less death, and less presentation of severity indicators and comorbidities than adults. Due to the low amount of death in the adolescent subgroup, modeling time to death produced wide confidence intervals and possibly inflated hazards ratios. To better understand specific risk factors that impact treatment outcomes for MDR-TB in adolescents, further analysis should be completed within a larger cohort of adolescents.