Abstract Title: COVID-19 Excess Mortality and the Cost-Effectiveness of Treatment Options

ABSTRACT PREVIEW: COVID-19 EXCESS MORTALITY AND THE COST-EFFECTIVENESS OF TREATMENT OPTIONS

COVID-19 Excess Mortality and the Cost-Effectiveness of Treatment Options

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Part 1
I Agree

Part 1
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Abstract

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Purpose

Mexico has experienced one of the worst COVID-19 epidemics worldwide, with high hospitalization and case fatality rates. There is limited evidence to guide treatment decisions aimed at mitigating these disease burdens. We aim to evaluate the cost-effectiveness of different treatments that reduce mortality in COVID-19 hospitalized patients in Mexico using a microsimulation model.

Methods

We developed a decision-analytic microsimulation model that simulates cohorts of intubated and non-intubated hospitalized COVID-19 patients. We used this model to evaluate various treatments that have shown effectiveness in reducing mortality among COVID-19 patients. The main outcomes were quality-adjusted life years (QALYs), lifetime healthcare costs (Mexican pesos [$]), and incremental cost-effectiveness ratios. We assumed a willingness-to-pay (WTP) threshold of Mexico's per-capita GDP. We compared three treatments for non-intubated patients: 1) Remdesivir; 2) Remdesivir and Baricitinib, and 3) no treatment. For intubated patients, we compared two treatments: 1) Dexamethasone; 2) no treatment. Focusing on those hospitalized, we used publicly available data for COVID-19 deaths and background age- and sex-specific mortality rates to estimate the COVID-19-specific mortality for Mexico's population aged 45 years and older using relative survival methods. We quantified and propagated the uncertainty of model parameters through probabilistic sensitivity analysis (PSA).

Results

The COVID-19-specific mortality rate increases with age (438 per 100,000 in patients 45-54 years-old to 1,009 per 100,000 in patients aged 70 and older)). Men face higher mortality rates than women (794 vs. 665 per 100,000). The non-intubated cohort lives 5.27 discounted QALYs and experiences costs of $250,000 without COVID-19 treatment, 5.97 QALYs and $332,000 with Remdesivir alone, and 6.70 QALYs and $401,300 with Remdesivir and Baricitinib. At the per-capita GDP WTP, Remdesivir and Baricitinib is cost-effective – robustly so with respect to parameter uncertainty (Figure, upper panel). For intubated hospitalized patients, Dexamethasone yields 2.73 discounted QALYs with lifetime costs of $719,500, while no COVID-19 treatment yields 1.45 QALYs and costs of $684,900. Dexamethasone is highly likely to be cost-effective at the per-capita GDP WTP (Figure, lower panel).

Conclusions

Treating COVID-19 hospitalized patients in Mexico is cost-effective. Remdesivir and Baricitinib is a high-value strategy for non-intubated patients as is Dexamethasone for intubated patients.