Impact of COVID-19 variants on vaccination program in South Korea

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ABSTRACT

Two doses of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccines are currently administered in South Korea; however, vaccine supply is limited. We evaluated the impact of a coronavirus disease (COVID-19) vaccination campaign using single doses on reducing incidence, ICU hospitalization, and deaths in South Korea, considering constraints in vaccine supply and the emergence of variant strains. We developed an age-structured model of SARS-CoV-2 transmission parameterized with Korean demographics and age-specific COVID-19 outcomes. In our model, we considered a higher transmissibility of SARS-CoV-2 variant compared to pre-existing strain, and reduced vaccine efficacy against the variant. Vaccination program is expected to reduce the overall attack rate with the highest relative reduction observed among individuals aged ≥ 70 years. Even in the presence of a variant, vaccination is expected to reduce the overall attack rate. Our results indicate that vaccination can have a substantial impact on mitigating the COVID-19 outbreaks. However, herd immunity is unlikely to be achieved with the administration of a single dose of COVID-19 vaccine, especially with the potential emergence of SARS-CoV-2 variants.