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LETTER TO THE EDITOR

Influence of COVID-19 in patients with concurrent tuberculosis coinfections

To the Editor,

With great interest, we read the recent review and meta-analyses written by Sarkar et al.,[1] which systematically assessed the consequence of COVID-19 in patients with concurrent infections, including tuberculosis (TB), influenza, HIV, chronic hepatitis, and dengue. The authors concluded that TB patients show an increased risk of mortality during coinfection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), while there is no significant impact found in patients living with HIV and chronic hepatitis. Although we appreciate the authors who performed comprehensive data analysis, we believe that further discussion on these findings is warranted.

First, the authors limited their search to PubMed, Medline, Embase, Google Scholar, and MedRxiv, but did not explore other international databases with broad subject areas, including Cochrane Library, ClinicalTrials.gov, and other large preprint platforms such as bioRxiv. The selection of a restricted subset of databases for performing the literature search may cause biased results.[2]

Second, in the meta-analysis study about the influence of TB on mortality in COVID-19 patients, we think Chen et al.'s[3] study cannot be included in the pooled result because the number of death event ($n = 1$) in the TB group is not accurate and should be more. After carefully checking the original information, we found that among COVID-19 patients (age ≥ 65 years) with concurrent TB coinfections, there was only one death event, but for patients (age < 65 years) with concurrent TB coinfections, the detailed death events were not shown. Hence, this study cannot be incorporated into the meta-analyses.

In addition, we found an error in the data of Fig. 3, which needs to be corrected. In the Davies et al.'s study, the total number of patients in control group (COVID-19 patients without TB) is 20180 rather than 20280. Therefore, we performed a meta-analysis of three articles (including Davies et al.,[4] Du et al.,[5] and Therese et al.[6]) using R software and the revised results are shown in Figure 1. Mortality was evaluated in three articles with a total of 23,017 patients. Significantly, increased risk of mortality is observed in TB patients coinfected with COVID-19 in comparison with the control group (risk ratio [RR] = 2.09; 95% confidence interval [CI], 1.75–2.51; $I^2 = 0\%$) (Figure 1).

Finally, studies had shown that the older COVID-19 patients have greater initial comorbidities, more severe symptoms, and higher mortality rate as compared with younger patients.[3,7] Thus, the age should be taken into consideration to draw a firm conclusion. Therefore, it will better to perform a subgroup analysis in terms of age, based on the data of the studies included in the meta-analysis. Moreover, HIV, chronic hepatitis, and influenza all belonged to the virus infection disease. We think readers will be interested in knowing the impact of virus infection on mortality in COVID-19 patients. Hence, we calculated the merged RR of virus infection. No significant augmented risk is found to be associated with it (RR = 1.37; 95% CI, 0.66–2.84; $I^2 = 98\%$) (Figure 2).

Overall, the authors analyzed a valuable issue regarding the impact of COVID-19 in patients with concurrent coinfections. However, extensive sample studies are still needed to further verify the results mentioned.

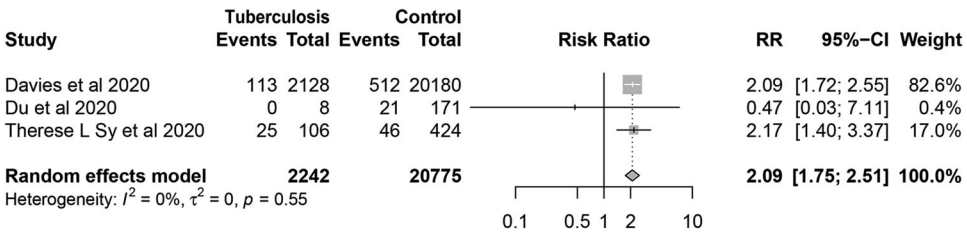

FIGURE 1 Meta-analysis of the impact of tuberculosis on mortality in COVID-19 patients. RR,risk ratio

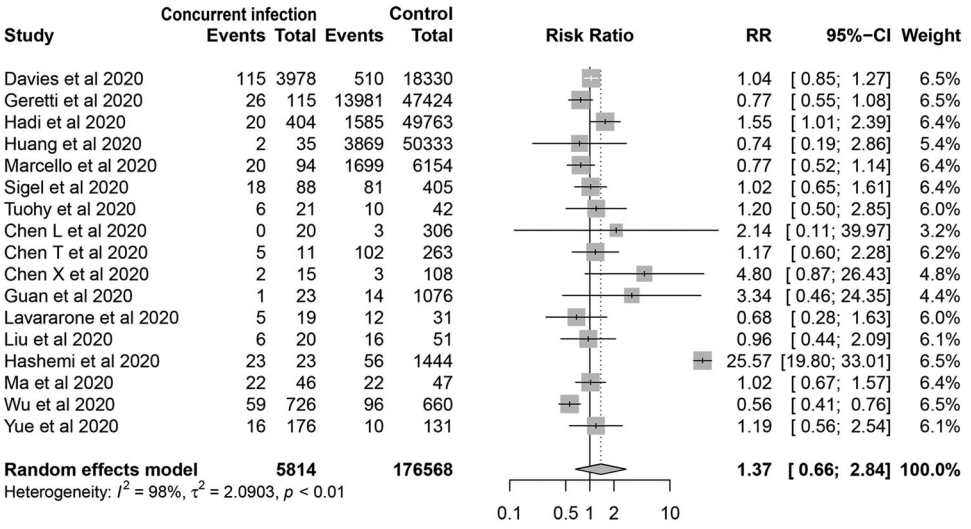

FIGURE 2 Meta-analysis of the impact of virus infection, including HIV, chronic hepatitis, and influenza on mortality in COVID-19 patients. RR,risk ratio

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CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

AUTHOR CONTRIBUTIONS

Tieshan Teng, Qiming Li, and Longxiang Xie conceived the study protocol. Guoying Wang, Linghao Cai, and Dandan Chen participated in the literature search and the data collection. Guoying Wang, Linghao Cai, Dandan Chen, Tieshan Teng, Qiming Li, and Longxiang Xie analyzed the data. Tieshan Teng, Qiming Li, and Longxiang Xie drafted the manuscript. Guoying Wang, Linghao Cai, and Dandan Chen revised the manuscript. All authors read and approved the final manuscript. Guoying Wang and Linghao Cai contributed equally to this study.

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REFERENCES

1. Sarkar S, Khanna P, Singh AK. Impact of COVID-19 in patients with concurrent co-infections: a systematic review and meta-analyses. *J Med Virol*, 2020. https://doi.org/10.1002/jmv.26740

2. Higgins J, Green S. eds. *Cochrane Handbook For Systematic Reviews of Interventions Version 5.1.0. (The Cochrane Collaboration, 2011)*; 2017. http://handbook.cochrane.org. Accessed June 19, 2017.
3. Chen T, Dai Z, Mo P, et al. Clinical characteristics and outcomes of older patients with coronavirus disease 2019 (COVID-19) in Wuhan, China (2019): a single-centered, retrospective study. *J Gerontol A Biol Sci Med Sci* 2020;75:1788-1795. https://doi.org/10.1093/gerona/glaa089
4. Davies MA. HIV and risk of COVID-19 death: a population cohort study from the Western Cape Province, South Africa. *Medrxiv*. 2020. https://doi.org/10.1101/2020.07.02.20145185
5. Du RH, Liang LR, Yang CQ, et al. Predictors of mortality for patients with COVID-19 pneumonia caused by SARS-CoV-2: a prospective cohort study. *Eur Respir J*. 2020;55(5):2000524.
6. Sy KTL, Haw NJL, Uy J. Previous and active tuberculosis increases risk of death and prolongs recovery in patients with COVID-19. *Infect Dis*. 2020;52(12):902-907. https://doi.org/10.1080/23744235
7. CDC. COVID-19 response team severe outcomes among patients with coronavirus disease 2019 (COVID–19)–United States, Feb 12–March 16, 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69:343-346.