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Background

- Diabetes Mellitus is one of the leading causes of morbidity and mortality in the world.
- In the United States alone, more than 34 million adults had known or undiagnosed diabetes in 2018.
- Infectious diseases are more frequent and can be associated with worse outcomes in patients with diabetes.
- We aimed to systematically review and synthesize with a meta-analysis the available observational studies reporting the effect of diabetes in mortality among hospitalized patients with COVID-19.

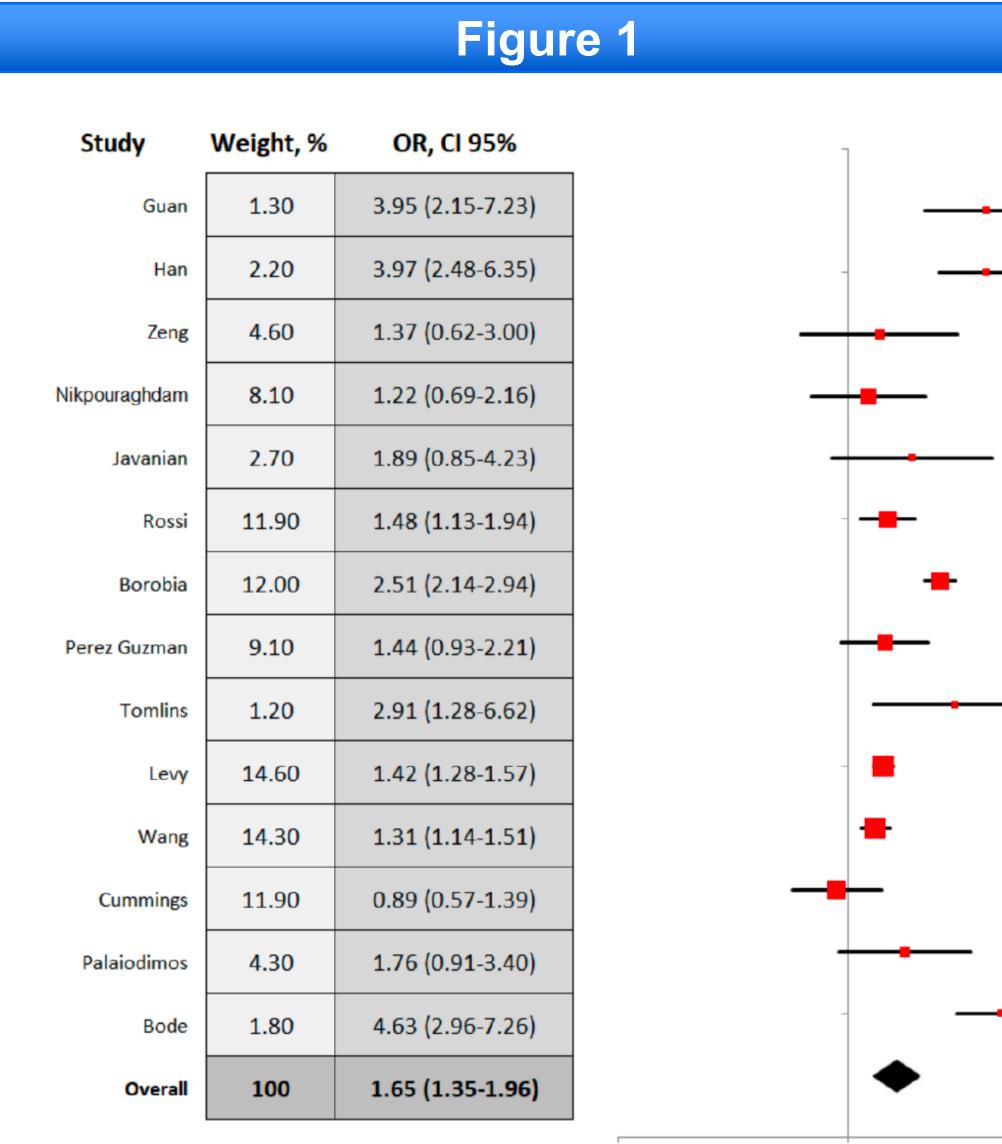
Methods

- This study was performed according to Preferred Reporting Items the for Systematic Reviews and Meta-Analyses (PRISMA)
- Medline, Embase, Google Scholar, and medRxiv databases were reviewed for identification of eligible studies.
- A random-effect model meta-analysis was used and I-square was utilized to assess the heterogeneity.
- In-hospital mortality was defined as the endpoint.
- Sensitivity, subgroup, metaand regression analyses were performed.

Diabetes is Associated with Increased Risk for In-hospital Mortality in Patients with COVID-19: A Systematic Review and Meta-analysis Comprising 18,506 patients Natalia Chamorro-Pareja MD^{1,2}, Dimitrios Karamanis PhD³, Weijia Li MD^{1,2}, Phaedon D. Zavras MD^{1,2}, Priyanka Mathias MD^{2,4}, Damianos G. Kokkinidis MD^{1,2}, Leonidas Palaiodimos MD^{2,5}

Results

- Out of 1,721 studies screened from the literature sources, 14 observational studies (12 retrospe prospective) met the prespecified criteria for inc analysis
- Five studies were conducted in Asia, five in the United States and four in Europe.
- 18,506 patients were included in this meta-analysis (3,713) diabetics and 14,793 non-diabetics).
- Patients with diabetes were associated with a higher risk of death compared to patients without diabetes (OR: 1.65; 95% CI: 1.35–1.96; I² 77.4%; Figure 1).
- Subgroup analysis showed similar results, including the studies from the US alone (Figure 2).
- Heterogeneity was high.
- A study level meta-regression analysis was performed for all the important covariates and no significant interactions were found between the covariates and the outcome of mortality.



Heterogeneity: I²= 77.4% , p=0.000

no diabetes worse

0.1



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Figure 2

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Study	Weight, %	OR, CI 95%
Levy	35.70	1.42 (1.28-1.57)
Wang	34.30	1.31 (1.14-1.51)
Cummings	22.90	0.89 (0.57-1.39)
Palaiodimos	5.20	1.78 (0.91-3.40)
Bode	1.90	4.83 (2.98-7.28)
Overall	100	1.34 (1.04-1.85)

United States

erogeneity: I²= 73.7% , p=0.004

no diabetes worse

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Asia

Study	Weight, %	OR, CI 95%
Guan	11.40	3.95 (2.15-7.23)
Han	15.90	3.97 (2.48-6.35)
Zeng	24.20	1.37 (0.62-3.00)
Nikpouraghdam	30.20	1.22 (0.69-2.16)
Javanian	18.30	1.89 (0.85-4.23)
Overall	100	2.12 (1.09-3.16)

Heterogeneity: I²= 61.1% , p=0.036

no diabetes worse

Europe-United States

Study	Weight, %	OR, CI 95%
Rossi	14.70	1.48 (1.13-1.94)
Borobia	14.82	2.51 (2.14-2.94)
Perez Guzman	11.10	1.44 (0.93-2.21)
Tomlins	1.40	2.91 (1.28-6.62)
Levy	18.20	1.42 (1.28-1.57)
Wang	17.90	1.31 (1.14-1.51)
Cummings	14.60	0.89 (0.57-1.39)
Palaiodimos	5.20	1.76 (0.91-3.40)
Bode	2.10	4.63 (2.96-7.26)
Overall	100	1.60 (1.27-1.93)

Heterogeneity: I²= 82.8% , p=0.000

no diabetes worse

Conclusions

- The likelihood of death is 65% higher in hospitalized patients with COVID-19 co to non-diabetics.
- Attention should be paid in protecti population from COVID-19 given the chance for adverse outcomes

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