

The Case Fatality Rate of Alpha Covid-19 Variant in Patients with Concurrent Diabetes or Chronic Kidney Disease: A Systematic Review and Meta-analysis

Farnia Ghanbarveisi ¹, Zeinab Mohseni Afshar ², Samira Shiri ³, Maliheh Dayani ⁴,
Kamran Tavakol ⁵, Mehdi Naderi ⁶, Mojgan Rajati ⁷, Maryam Karami ¹, Fatemeh Rajati ^{8*}

Supplementary material

Supplementary 1. Search Strategy in Each Database

Diabetes Topic

Scopus:

((TITLE-ABS-KEY (diabetes) OR TITLE-ABS-KEY ("Glucose Metabolism Disorders") OR TITLE-ABS-KEY (t2dm)) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY (fatality) OR TITLE-ABS-KEY (mortality) OR TITLE-ABS-KEY (death)) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY ("Covid-19") OR TITLE-ABS-KEY (covid19) OR TITLE-ABS-KEY ("2019 novel coronavirus infection") OR TITLE-ABS-KEY ("coronavirus disease 2019") OR TITLE-ABS-KEY ("coronavirus covid-19") OR TITLE-ABS-KEY (2019-ncov) OR TITLE-ABS-KEY ("SARS-CoV2") OR TITLE-ABS-KEY ("SARS-CoV-2") OR TITLE-ABS-KEY ("SARS Coronavirus 2") OR TITLE-ABS-KEY ("Coronavirus 2") OR TITLE-ABS-KEY ("2019-nCoV") OR TITLE-ABS-KEY ("novel coronavirus 2019")) AND PUBYEAR > 2018)

PubMed:

(((TITLE-ABS-KEY ("Covid-19") OR TITLE-ABS-KEY (covid19) OR TITLE-ABS-KEY ("2019 novel coronavirus infection") OR TITLE-ABS-KEY ("coronavirus disease 2019") OR TITLE-ABS-KEY ("coronavirus covid-19") OR TITLE-ABS-KEY (2019-ncov) OR TITLE-ABS-KEY ("SARS-CoV2") OR TITLE-ABS-KEY ("SARS-CoV-2") OR TITLE-ABS-KEY ("SARS Coronavirus 2") OR TITLE-ABS-KEY ("Coronavirus 2") OR TITLE-ABS-KEY ("2019-nCoV") OR TITLE-ABS-KEY ("novel coronavirus 2019")) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY (fatality) OR TITLE-ABS-KEY (mortality) OR TITLE-ABS-KEY (death)) AND PUBYEAR > 2018) AND (("diabetes mellitus"[MeSH Terms] OR ("diabetes"[All Fields] AND "mellitus"[All Fields]) OR "diabetes mellitus"[All Fields] OR "diabetes"[All Fields])) OR Diabetes Mellitus, Type 2) OR T2DM) OR ((Diabetes Mellitus, Type 2) OR T2DM)) AND PUBYEAR > 2018)

Embase:

#1

'sars-cov 2':ti,ab,kw OR 'n cov':ti,ab,kw OR 'sars cov':ti,ab,kw OR coronavirus:ti,ab,kw OR '2019 ncov':ti,ab,kw OR 'sars coronavirus':ti,ab,kw OR 'covid 19':ti,ab,kw OR 'sars-cov-2 infection':ti,ab,kw OR '2019 novel coronavirus infection':ti,ab,kw OR '2019-ncov infection':ti,ab,kw OR 'coronavirus disease 2019':ti,ab,kw OR 'coronavirus disease-19':ti,ab,kw OR '2019-ncov disease':ti,ab,kw OR 'covid-19 virus infection':ti,ab,kw

#2



'case fatality rate'/exp OR 'mortality'/exp OR death:ti,ab,kw OR 'mortality rate'/exp OR 'fatality'/exp OR fatality:ti,ab,kw OR 'death'/exp OR mortality:ti,ab,kw

#3

'diabetes mellitus':ti,ab,kw OR 'disorders of carbohydrate metabolism':ti,ab,kw OR 'non insulin dependent diabetes mellitus':ti,ab,kw

#1 AND #2 AND #3

CKD Topic

Scopus:

((TITLE-ABS-KEY ("Covid-19") OR TITLE-ABS-KEY (covid19) OR TITLE-ABS-KEY ("2019 novel coronavirus infection") OR TITLE-ABS-KEY ("coronavirus disease 2019") OR TITLE-ABS-KEY ("coronavirus covid-19") OR TITLE-ABS-KEY (2019-ncov) OR TITLE-ABS-KEY ("SARS-CoV2") OR TITLE-ABS-KEY ("SARS-CoV-2") OR TITLE-ABS-KEY ("SARS Coronavirus 2") OR TITLE-ABS-KEY ("Coronavirus 2") OR TITLE-ABS-KEY ("2019-nCoV") OR TITLE-ABS-KEY ("novel coronavirus 2019")) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY (fatality) OR TITLE-ABS-KEY (mortality) OR TITLE-ABS-KEY (death)) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY ("kidney diseases") OR TITLE-ABS-KEY ("kidney failure") OR TITLE-ABS-KEY ("renal dialysis") OR TITLE-ABS-KEY (anuria) OR TITLE-ABS-KEY ("diabetic nephropathies") OR TITLE-ABS-KEY ("diabetic nephropathies") OR TITLE-ABS-KEY ("hepatorenal syndrome") OR TITLE-ABS-KEY (hydronephrosis) OR TITLE-ABS-KEY ("hypertension, renal") OR TITLE-ABS-KEY ("kidney cortex necrosis") OR TITLE-ABS-KEY ("kidney diseases, cystic") OR TITLE-ABS-KEY ("kidney papillary necrosis") OR TITLE-ABS-KEY (nephritis) OR TITLE-ABS-KEY (nephrocalcinosis) OR TITLE-ABS-KEY (nephrolithiasis) OR TITLE-ABS-KEY (nephrosclerosis) OR TITLE-ABS-KEY (nephrosis) OR TITLE-ABS-KEY (perinephritis) OR TITLE-ABS-KEY ("renal artery obstruction") OR TITLE-ABS-KEY ("renal insufficiency") OR TITLE-ABS-KEY (uremia) OR TITLE-ABS-KEY (microalbuminuria) OR TITLE-ABS-KEY (albuminuria) OR TITLE-ABS-KEY (proteinuria) OR TITLE-ABS-KEY (proteinur*) OR TITLE-ABS-KEY (albuminur*) OR TITLE-ABS-KEY (microalbumin*)) AND PUBYEAR > 2018)

PubMed:

((TITLE-ABS-KEY ("Covid-19") OR TITLE-ABS-KEY (covid19) OR TITLE-ABS-KEY ("2019 novel coronavirus infection") OR TITLE-ABS-KEY ("coronavirus disease 2019") OR TITLE-ABS-KEY ("coronavirus covid-19") OR TITLE-ABS-KEY (2019-ncov) OR TITLE-ABS-KEY ("SARS-CoV2") OR TITLE-ABS-KEY ("SARS-CoV-2") OR TITLE-ABS-KEY ("SARS Coronavirus 2") OR TITLE-ABS-KEY ("Coronavirus 2") OR TITLE-ABS-KEY ("2019-nCoV") OR TITLE-ABS-KEY ("novel coronavirus 2019")) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY (fatality) OR TITLE-ABS-KEY (mortality) OR TITLE-ABS-KEY (death)) AND PUBYEAR > 2018) AND ((TITLE-ABS-KEY ("kidney diseases") OR TITLE-ABS-KEY ("kidney failure") OR TITLE-ABS-KEY ("renal dialysis") OR TITLE-ABS-KEY (anuria) OR TITLE-ABS-KEY ("diabetic nephropathies") OR TITLE-ABS-KEY ("hepatorenal syndrome") OR TITLE-ABS-KEY (hydronephrosis) OR TITLE-ABS-KEY ("hypertension, renal") OR TITLE-ABS-KEY ("kidney cortex necrosis") OR TITLE-ABS-KEY ("kidney diseases, cystic") OR TITLE-ABS-KEY ("kidney papillary necrosis") OR TITLE-ABS-KEY (nephritis) OR TITLE-ABS-KEY (nephrocalcinosis) OR TITLE-ABS-KEY (nephrolithiasis) OR TITLE-ABS-KEY (nephrosclerosis) OR TITLE-ABS-KEY (nephrosis) OR TITLE-ABS-KEY (perinephritis) OR TITLE-

ABS-KEY ("renal artery obstruction") OR TITLE-ABS-KEY ("renal insufficiency") OR TITLE-ABS-KEY (uremia) OR TITLE-ABS-KEY (microalbuminuria) OR TITLE-ABS-KEY (albuminuria) OR TITLE-ABS-KEY (proteinuria) OR TITLE-ABS-KEY (proteinur*) OR TITLE-ABS-KEY (albuminur*) OR TITLE-ABS-KEY (microalbumin*)) AND PUBYEAR > 2018)

Embase:

#1

'sars-cov 2':ti,ab,kw OR 'n cov':ti,ab,kw OR 'sars cov':ti,ab,kw OR coronavirus:ti,ab,kw OR '2019 ncov':ti,ab,kw OR 'sars coronavirus':ti,ab,kw OR 'covid 19':ti,ab,kw OR 'sars-cov-2 infection':ti,ab,kw OR '2019 novel coronavirus infection':ti,ab,kw OR '2019-ncov infection':ti,ab,kw OR 'coronavirus disease 2019':ti,ab,kw OR 'coronavirus disease-19':ti,ab,kw OR '2019-ncov disease':ti,ab,kw OR 'covid-19 virus infection':ti,ab,kw

#2

'case fatality rate'/exp OR 'mortality'/exp OR death:ti,ab,kw OR 'mortality rate'/exp OR 'fatality'/exp OR fatality:ti,ab,kw OR 'death'/exp OR mortality:ti,ab,kw

#3

('kidney failure':ti,ab,kw OR 'renal dialysis':ti,ab,kw OR proteinuria:ti,ab,kw OR albuminuria:ti,ab,kw OR 'kidney disease':ti,ab,kw OR 'diabetic nephropathy':ti,ab,kw OR nephrosis:ti,ab,kw OR 'hepatorenal syndrome':ti,ab,kw) AND [2020-2019]/py

#1 AND #2 AND #3

Supplementary 2. MINORS scale for Assessing Risk of Bias in the Included Studies**Supplementary 2(a). Risk of Bias Assessment for Diabetes Studies** □

n	Study	①	②	③	④	⑤	⑥	⑦	⑧	Score
1	Shi Q	2	1	1	2	1	2	2	2	13
2	(NCPERE)Team*	2	0	0	2	0	2	2	0	8
3	Guan WJ	2	0	0	2	0	2	2	0	8
4	Kim N-Y	2	2	2	2	1	2	2	0	13
5	Luo P	2	2	2	2	0	2	2	2	14
6	Nikpouraghdam M	2	0	0	2	0	2	2	0	8
7	Guo W	2	2	2	2	2	2	2	1	15
8	Richardson S	2	0	0	2	0	2	2	0	8
9	Cariou B	2	0	0	2	0	2	2	0	8
10	Wang F	2	2	2	2	1	2	2	0	13
11	Wang L	2	1	1	2	0	2	2	2	12
12	Wu C	2	1	2	2	0	2	2	2	13
13	Yan Y	2	2	2	2	0	2	2	2	14
14	Zhang Y	2	2	2	2	0	2	2	2	14
15	Zhou F	2	1	2	2	0	2	2	2	13
16	Chen T	2	0	1	2	0	2	2	0	9
17	Cao J	2	1	2	2	0	2	2	2	13
18	Wang Y	2	0	0	2	0	2	2	1	9
19	Du R-H	2	1	2	2	0	2	2	2	13
20	Shabto J.M.	2	2	1	2	0	2	2	0	11
21	Kong W	2	2	2	2	1	2	2	1	14
22	Chen Y	2	0	0	2	0	2	2	2	10

Note: ① A clearly stated aim; ② Inclusion of consecutive patients; ③ Prospective collection of data; ④ Endpoint appropriate to the aim of the study; ⑤ Unbiased assessment of the study endpoint; ⑥ Follow-up period appropriate to the aim of the study; ⑦ Loss to follow-up less than 5%; ⑧ Prospective calculation of the study size

The items are scored 0 (not reported), 1 (reported but inadequate), or 2 (reported and adequate). The global ideal score was 16 for non-comparative studies.

* The Novel Coronavirus Pneumonia Emergency Response Epidemiology Team

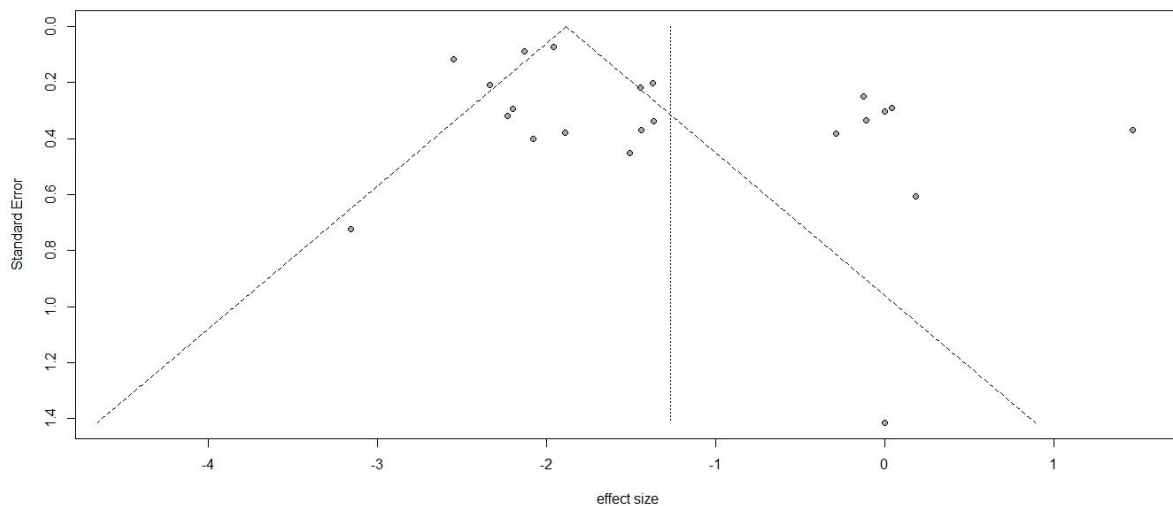
Supplementary 2(b). Risk of Bias Assessment for Renal Studies □

n	Study	①	②	③	④	⑤	⑥	⑦	⑧	Score
1	Banerjee D	2	1	2	2	1	2	2	0	12
2	Nikpouraghdam M	2	0	0	2	0	2	2	0	8
3	Zhou F	2	1	2	2	0	2	2	2	13
4	Valeri A.M.	2	2	2	2	1	2	2	1	14
5	Wang D	2	1	2	2	1	2	2	2	14
6	Wang L	2	1	1	2	0	2	2	2	12
7	Yan Y	2	1	2	2	0	2	2	1	12
8	Chen T	2	0	1	2	0	2	2	0	9
9	Guan W	2	0	0	2	0	2	2	0	8
10	Yiqiong M	2	0	0	2	0	2	2	0	8

Note: ① A clearly stated aim; ② Inclusion of consecutive patients; ③ Prospective collection of data; ④ Endpoint appropriate to the aim of the study; ⑤ Unbiased assessment of the study endpoint; ⑥ Follow-up period appropriate to the aim of the study; ⑦ Loss to follow-up less than 5%; ⑧ Prospective calculation of the study size.

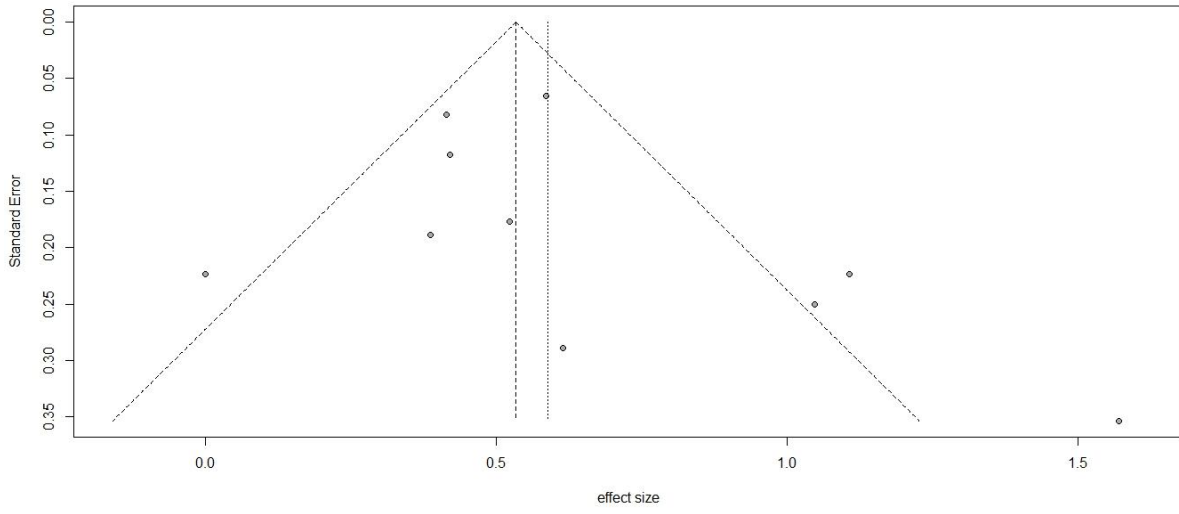
The items are scored 0 (not reported), 1 (reported but inadequate), or 2 (reported and adequate). The global ideal score was 16 for non-comparative studies.

Supplementary 3. Funnel Plot for Diabetes Topic



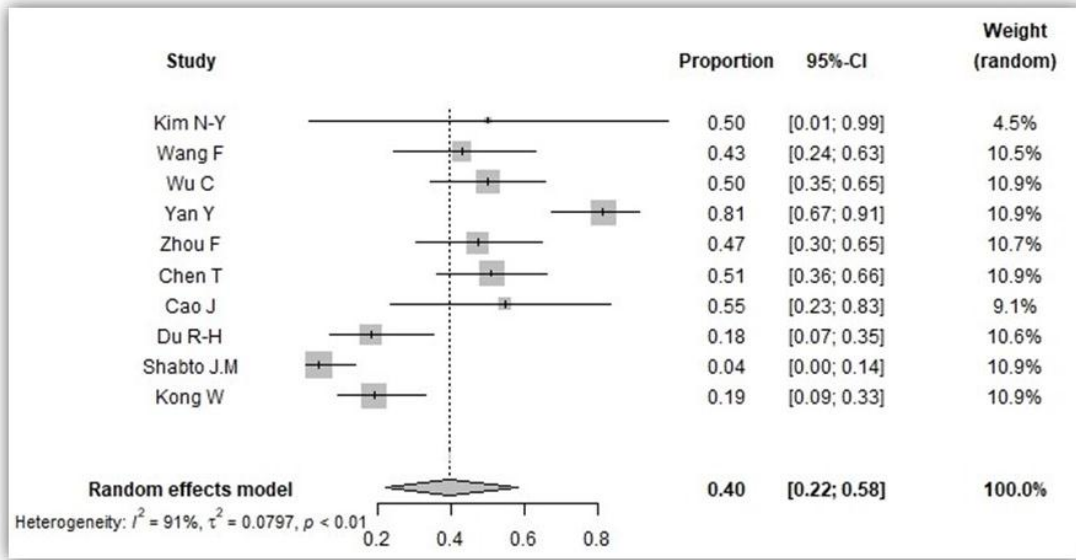
Supplementary 3. Publication Bias in Diabetes

Supplementary 4. Funnel Plot for CKD Topic

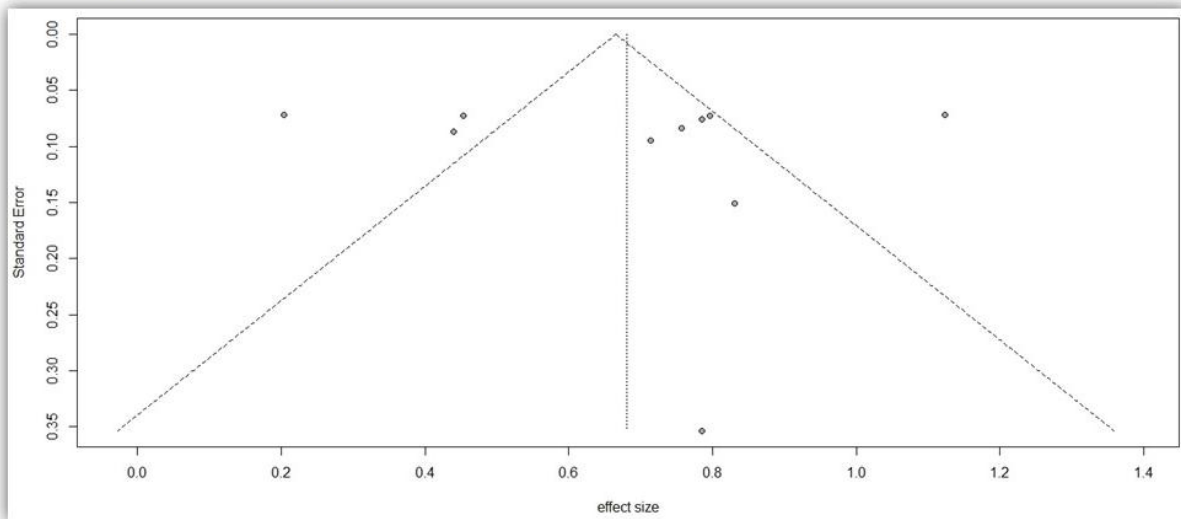


Supplementary 4. Publication Bias in Kidney Disease

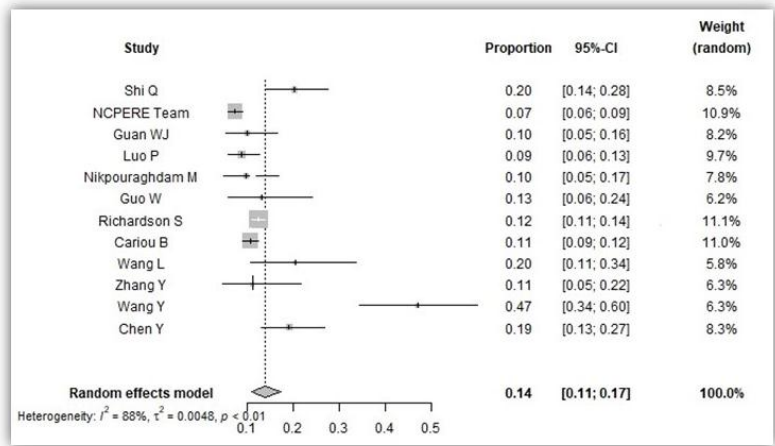
Supplementary 5. Subgroup Analysis to Assess the Effect of Sample Size on CFR of Covid-19 in Diabetes Patients



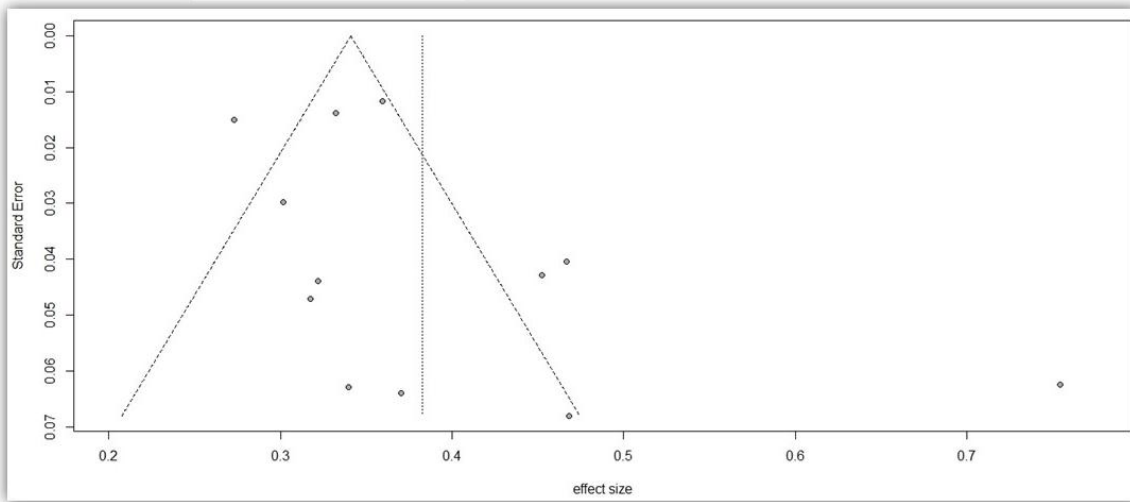
Supplementary 5(a₁)



Supplementary 5(a₂)



Supplementary 5(b₁)



Supplementary 5(b₂)

Supplementary 5: Subgroup Analysis to Assess the Effect of Sample Size on CFR of COVID-19 in Patients with Diabetes

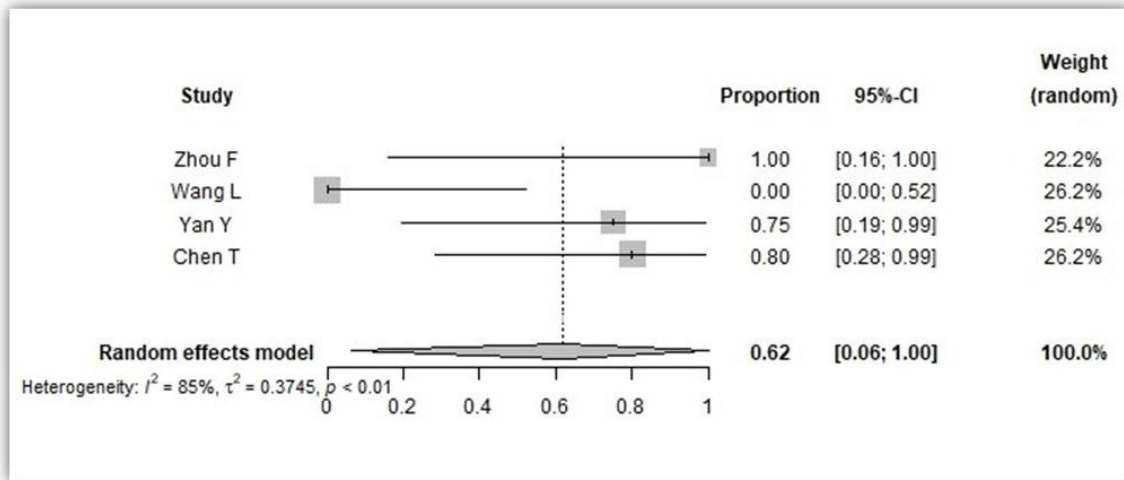
Supplementary 5(a₁): Forest Plot of the Meta-analysis of Studies with Less than 52 Diabetic Patients

Supplementary 5(a₂): Funnel Plot of the Meta-analysis of Studies with Less than 52 Diabetic Patients (P-value = 0.8236)

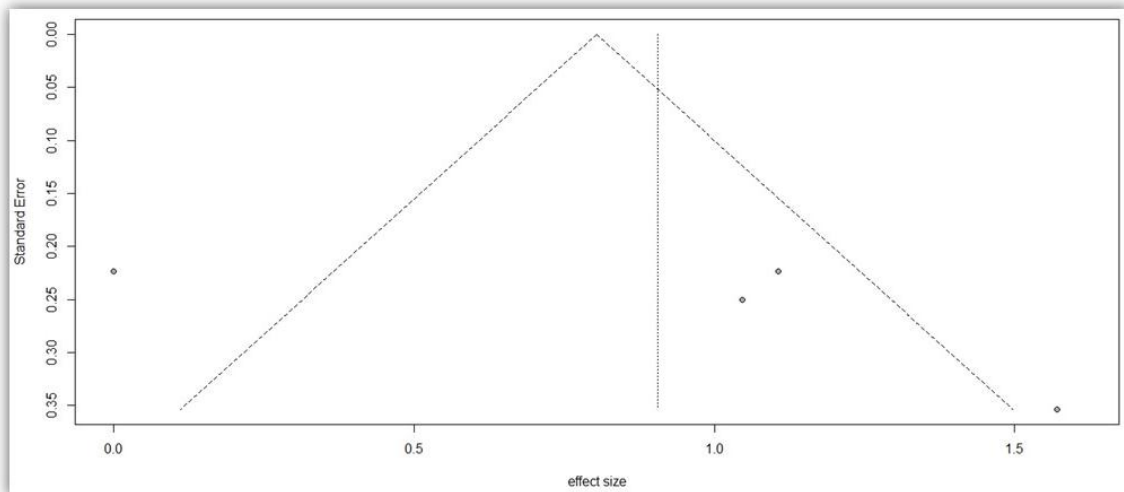
Supplementary 5(b₁): Forest Plot of the Meta-analysis of Studies with More than 52 Diabetic Patients

Supplementary 5(b₂): Funnel Plot of the Meta-analysis of Studies with More than 52 Diabetic Patients (P-value = 0.1268)

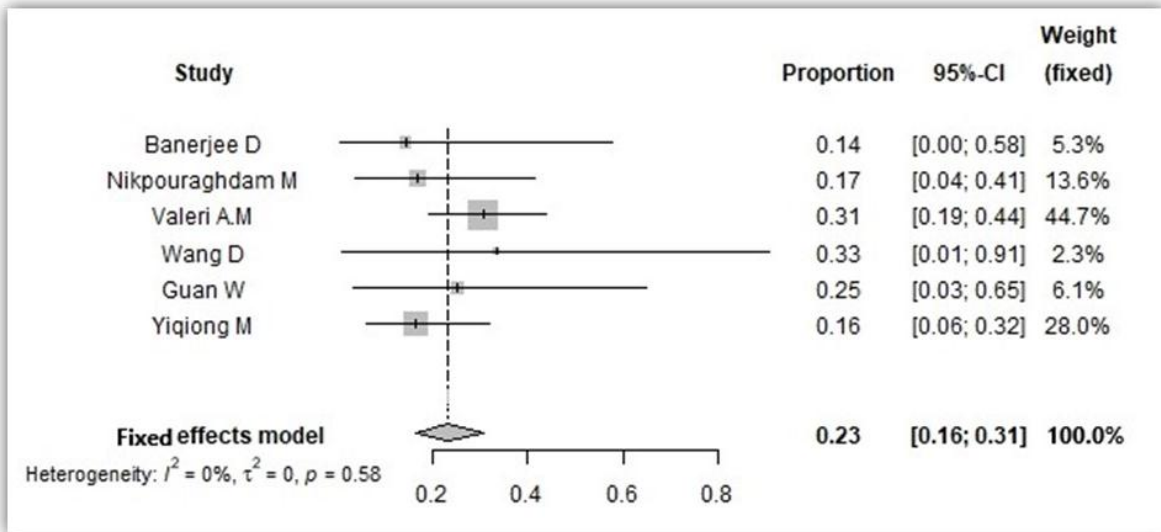
Supplementary 6. Subgroup Analysis to Assess the Effect of Sample Size on CFR of Covid-19 in Patients with Chronic Kidney Disease.



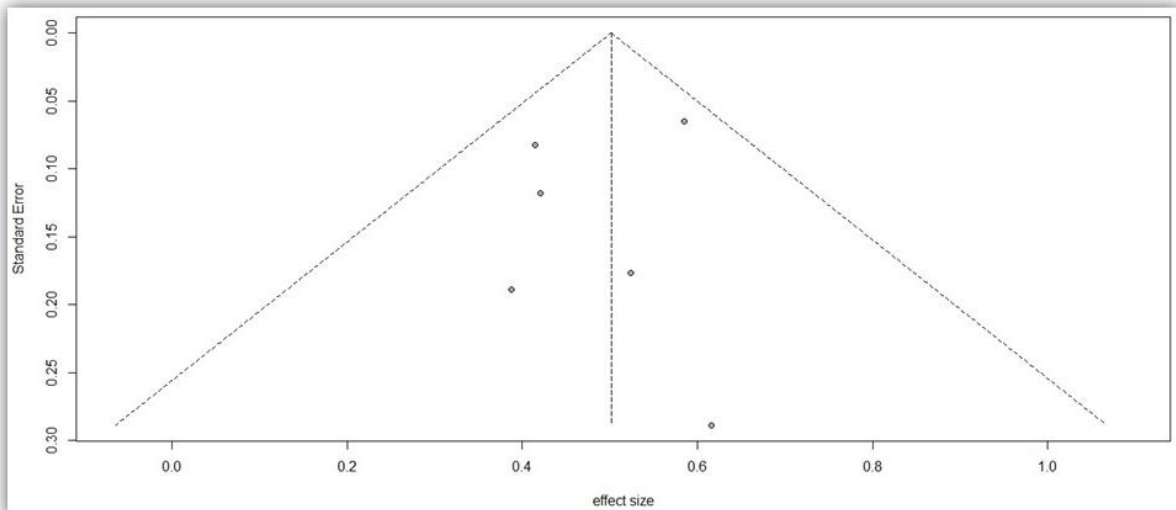
Supplementary 6(a₁)



Supplementary 6(a₂)



Supplementary 6(b₁)



Supplementary 6(b₂)

Supplementary 6. Subgroup Analysis to Assess the Effect of Sample Size on CFR of Covid-19 in Patients with Chronic Kidney Disease:

Supplementary 6(a₁): Forest Plot of the Meta-analysis of Studies with Less than Six Renal Patients

Supplementary 6(a₂): Funnel Plot of the Meta-analysis of Studies with Less than Six Renal Patients (linear regression test of funnel plot asymmetry: P-value = 0.4073)

Supplementary 6(b₁): Forest Plot of the Meta-analysis of Studies with More than Six Renal Patients

Supplementary 6(b₂): Funnel Plot of the Meta-analysis of Studies with More than Six Renal Patients (linear regression test of funnel plot asymmetry: P-value = 0.6283)