

Supplementary materials

Supplementary File S1. Search terms used for OVID MedLine, SCOPUS, Europe PubMed Central and medRxiv.

MedLine Search Terms

1. COVID-19.mp. or COVID-19/
2. SARS-CoV-2.mp. or SARS-CoV-2/
3. coronavirus disease 2019.mp. or COVID-19/
4. 1 or 2 or 3
5. Gastrointestinal Diseases/ or gastrointestinal symptoms.mp.
6. abdominal pain.mp. or Abdominal Pain/
7. Vomiting/ or vomiting.mp.
8. Diarrhea/ or diarrh?ea.mp. or Diarrhea, Infantile/
9. Constipation/ or constipation.mp.
10. malnutrition.mp. or Malnutrition/
11. gastritis.mp. or Gastritis/
12. Gastroesophageal Reflux/ or gord.mp.
13. reflux.mp. or Gastroesophageal Reflux/ or Bile Reflux/
14. pancreatitis.mp. or Pancreatitis/
15. Colitis/ or colitis.mp.
16. Esophagitis/ or Deglutition Disorders/ or oesophagitis.mp.
17. transaminitis.mp.
18. cholestasis.mp. or Cholestasis/
19. cholestatic liver injury.mp.
20. appendicitis.mp. or Appendicitis/
21. Gastrointestinal Hemorrhage/ or upper gastrointestinal bleed.mp.
22. Gastrointestinal Hemorrhage/ or lower gastrointestinal bleed.mp.
23. 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22
24. Longitudinal Studies/ or longitudinal.mp.
25. observational.mp. or Observational Study/

26. Cross-Sectional Studies/ or cross-sectional.mp.

27. Cohort Studies/ or cohort.mp.

28. Case-Control Studies/ or case control.mp.

29. 24 or 25 or 26 or 27 or 28

30. 4 and 23 and 29

31. limit 30 to (english language and humans and yr="2019 -Current")

SCOPUS Search Terms

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(( TITLE-ABS ( covid-19 ) ) OR ( TITLE-ABS ( sars-cov-2 ) ) OR ( TITLE-ABS ( "coronavirus disease 2019" ) ) ) AND ( ( TITLE-ABS ( "gastrointestinal disease*" ) ) OR ( TITLE-ABS ( "gastrointestinal symptom*" ) ) OR ( TITLE-ABS ( "abdominal pain" ) ) OR ( TITLE-ABS ( nausea ) ) OR ( TITLE-ABS ( vomiting ) ) OR ( TITLE-ABS ( diarrh*ea ) ) OR ( TITLE-ABS ( constipation ) ) OR ( TITLE-ABS ( malnutrition ) ) OR ( TITLE-ABS ( gastritis ) ) OR ( TITLE-ABS ( colitis ) ) OR ( TITLE-ABS ( *esophagitis ) ) OR ( TITLE-ABS ( transaminitis ) ) OR ( TITLE-ABS ( cholestasis ) ) OR ( TITLE-ABS ( appendicitis ) ) OR ( TITLE-ABS ( "gastrointestinal haemorrhage" ) ) OR ( TITLE-ABS ( "upper gastrointestinal bleed" ) ) OR ( TITLE-ABS ( "lower gastrointestinal bleed" ) ) OR ( TITLE-ABS ( "cholestatic liver injury" ) ) ) AND ( ( TITLE-ABS ( longitudinal ) ) OR ( TITLE-ABS ( cross-sectional ) ) OR ( TITLE-ABS ( cohort ) ) OR ( TITLE-ABS ( "case control" ) ) OR ( TITLE-ABS ( case-control ) ) OR ( TITLE-ABS ( observational ) ) ) )
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Europe PMC Search Terms

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((TITLE-ABS(covid-19)) OR (TITLE-ABS(sars-cov-2)) OR (TITLE-ABS("coronavirus disease 2019")) AND ((TITLE-ABS("gastrointestinal disease*")) OR (TITLE-ABS("gastrointestinal symptom*")) OR (TITLE-ABS("abdominal pain")) OR (TITLE-ABS(nausea)) OR (TITLE-ABS(vomiting)) OR (TITLE-ABS(diarrh*ea)) OR (TITLE-ABS(constipation)) OR (TITLE-ABS(malnutrition)) OR (TITLE-ABS(gastritis)) OR (TITLE-ABS(colitis)) OR (TITLE-ABS(*esophagitis)) OR (TITLE-ABS(transaminitis)) OR (TITLE-ABS(cholestasis)) OR (TITLE-ABS(appendicitis)) OR (TITLE-ABS("gastrointestinal haemorrhage")) OR (TITLE-ABS("upper gastrointestinal bleed")) OR (TITLE-ABS("lower gastrointestinal bleed")) OR (TITLE-ABS("cholestatic liver injury")))) AND ((TITLE-ABS(longitudinal)) OR (TITLE-ABS(cross-sectional)) OR (TITLE-ABS(cohort)) OR (TITLE-ABS("case control")) OR (TITLE-ABS(case-control)) OR (TITLE-ABS(observational)))
```

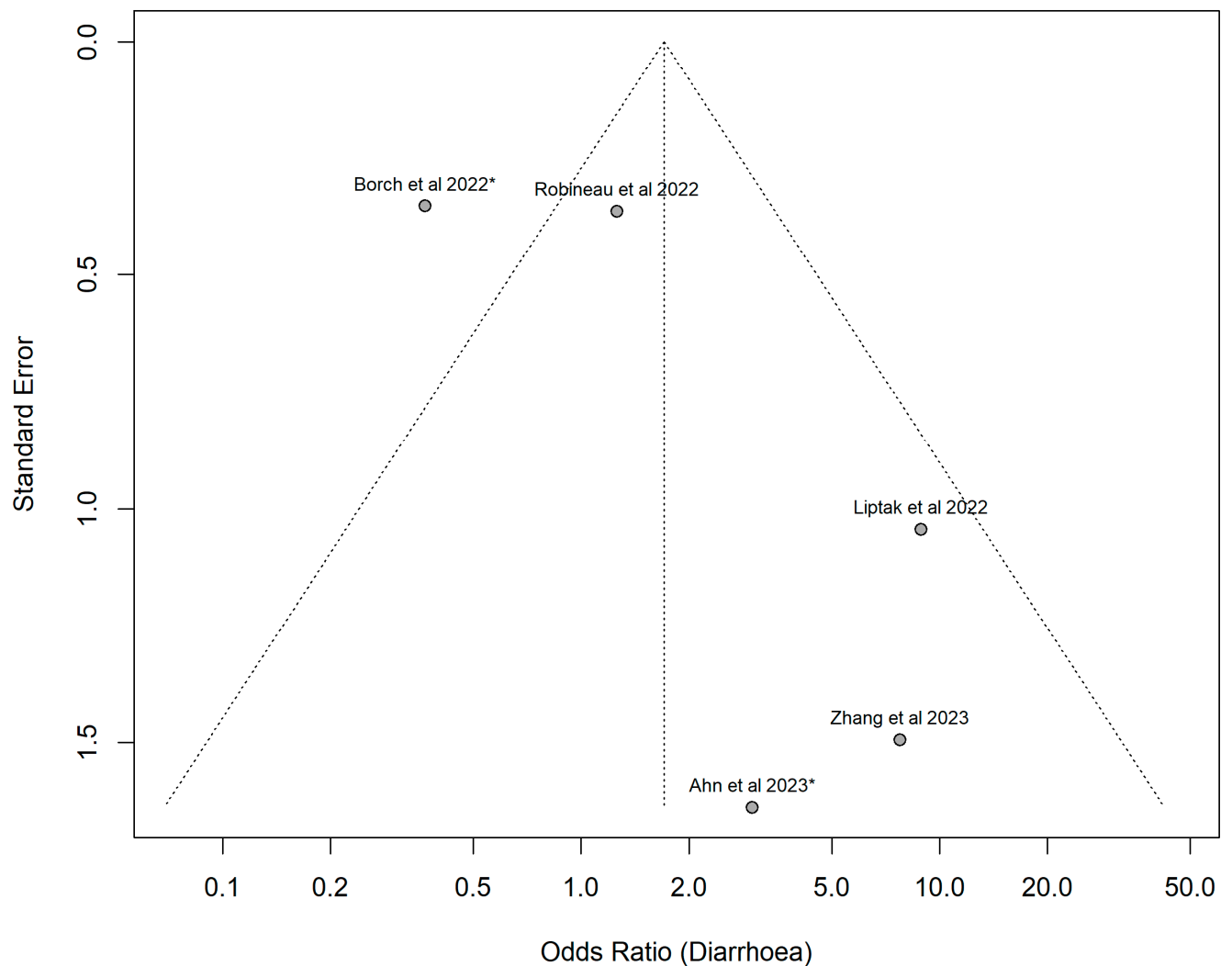
medRxiv (searched using the "medRxiv" API package in R studio)

```
topic1 <- c("covid-19","COVID-19","sars-[Cc][Oo][Vv]-2","SARS-[Cc][Oo][Vv]-2","coronavirus disease 2019") # Combined with Boolean OR
```

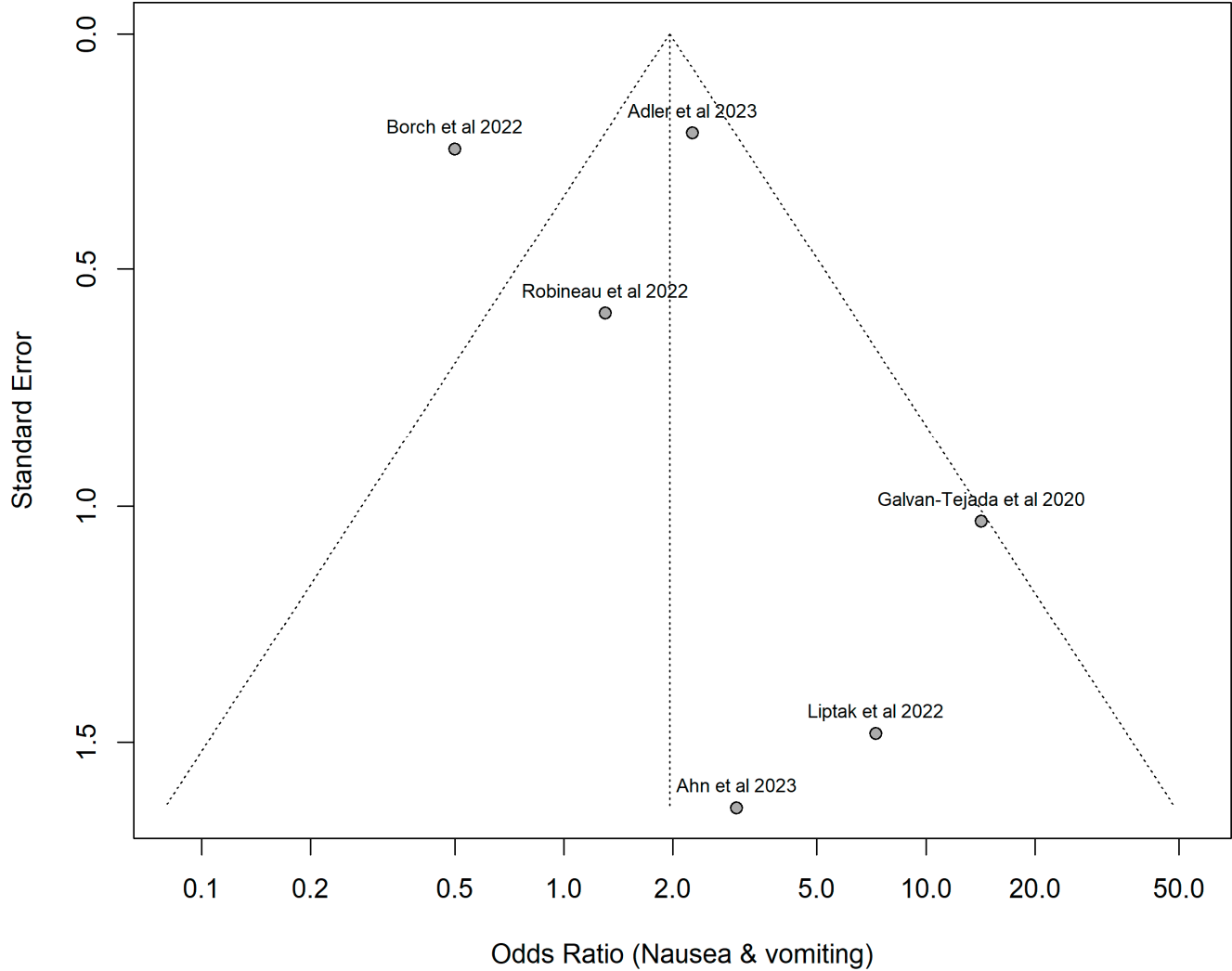
```
topic2 <- c("gastrointestinal disease","gastrointestinal symptom*","abdominal pain","nausea","vomiting","diarr*ea","constipation","malnutrition","gastritis","colitis","*esophagitis","transaminitis","cholestasis","appendicitis","gastrointestinal haemorrhage","upper gastrointestinal bleed","lower gastrointestinal bleed","cholestatic liver injury")
```

```
topic3 <- c("longitudinal","cross-sectional","cross sectional","cohort","case control","case-control","observational") # Combined with Boolean OR
myquery <- list(topic1, topic2
```

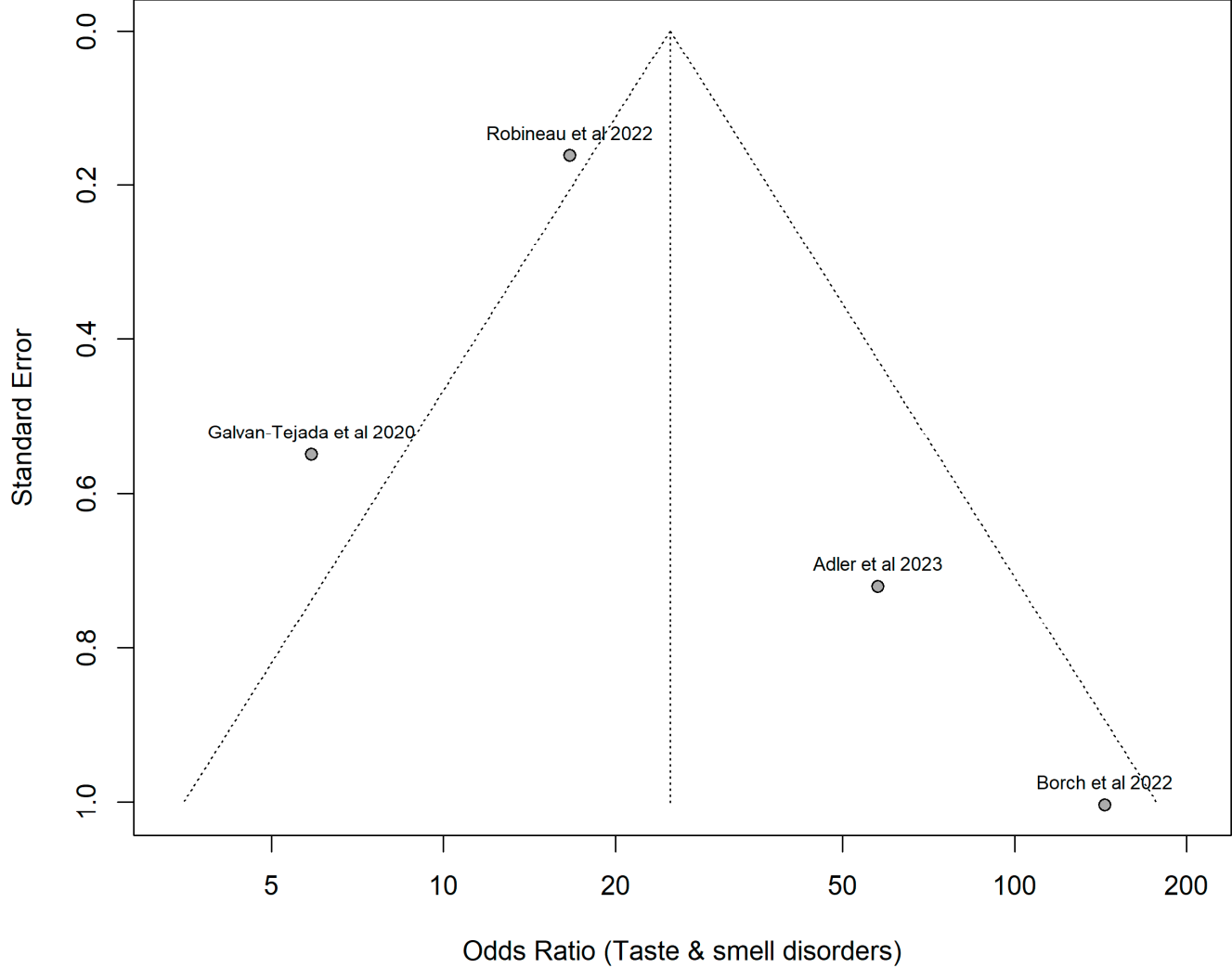
Supplementary Figure S1. Funnel plot of study bias for five studies reporting an odds ratio for persistent diarrhoea. The funnel and pooled effect estimate shown in the dotted lines is based on a random effects model, though we do not interpret this further due to significant inter-study heterogeneity (see Main Text).



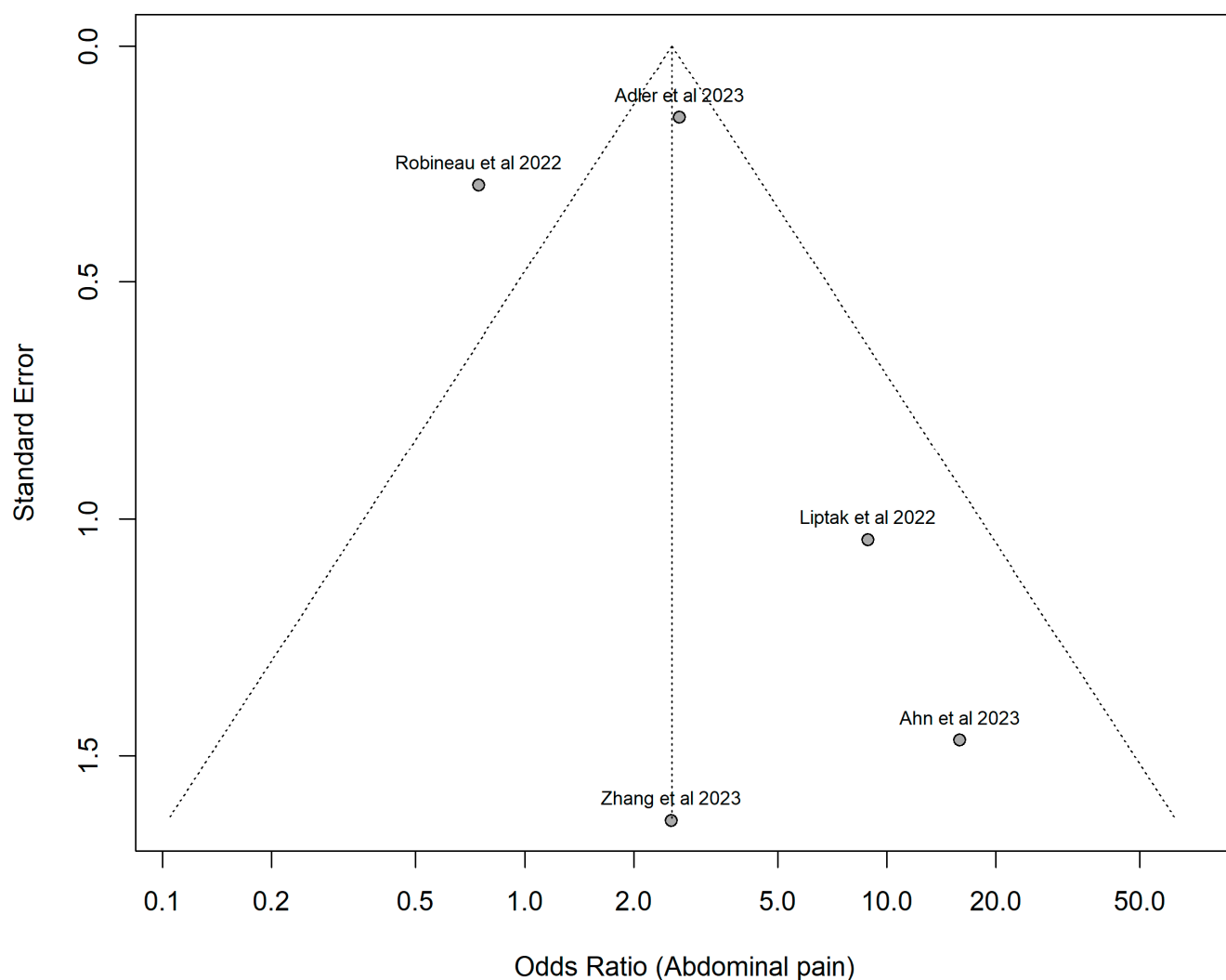
Supplementary Figure S2. Funnel plot of study bias for six studies reporting an odds ratio for persistent nausea and vomiting. The funnel and pooled effect estimate shown in the dotted lines is based on a random effects model, though we do not interpret this further due to significant inter-study heterogeneity (see Main Text).



Supplementary Figure S3. Funnel plot of study bias for four studies reporting an odds ratio for persistent taste and smell disorders. The funnel and pooled effect estimate shown in the dotted lines is based on a random effects model, though we do not interpret this further due to significant inter-study heterogeneity (see Main Text).



Supplementary Figure S4. Funnel plot of study bias for five studies reporting an odds ratio for persistent abdominal pain. The funnel and pooled effect estimate shown in the dotted lines is based on a random effects model, though we do not interpret this further due to significant inter-study heterogeneity (see Main Text).



Supplementary Table S1. Risk of bias assessment, including justification for studies deemed to be of moderate or low quality.

Author and year	Country	Overall quality of study	Reasoning for medium or high risk studies
Islam, M. et al 2021 ³⁰	Bangladesh	Moderate	Exposure not reliably measured, inclusion criteria not clearly defined.
Ghoshal, U.C. et al 2021 ⁵⁰	Bangladesh and India	High	N/A

Liang, L. et al 2020 ⁴¹	China	Moderate	Absence of a comparator group, did not adjust for confounding variables.
Xie, XP. et al 2021 ⁴²	China	Low	Absence of a comparator group, did not adjust for confounding variables, no information on participants lost to follow-up.
Attauabi, M. et al 2021 ⁴⁶	Denmark	Low	Absence of a comparator group, did not adjust for confounding variables.
Borch, L. et al 2022 ⁵²	Denmark	Moderate	Did not adjust for confounding variables.
Vaillant, MF. et al 2021 ³³	France	Low	Absence of comparator group, participants potentially not free of outcome at study enrolment.
Faycal, A. et al. 2021 ³⁹	France	Moderate	Absence of a comparator group.
Gerard, M. et al 2021 ³⁴	France	Moderate	Absence of a comparator group, did not adjust for confounding variables, no information on participants lost to follow-up.
Belkacemi, M. et al 2022 ³⁷	France	Low	Absence of comparator group, did not adjust for confounding factors, participants potentially not free of outcome at study enrolment.
Robineau, O. et al 2022 ⁴⁰	France	High	N/A
Augustin, M. et al 2021 ⁴⁸	Germany	Moderate	Absence of a comparator group.
Noviello, D. et al 2021 ⁴⁹	Italy	High	N/A
Comelli, A. et al 2022 ⁴⁵	Italy	Moderate	Absence of a comparator group, no information on participants lost to follow-up.
Damanti, S. et al 2022 ³⁵	Italy	Low	Absence of a comparator group, exposure method not reliably measured, did not control for confounding variables, participants potentially not free of outcome at study enrolment, no information on participants lost to follow-up.
Fatima, G. et al 2021 ⁷¹	India	Low	Absence of comparator group, did not adjust for confounding variables, participants potentially not free of outcome at study enrolment.
Rao, G. et al 2021 ⁷⁰	India	Low	Exposure method not reliably measured, did not adjust for confounding variables, study subjects and setting not clearly described.
Fernandez-Plata, R. et al 2022 ⁵³	Mexico	Moderate	Absence of a comparator group, no information on participants lost to follow-up.
Galvan-Tejada, C. et al 2020 ⁵¹	Mexico	High	N/A
Qamar, M. et al 2022 ³²	Pakistan	Moderate	Lack of information on outcome measurement.
Stepan, M. D. et al 2022 ⁴⁴	Romania	High	N/A
Khodeir, M. et al 2021 ³¹	Saudi Arabia	Moderate	Inclusion criteria not clearly defined, did not adjust for confounding factors.

Liptak, P. et al 2022 ⁴⁷	Slovakia	High	N/A
Karaarslan, F. et al 2021 ³⁶	Turkey	Low	Absence of a comparator group, did not adjust for confounding factors.
Penner, J. et al 2021 ⁴³	UK	Moderate	Absence of a comparator group, did not adjust for confounding factors.
Taquet, M. et al 2021 ⁸	USA	High	N/A
Wu, Q. et al 2022 ³⁸	USA	High	N/A
Austhof, E. et al. 2022 ⁵⁴	USA	Moderate	Absence of a comparator group, did not adjust for confounding factors.
Adler et al. 2023 ⁵⁵	Israel	Moderate	Did not adjust for confounding factors.
Ahn et al. 2023 ⁵⁶	South Korea	Moderate	Did not adjust for confounding factors, exposure not reliably measured.
Chanchaoenthana et al. 2023 ⁵⁷	Thailand	Moderate	Absence of a comparator group, did not adjust for confounding factors.
da Costa e Silva et al. 2023 ⁵⁸	Brazil	Low	Absence of a comparator group, did not adjust for confounding factors, no information on participants lost to follow-up.
Dagher et al. 2023 ⁵⁹	USA	Low	Absence of a comparator group, did not adjust for confounding variables, participants potentially not free of outcome at study enrolment.
Fernandez-de-Las-Penas et al. 2023 ⁶⁰	Spain	Moderate	Absence of a comparator group, did not adjust for confounding variables.
Fischer et al. 2022 ⁶¹	Luxembourg	Moderate	Absence of a comparator group.
Golla et al. 2023 ⁶²	India	Moderate	Did not adjust for confounding factors, no information on participants lost to follow-up.
Imoto et al. 2022 ⁶³	Japan	High	N/A
Karuna et al. 2023 ⁶⁴	USA, Peru, Malawi, South Africa, Zambia and Zimbabwe	Moderate	Absence of a comparator group, participants potentially not free of outcome at study enrolment.
Sedik 2023 ⁶⁵	Iraq	Low	Absence of a comparator group, did not adjust for confounding variables, participants potentially not free of outcome at study enrolment.
Xu et al. 2023 ⁶⁶	USA	Moderate	Exposure not reliably measured, , no information on participants lost to follow-up.
Yamamoto et al. 2023 ⁶⁷	Japan	Moderate	Absence of a comparator group.
Zhang et al. 2023 ⁶⁸	China	High	N/A
Chang et al. 2023 ⁶⁹	Not specified	High	N/A
Andersson et al. 2023 ⁷³	Denmark	High	N/A

Ma et al. ⁷²	UK	High	N/A
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