

Supplemental Material Content

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eTable 1. Modified Newcastle-Ottawa risk of bias scoring guide.

Sample representativeness	
1 point	Population contained multiple hospitals in multiple regions.
0 points	Population contained either a single hospital, a single regions, or both.
Sample size	
1 point	Sample size was greater than or equal to 200 participants.
0 points	Sample size was less than 200 participants.
Non-respondents	
1 point	Comparability between respondent and non-respondent characteristics was established with a satisfactory response rate.
0 points	The comparability between respondents and non-respondents was unsatisfactory, the response rate was unsatisfactory, or there was no description of the response rate or the characteristics of the responders or non-responders.
Ascertainment of insomnia, stress, anxiety, and depression	
1 point	The study employed a commonly used measurement tool with a valid cutoff score.
0 points	The study employed an infrequently used measurement tool, a commonly used measurement tool with an invalid cutoff score, or any tool with published sensitivity/specificity values <70%.
Quality of descriptive statistics reporting	
1 point	The study reported descriptive statistics to describe the population (e.g., age, sex, class year) with proper measures of dispersion.
0 points	The study did not report descriptive statistics, incompletely reported descriptive statistics, or did not report measures of dispersion.

eTable 2. Newcastle-Ottawa Risk of Bias Assessment.

First Author, Year	Representativeness	size	Comparability	Outcome	Statistics	Total
Almater et al, ¹ 2020	0	0	0	1	1	2
Alshekaili et al, ² 2020	1	0	1	1	0	3
Cui et al, ³ 2020	0	1	1	1	0	3
Elkholy et al, ⁴ 2020	1	1	1	1	0	4
Giardino et al, ⁵ 2020	1	1	0	0	0	2
Haravuori et al, ⁶ 2020	1	1	0	0	0	2
Lai et al, ⁷ 2020	1	1	1	1	1	5
Liu et al, ⁸ 2020	0	1	0	1	0	2
Magnavita et al, ⁹ 2020	1	0	0	1	0	2
Shechter et al, ¹⁰ 2020	1	1	0	1	0	3
Tiete et al, ¹¹ 2020	1	0	1	1	0	3
Wang et al, ¹² 2020	1	1	1	1	0	4
Youssef et al, ¹³ 2020	1	1	1	1	1	5
Azoulay et al, ¹⁴ 2021	1	1	1	1	0	4
Di Mattei et al, ¹⁵ 2021	1	1	0	1	0	3
Fiol-DeRoque et al, ¹⁶ 2021	1	0	1	1	1	4
Guo et al, ¹⁷ 2021	1	0	1	1	1	4
Lee et al, ¹⁸ 2021	1	0	1	1	0	4
Wright et al, ¹⁹ 2021	0	1	0	1	0	2

eTable 3. Sensitivity Analysis of the Prevalence of Insomnia or Insomnia Symptoms Among Frontline Healthcare Workers During the COVID-19 Pandemic.

First Author, Year	Prevalence (%)	95% CI		Tau ²	I ²
		Lower	Upper		
Omitted Almater et al, ¹ 2020	45.9	45.1	46.7	0.68	99%
Omitted Alshekaili et al, ² 2020	46.8	46.0	47.6	0.60	99%
Omitted Cui et al, ³ 2020	45.9	45.1	46.7	0.68	99%
Omitted Elkholy et al, ⁴ 2020	46.4	45.6	47.2	0.66	99%
Omitted Giardino et al, ⁵ 2020	43.8	43.0	44.6	0.55	99%
Omitted Haravuori et al, ⁶ 2020	46.3	45.3	47.2	0.68	99%
Omitted Lai et al, ⁷ 2020	46.9	46.1	47.7	0.67	99%
Omitted Liu et al, ⁸ 2020	47.7	46.9	48.6	0.67	99%
Omitted Magnavita et al, ⁹ 2020	46.1	45.3	47.1	0.61	99%
Omitted Tiete et al, ¹¹ 2020	44.9	44.1	45.7	0.59	99%
Omitted Wang et al, ¹² 2020	46.3	45.5	47.1	59.4	99%
Omitted Youssef et al, ¹³ 2020	45.6	44.8	46.4	0.67	99%
Omitted Di Mattei et al, ¹⁵ 2021	45.4	44.6	46.2	0.67	99%
Omitted Fiol-DeRoque et al, ¹⁶ 2021	46.5	45.7	47.3	0.64	99%
Omitted Guo et al, ¹⁷ 2021	43.4	42.5	44.2	48.8	99%
Omitted Lee et al, ¹⁸ 2021	46.1	45.3	46.9	0.67	99%

eTable 4. Sensitivity Analysis of the Prevalence of Stress or Stress Symptoms Among Front-line Healthcare Workers During the COVID-19 Pandemic.

First Author, Year	Prevalence (%)	95% CI		Tau ²	I ²
		Lower	Upper		
Omitted Almater et al, ¹ 2020	54.6	53.4	55.9	0.58	99%
Omitted Alshekaili et al, ² 2020	57.9	56.6	59.3	0.49	98%
Omitted Elkholy et al, ⁴ 2020	52.4	51.1	53.7	0.40	98%
Omitted Lai et al, ⁷ 2020	50.5	49.1	52.0	0.58	98%
Omitted Magnavita et al, ⁹ 2020	55.3	54.0	56.6	0.63	99%
Omitted Shechter et al, ¹⁰ 2020	54.7	53.4	56.0	0.66	99%
Omitted Tiete et al, ¹¹ 2020	56.7	55.4	58.1	0.62	99%
Omitted Youssef et al, ¹³ 2020	56.7	55.4	58.0	0.60	99%
Omitted Di Mattei et al, ¹⁵ 2021	53.7	52.3	55.1	0.65	99%
Omitted Fiol-DeRoque et al, ¹⁶ 2021	56.2	54.9	57.6	0.62	99%

eTable 5. Sensitivity Analysis of the Prevalence of Anxiety or Anxiety Symptoms Among Frontline Healthcare Workers During the COVID-19 Pandemic.

First Author, Year	Prevalence (%)	95% CI		Tau ²	I ²
		Lower	Upper		
Omitted Almater et al, ¹ 2020	38.2	37.5	38.9	0.69	99%
Omitted Alshekaili et al, ² 2020	38.2	37.5	39.0	0.69	99%
Omitted Cui et al, ³ 2020	37.9	37.1	38.6	0.67	99%
Omitted Elkholy et al, ⁴ 2020	37.0	36.3	37.8	0.55	99%
Omitted Giardino et al, ⁵ 2020	35.7	34.9	36.4	0.55	99%
Omitted Haravuori et al, ⁶ 2020	45.6	44.7	46.5	0.62	99%
Omitted Lai et al, ⁷ 2020	37.7	37.0	38.5	0.69	99%
Omitted Liu et al, ⁸ 2020	39.6	38.8	40.4	0.67	99%
Omitted Magnavita et al, ⁹ 2020	38.4	37.7	39.2	0.59	99%
Omitted Shechter et al, ¹⁰ 2020	38.4	37.7	39.2	0.68	99%
Omitted Tiete et al, ¹¹ 2020	37.7	36.9	38.4	0.68	99%
Omitted Wang et al, ¹² 2020	38.6	37.9	39.3	0.57	99%
Omitted Youssef et al, ¹³ 2020	38.1	37.3	38.8	0.69	99%
Omitted Azoulay et al, ¹⁴ 2021	37.1	36.3	37.8	0.66	99%
Omitted Di Mattei et al, ¹⁵ 2021	38.6	37.9	39.4	0.68	99%
Omitted Fiol-DeRoque et al, ¹⁶ 2021	37.8	37.1	38.6	0.68	99%
Omitted Guo et al, ¹⁷ 2021	37.2	36.5	38.0	0.68	99%
Omitted Lee et al, ¹⁸ 2021	37.8	37.1	38.6	0.68	99%
Omitted Wright et al, ¹⁹ 2021	38.3	37.6	39.0	0.65	99%

eTable 6. Sensitivity Analysis of the Prevalence of Depression or Depressive Symptoms Among Frontline Healthcare Workers During the COVID-19 Pandemic.

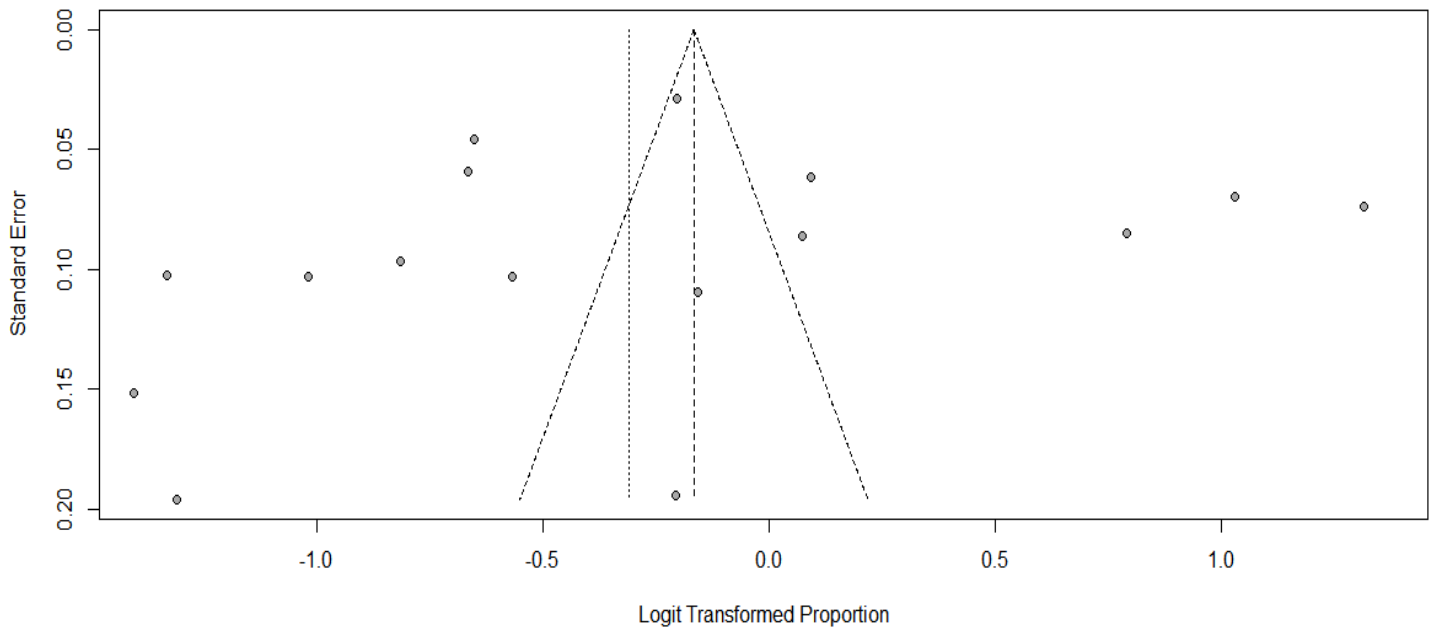
First Author, Year	Prevalence (%)	95% CI		Tau ²	I ²
		Lower	Upper		
Omitted Almater et al, ¹ 2020	43.8	43.0	44.5	0.72	99%
Omitted Alshekaili et al, ² 2020	44.1	43.4	44.9	0.72	99%
Omitted Cui et al, ³ 2020	43.5	42.7	44.2	0.70	99%
Omitted Elkholy et al, ⁴ 2020	42.7	42.0	43.5	0.58	99%
Omitted Giardino et al, ⁵ 2020	41.3	40.6	42.1	0.55	98%
Omitted Haravuori et al, ⁶ 2020	48.5	47.6	49.4	0.71	98%
Omitted Lai et al, ⁷ 2020	43.3	42.5	44.1	0.72	99%
Omitted Liu et al, ⁸ 2020	44.1	43.4	44.9	0.73	99%
Omitted Magnavita et al, ⁹ 2020	43.9	42.2	44.7	0.70	99%
Omitted Shechter et al, ¹⁰ 2020	43.6	42.9	44.4	0.73	99%
Omitted Tiete et al, ¹¹ 2020	43.4	42.7	44.2	0.72	99%
Omitted Wang et al, ¹² 2020	44.3	43.5	45.0	0.61	99%
Omitted Youssef et al, ¹³ 2020	43.3	42.6	44.1	0.70	99%
Omitted Azoulay et al, ¹⁴ 2021	44.2	43.4	45.0	0.72	99%
Omitted Di Mattei et al, ¹⁵ 2021	41.1	43.3	44.8	0.73	99%
Omitted Fiol-DeRoque et al, ¹⁶ 2021	43.8	43.1	44.6	0.73	99%
Omitted Guo et al, ¹⁷ 2021	43.0	42.2	43.7	0.71	99%
Omitted Lee et al, ¹⁸ 2021	44.5	43.8	45.3	0.58	99%
Omitted Wright et al, ¹⁹ 2021	43.9	43.2	44.7	0.66	99%

eTable 7. Sensitivities and Specificities of Commonly Used Instruments for Diagnosing Insomnia, Stress, Anxiety, and Depression.

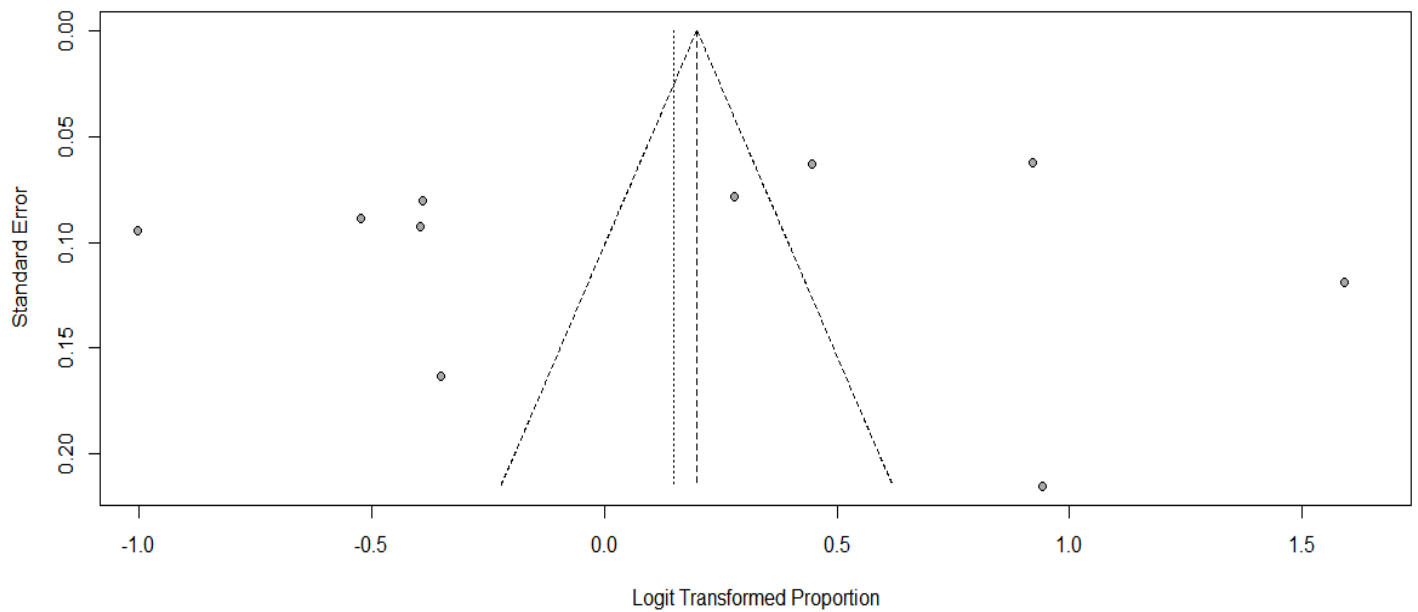
Instrument	Cutoff	Sensitivity (%)	Specificity (%)
Insomnia			
ISI ²⁰	≥8	99 (97 to 100)	92 (89 to 95)
PSQI ²¹	≥6	100 (83 to 100)	49 (36 to 63)
ESS ²¹	≥10	76 (63 to 86)	20 (6 to 44)
Stress			
PSS-10 ²²	≥9	83 (81 to 88)	75 (72 to 81)
IES-R ²²	≥18	86 (67 to 94)	83 (76 to 88)
ERI ²³	≥2	73 (59 to 93)	89 (85 to 99)
PC-PTSD ²⁴	≥3	57 (45 to 68)	77 (67 to 82)
Anxiety			
GAD-2 ²⁵	≥3	73 (39 to 94)	83 (76 to 89)
GAD-7 ²⁵	≥10	64 (31 to 89)	86 (78 to 91)
OASIS ²⁵	≥8	82 (48 to 98)	82 (75 to 88)
HADS-A ²⁵	≥8	90 (85 to 93)	78 (69 to 85)
Depression			
BDI ²⁶	≥10	91 (86 to 96)	79 (52 to 100)
CES-D ²⁶	≥16	84 (79 to 89)	74 (68 to 80)
PRIME-MD ²⁶	≥1	91 (81 to 100)	66 (48 to 84)
GHQ ²⁶	≥4	86 (76 to 95)	66 (57 to 74)
HADS-D ²⁶	≥11	69 (45 to 86)	86 (73 to 93)
PHQ-9 ²⁶	≥10	88 (74 to 96)	88 (85 to 90)
Zung-SDS ²⁶	≥50	86 (73 to 100)	76 (57 to 95)
HSCL ²⁶	≥43	82 (71 to 93)	73 (52 to 94)

Abbreviations: BDI, Beck Depression Inventory; CES-D, Center for Epidemiological Studies Depression; ESS Epworth sleepiness score; ERI, Effort Reward Imbalance; GAD-2, 2-item Generalized Anxiety Disorder Scal; GAD-7, Generalized Anxiety Disorder 7-item; GHQ, Primary Care Evaluation of Mental Disorders; HADS-A, Hospital Anxiety and Depression Scale-Anxiety Subscale; HADS-D, Hospital Anxiety and Depression Scale-Depression Subscale; HSCL, Hopkins Symptom Checklist; IES-R, 22-item Impact of Event Scale–Revised; ISI, The seven-item Insomnia Severity Index; OASIS, Overall Anxiety Severity and Impairment Scale; PC-PTSD, 4-item Primary Care PTSD screen; PHQ-9, Patient Health Questionnaire-9; PRIME-MD, Primary Care Evaluation of Mental Disorders; PSQI, Hospital Anxiety and Depression Scale; PSS-10, 10-item Perceived Stress Scale; Zung-SDS, Zung Self-Rating Depression Scale.

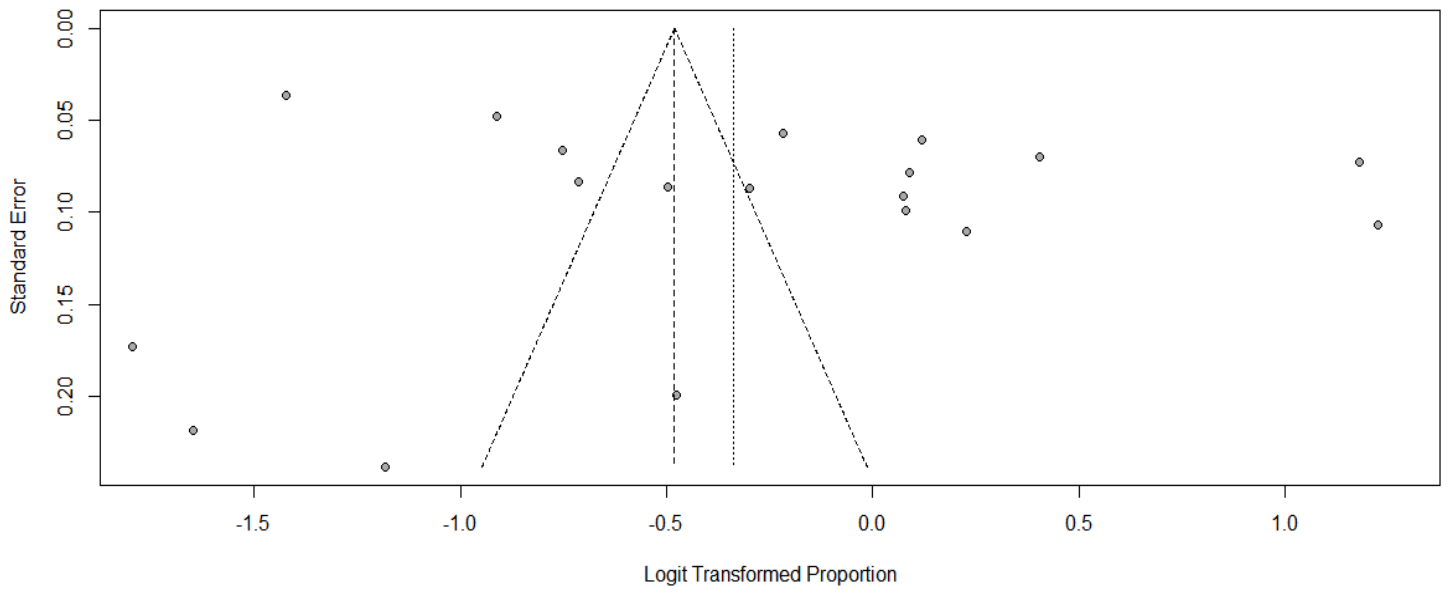
eFigure 1. Assessment of Small Study Effects by Funnel Plot for the 16 Studies Reporting on Insomnia or Insomnia Symptoms Prevalence



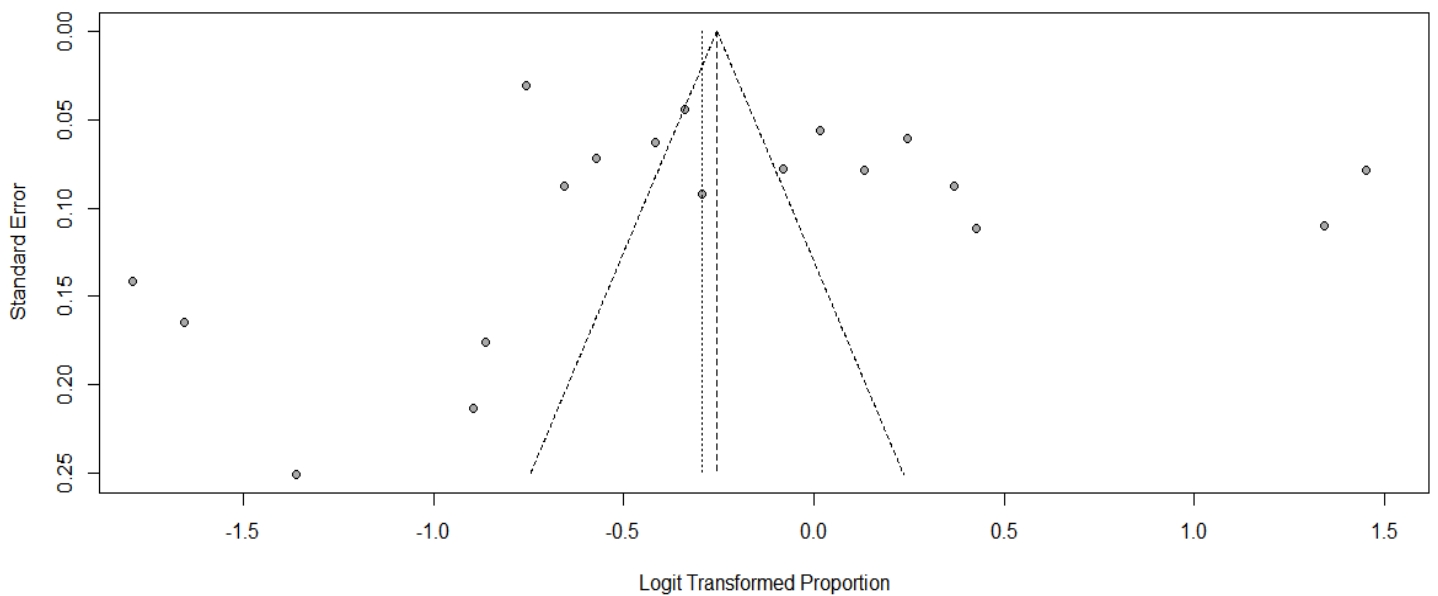
eFigure 2. Assessment of Small Study Effects by Funnel Plot for the 10 Studies Reporting on Stress or Stress Symptoms Prevalence



eFigure 3. Assessment of Small Study Effects by Funnel Plot for the 19 Studies Reporting on Anxiety or Anxiety Symptoms Prevalence



eFigure 4. Assessment of Small Study Effects by Funnel Plot for the 19 Studies Reporting on Depression or Depressive Symptoms Prevalence



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