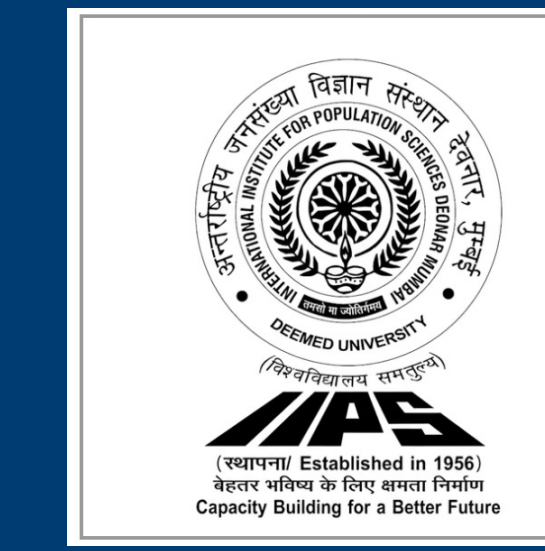




Meta-analysis and Systematic Review of mental health outcomes and social determinants of health during COVID-19

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BACKGROUND

- While there has been no dearth of research into the physiological and epidemiological aspects of the COVID-19 pandemic, there has been no concrete evidence regarding its effect on the nervous system. COVID-19 has had differential impact on different sub-groups of population based on different socio-demographic determinants of health (SDoH).
- The vulnerable population groups such as the Health Care Workers(HCWs) and those working at the frontline were far more exposed to the risk of infection and have had traumatic experiences, therefore showing higher odds of suffering from depression, anxiety and post-traumatic stress disorder compared to the general population [3,5,7,8,9].
- Age, gender, socio-economic status, level of education, marital status, work-related stress, shortage of food supplies were found to be significant social determinants of mental health as a result of COVID-19. [1,3,4,5,6,11]
- This meta-analysis and systematic review aims to synthesize the existing literature on mental health outcomes related to the COVID-19 pandemic, including but not limited to anxiety, depression, post-traumatic stress disorder (PTSD), and substance abuse, and explore how these outcomes have been associated with different social determinants of health in different populations settings.

METHODOLOGY

- This systematic review and meta-analysis was conducted using the preferred reporting items for systematic review and meta-analysis checklist and flowchart (PRISMA 2020) [2].
- Search databases include PUBMED, Web of Science, Science Direct, SCOPUS and Google Scholar. The pre-print versions available in Medrxiv were included.
- Keywords used for the systematic search include (MeSH and other free text word synonyms include: COVID-19, mental health, depression, anxiety, PTSD, social determinants of health, stress, gender, inequalities, discrimination.
- Inclusion criteria: (a) Population(P) : assessed population groups of different ages, sectors and regions; (b)Intervention/Exposure (I): Studies which examined the prevalence of mental health outcomes using validated instruments; (c) Comparator/control (C): No comparator or controls were applicable as we screened for epidemiologic studies reporting prevalence;(d) Outcomes(O) : Prevalence of depression, anxiety and PTSD and iv) Language was restricted to English only.
- Exclusion criteria: (a) Studies which did not present aggregate prevalence of depression, anxiety and PTSD. (b) Qualitative studies, systematic review, meta-analysis, studies with sample size less than 100.
- The data was analyzed using the R 4.3.0., an open source software.
- The overall prevalence of depression, anxiety and PTSD was calculated using the random-effects model according to the Der Simonian and Laird's approach at 95% confidence interval.
- Chi-square based Cochran's Q statistic and the I-squared (I²) metric were used in to test the heterogeneity of the studies.
- Publication bias among the included studies was addressed by funnel plot and egggers linear regression intercept.

RESULTS

From March 2020 to July 2023 , these studies were published with prevalence reports from different countries of the world majorly; China (6), United States (5), Turkey (2) among other countries. Of all the studies, 16 were cross-sectional and 2 were longitudinal in nature. 8 of them were conducted among health-care workers, mostly via online web-based surveys while two studies were conducted across multiple nations. Three mental health outcomes were primarily captured : Depression, Anxiety and PTSD.

Various validated scales with specific cut-off were used in our study such as; Generalised Anxiety Disorder, Zung's Self-Rating Anxiety Scale, COVID-19 Anxiety Scale (CAS), The State-Trait Anxiety Inventory, Hospital Anxiety and Depression Scale, Stanford Acute Stress Reaction Questionnaire, Global stress Index (GSI), Self-reported Stressor and Incidence Questionnaire, Perceived Stress Scale, Hamilton Depression Rating Scale, Zung's Self-Rating Depression Scale, Patient Health Questionnaire (PHQ-9), Depression Anxiety Stress Scale (DASS-21).

Below are forest plots showing pooled prevalence of depression, anxiety and PTSD [Fig.1, Fig.2 and Fig.3]

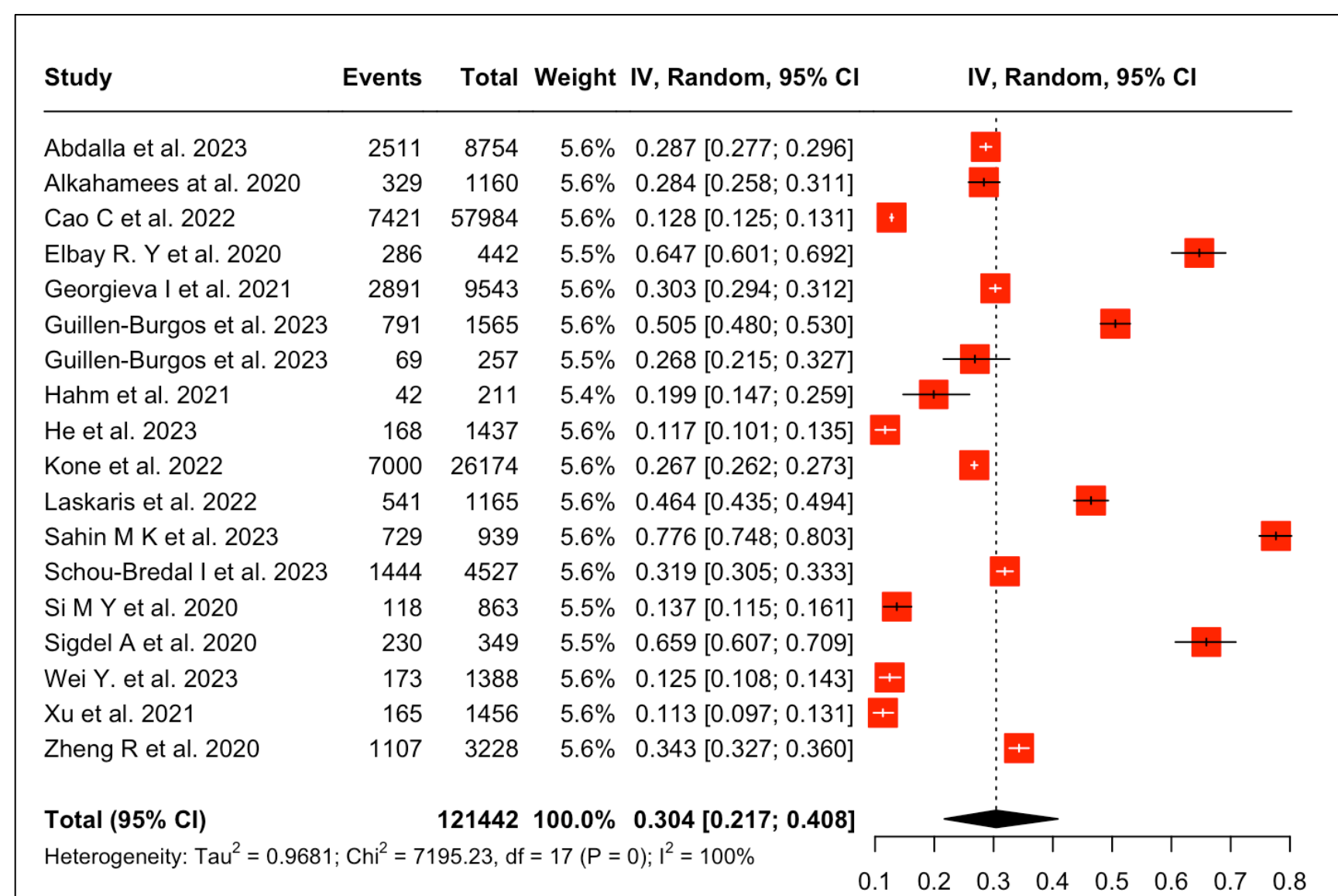


Figure 1: Forest plot showing pooled prevalence of depression (Q=6546.3297 df= 15, p-value < 0.0001)

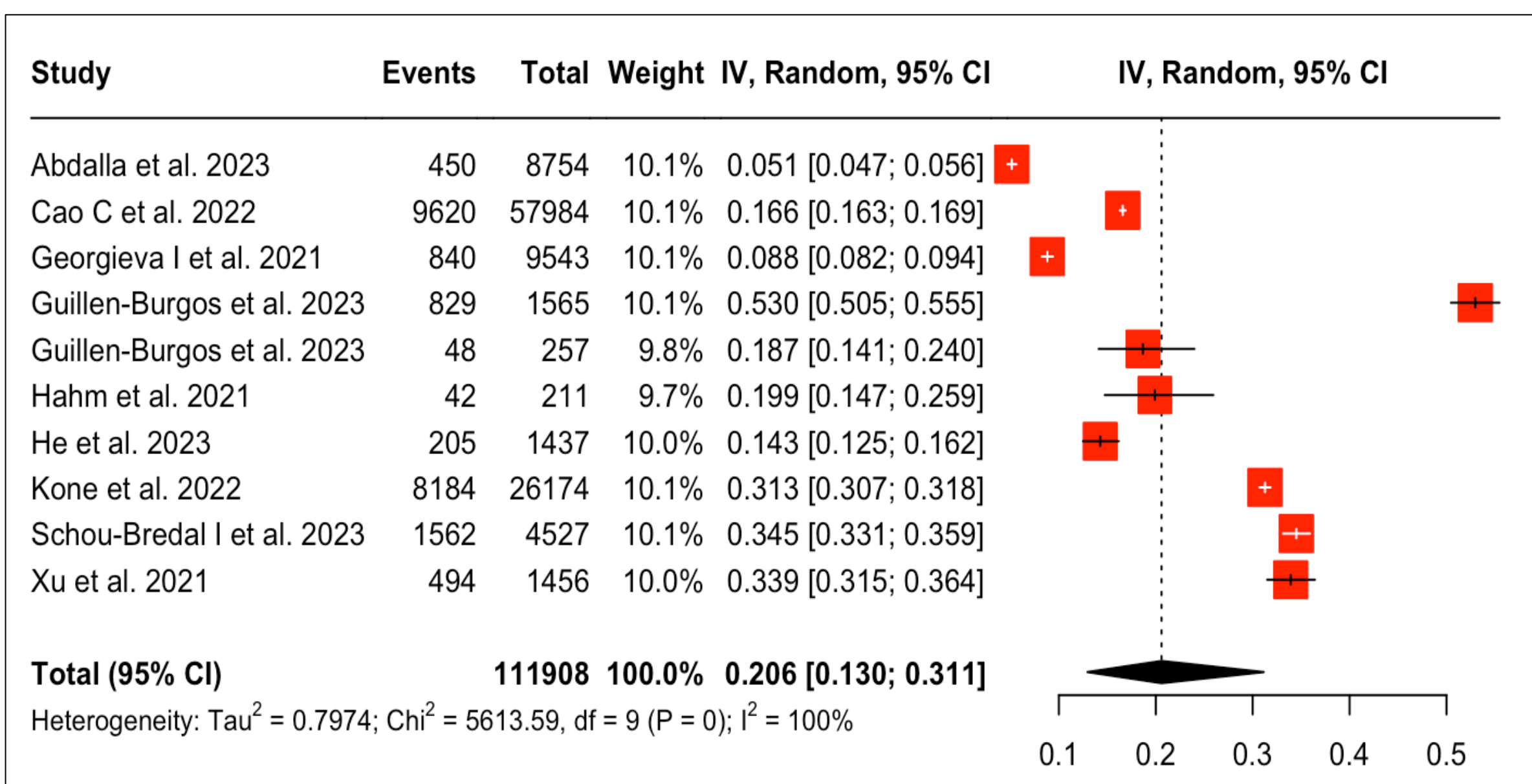


Figure 2: Forest plot showing pooled prevalence of PTSD (Q=5613.589, df= 9, p-value < 0.0001)

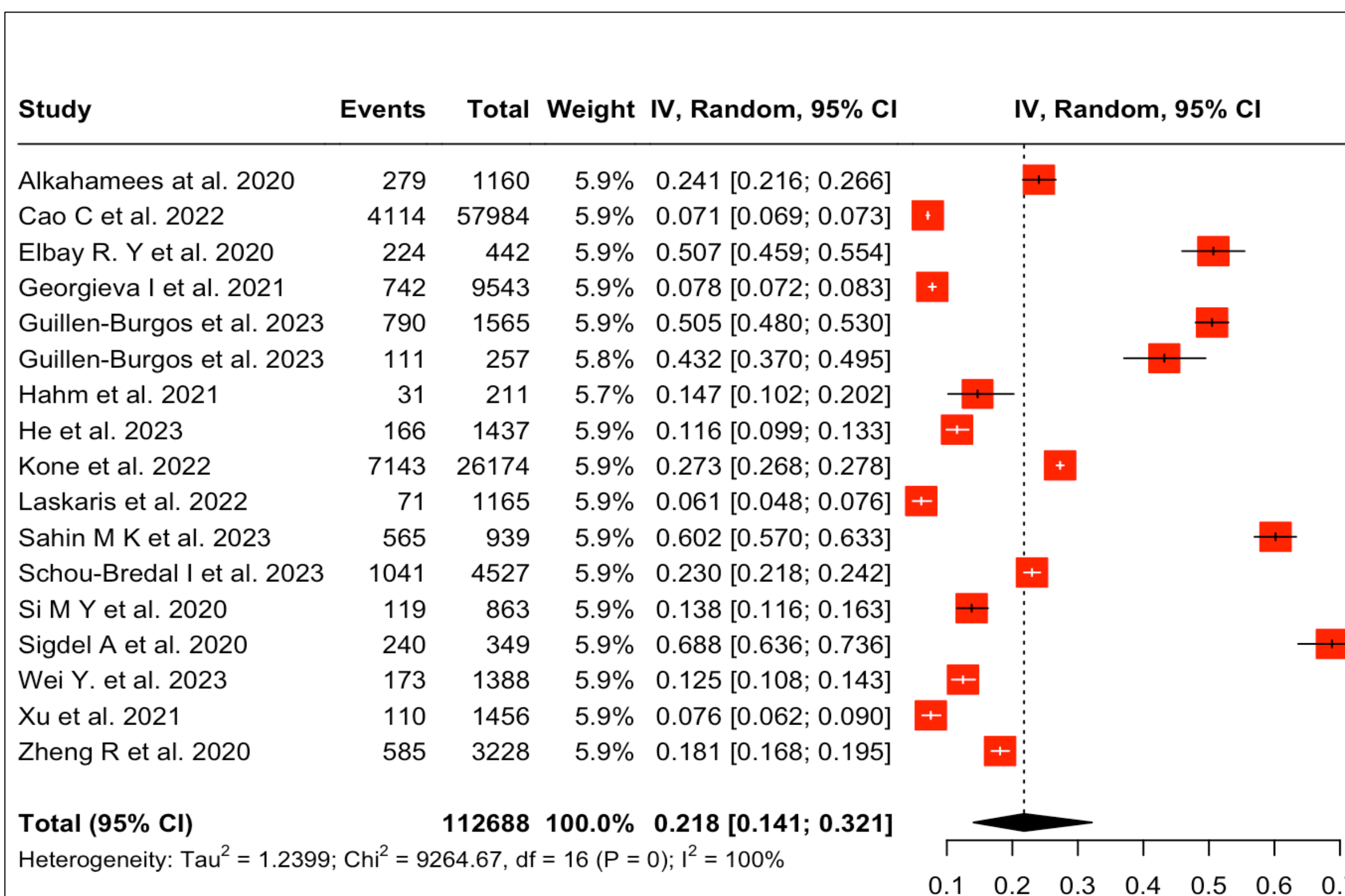


Figure 3: Forest plot showing pooled prevalence of Anxiety (Q=9264.67275, df= 16, p-value < 0.0001)

CONCLUSIONS

The major social determinants of health that were reported in different studies age, gender, educational level, socio-economic status, marital status, place of residence [1, 3,5,6,7,8,9,11]. However, Abdalla et al. (2023) reported that factors such as disruption in employment, finances and food supply were resulting in depression, anxiety and PTSD. Majority of the studies had a higher female sample. Fear of infection was also found to be resulting in mild to severe mental health outcomes in the general population[4,8]. Type of job and the stress at the place of work have resulted in higher prevalence of different mental ailments.

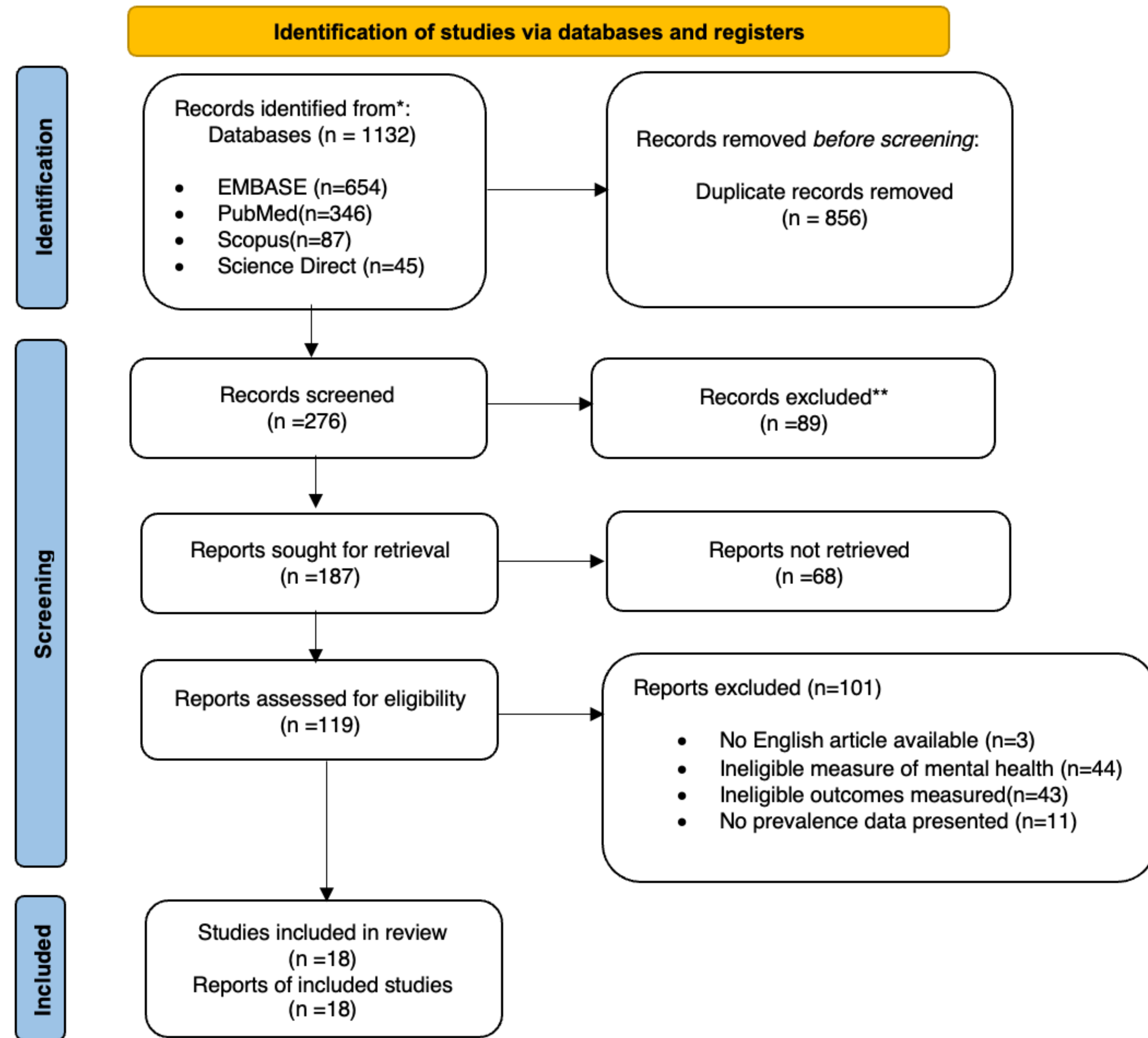
SUPPLEMENTARY MATERIALS

The following slides have supplementary materials related to the meta-analysis. These include : i) PRISMA 2020 Flowchart ii) Search Strategy by keywords and MeSH terms; iii) Description table of the included studies; iv) Forest plots showing prevalence of Depression, Anxiety and PTSD by gender across the studies chosen and v) Funnel plots measuring publication bias across studies.

The PRISMA checklist and Quality Assessment data have not been included in the poster temporarily.

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*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

SEARCH STRATEGY

PubMed (Search hits=654)

Search: (Covid-19) AND (mental health OR mental health disorders OR depression OR anxiety OR depressive disorder OR stress, psychological OR stress disorders OR Post-Traumatic)

("health"[All Fields] AND "personnel"[All Fields]) OR "health personnel"[All Fields] OR (" "[MeSH Terms] OR (" "[All Fields] AND " "[All Fields]) OR " "[All Fields])) AND ("severe acute respiratory syndrome coronavirus 2"[Supplementary Concept] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "ncov"[All Fields] OR "2019 ncov"[All Fields] OR "covid 19"[All Fields] OR "sars cov 2"[All Fields] OR (("coronavirus"[All Fields] OR "cov"[All Fields]) AND ("mental health"[MeSH Terms] OR ("mental"[All Fields] AND "health"[All Fields]) OR "mental health"[All Fields] OR ("mental health"[MeSH Terms] OR ("mental"[All Fields] AND "health"[All Fields]) OR "mental health"[All Fields]) AND ("disease"[MeSH Terms] OR "disease"[All Fields] OR "disorder"[All Fields] OR "disorders"[All Fields] OR "disorder s"[All Fields] OR "disordes"[All Fields])) OR ("depressed"[All Fields] OR "depression"[MeSH Terms] OR "depression"[All Fields] OR "depressions"[All Fields] OR "depression s"[All Fields] OR "depressive disorder"[MeSH Terms] OR ("depressive"[All Fields] AND "disorder"[All Fields]) OR "depressive disorder"[All Fields] OR "depressivity"[All Fields] OR "depressive"[All Fields] OR "depressively"[All Fields] OR "depressiveness"[All Fields] OR "depressives"[All Fields]) OR ("anxiety"[MeSH Terms] OR "anxiety"[All Fields] OR "anxieties"[All Fields] OR "anxiety s"[All Fields]) OR ("depressive disorder"[MeSH Terms] OR ("depressive"[All Fields] AND "disorder"[All Fields]) OR "depressive disorder"[All Fields]) OR ("stress, psychological"[MeSH Terms] OR ("stress"[All Fields] AND "psychological"[All Fields]) OR "psychological stress"[All Fields] OR ("stress"[All Fields] AND "psychological"[All Fields]) OR "stress psychological"[All Fields]) OR ("stress disorders, traumatic"[MeSH Terms] OR ("stress"[All Fields] AND "disorders"[All Fields] AND "traumatic"[All Fields]) OR "traumatic stress disorders"[All Fields] OR ("stress"[All Fields] AND "disorders"[All Fields]) OR "stress disorders"[All Fields]) OR "Post-Traumatic"[All Fields] OR ("sleep initiation and maintenance disorders"[MeSH Terms] OR ("sleep"[All Fields] AND "initiation"[All Fields] AND "maintenance"[All Fields] AND "disorders"[All Fields]) OR "sleep initiation and maintenance disorders"[All Fields]))

PubMed (Search hits=346)

Scopus (Search hits=87)

TITLE: (Mental health AND Covid 19)

Timespan: All years. Indexes: MEDLINE.

(Covid-19 OR severe acute respiratory syndrome coronavirus 2 OR corona virus OR coronavirus infections) AND (mental health OR mental health disorders OR depression OR anxiety OR depressive disorder OR stress, psychological OR stress disorders, Post-Traumatic OR sleep initiation and maintenance disorders)

(Covid-19 OR severe acute respiratory syndrome coronavirus 2 OR corona virus OR coronavirus infections) AND (mental health OR mental health disorders OR depression OR anxiety OR depressive disorder OR stress, psychological OR stress disorders, Post-Traumatic OR sleep initiation and maintenance disorders)

Science direct (search hits=45)

(Covid-19 OR severe acute respiratory syndrome coronavirus 2 OR corona virus OR coronavirus infections) AND (mental health OR mental health disorders OR depression OR anxiety OR depressive disorder OR stress, psychological OR stress disorders, Post-Traumatic OR sleep initiation and maintenance disorders)

STUDY	YEAR	REGION	STUDY DESIGN	POPULATION	AGE (MEAN ± SD OR IN YEARS)	GENDER	SOCIO-DEMOGRAPHIC	TYPE OF MENTAL HEALTH OUTCOME	PREVALENCE (%)	ASSESSMENT TOOL	TOTAL SAMPLE SIZE
Abdalla et al.	2023	Brazil, China, Germany, Egypt, India, Indonesia, Nigeria and United States	Cross-sectional	General population	18 to 65 and above	Male Female	Disruptions in employment,finances and food supply	Depression Anxiety PTSD	28.9 24.05 5.1	PHQ-2, PC-PTSD	8754
Alkahamees at al.	2020	Saudi Arabia	Cross-sectional	General population	40.25 ± 4.8	Male Female	Age, Sex,Education,Marital status,Employment status, Family monthly income,Self/ Family member working in medical field	Depression Anxiety	28.4 24.1	DASS-21 and IES-R	1160
Cao C et al. 2022	2022	China	Cross-sectional	General population	14.8 ± 4.8	Male Female	Gender, School type, Area of residence, Only child, Parent's marital status, Family relationship (Quarrel/Violence/Detachment), Lacking support, COVID related exposure.	Depression Anxiety PTSD	12.8 7.1 16.6	GAD-7, PHQ-9	57984
Elbay R. Y et al. 2020	2020	Turkey	Cross-sectional	Healthcare workers (HCWs)	36.05 ± 8.69	Male Female	Age, gender, marital status, specialties, number of children, composition of the household, comorbid medical diseases, history of mental disorders, smoking status, alcohol consumption and time spent daily on social media since the outbreak. Ever diagnosed with Covid-19 and Depression Anxiety Stress Scale (DASS) 21.	Depression Anxiety	64.7 50.7	DASS-21	442
Georgieva I et al. 2021	2021	United Kingdom, Belgium (Flemish region only), the Netherlands, Bulgaria, the Czech Republic, Finland, India, Latvia, Poland, Romania, and Sweden.	Cross-sectional	General population	47.5	Male Female	Gender, age, country, type, lost job compensation, Concerned Family, With Pre-existing Mental Disorder, Stress Outbreak, Fear Infection, Truthful Government, Time News, Average Restrictiveness, and Number Measures	Depression Anxiety PTSD	30.3 7.8 8.8	GAD-2, PHQ-2	9543
Guillen-Burgos	2023	Colombia	Longitudinal	Patients (COVID-19 survivors)	51.47, ± 19.60	Male Female	Age,Gender,Marital status,Education, Occupation,Ethnicity,Socio-economic status,Location of hospital stay,Length of hospital stay,Any/physical/mental/mechanical comorbidity,BMI,Severity illness	Depression Anxiety PTSD	50.5 50.5 53.0	GAD-7, PHQ-9, DSM-5, ISI	1565
Guillen-Burgos	2023	Low- and middle-income countries (LMICs)	Cross-sectional	Healthcare workers (HCWs)	32	Male Female	Age, gender, marital status, socioeconomic status, education, ethnicity, occupation, job area, attention of patients with COVID-19, and previous diagnosis of SARS-CoV2/ COVID-19 during the last 12 months	Depression Anxiety PTSD	26.8 43.2 18.7	PCL-5,GAD-7,PHQ-9	257
Hahm et al.	2021	United States	Longitudinal	General population(Asians and Asian American young adults)	24.5 (18.6–30.6)	Male Female	COVID-19 related racial discrimination	Depression Anxiety PTSD	19.9 14.7 19.9	PHQ-8, GAD-7,PLC-C	211
He et al.	2023	United States	Cross-sectional	HCW (White, Asian, Black, Latin)	Above 35 years	Female	Racial/Ethnic Differences	Depression Anxiety PTSD	11.7 11.6 14.3		1437
Kone et al.	2022	United States	Cross-sectional	PHW	18 to 90 years	Male Female	Feeling of isolation, Ability to take time off, Impact of trauma,Workplace benefits,coping mechanisms, professional and personal life stressors	Depression Anxiety PTSD	26.7 27.3 31.3	PHQ-9, GAD-2, IES-6	26174
Laskaris et al.	2022	United States	Cross-sectional	General population (auto-workers)	18 to 55 and above	Male Female	Sex at birth, age, race/ethnicity, education, employee type, COVID-19 infection, Pre-existing psychological or psychiatric condition, financial/family stressors since the beginning of the pandemic, Fear of SARS-COV-2 Exposure, positive safety climate/culture and Strong clarity of workplace COVID-19 safety protocols	Depression Anxiety	46.4 6.1	GAD-2, PHQ-2	1165
Sahin M K et al. 2023	2023	Turkey	Cross-sectional	Healthcare workers (HCWs)	18 to 40 and above	Male Female	age, sex, marital status, nature of the place of work, occupation, involvement in the diagnosis, treatment, and care of COVID19 patients in the pandemic, time in the profession, presence of chronic disease, history of psychiatric illness, receipt of psychiatric support during the pandemic, being tested for COVID-19, and receipt of COVID-19 treatment.	Depression Anxiety	77.6 60.2	PHQ-9, GAD-7, Insomnia Severity Index, and Impact of Event Scale-Revised.	939
Schou-Bredal I et al. 2023	2023	Norway	Cross-sectional	Healthcare workers (HCWs) and Non-HCWs	Less than 30 to above 70	Male Female	Age, gender, education level, employment status before and during COVID-19 outbreak, living with spouse or partner and size of place of residence.	Depression Anxiety PTSD	31.9 23.0 34.5	PCL-5	4527
Si M Y et al. 2020	2020	China	Cross-sectional	General population	Less than 30 to above 50	Male Female	Age, gender, education, marital status and occupation), general health status, variables related to the COVID-19 (e.g. whether ever been quarantined, level of concern to the outbreak), perceived threat of COVID19, perceived stress, anxiety, depression and PTS	Depression Anxiety	13.7 13.8	DASS-21 and IES-6	863
Sigdel A et al. 2020	2020	Nepal	Cross-sectional	General population	27.8	Male Female	Sex of Participants, Age of Participants, Place of current residence, Ethnicity, Educational level, Religion, Marital status, Major Occupations, Household ownership, Currently accompanying status, Health Professional, Most used mass media to get information on COVID 19 and Average hours spent on mass media on a day.	Depression Anxiety	65.9 68.8	GAD-7, PHQ-9	349
Wei Y. et al. 2023	2023	China	Cross-sectional	Healthcare workers (HCWs)	25	Male Female	Age, Gender, BMI, dietary habits, marital status, household income, work and life related factors.	Depression Anxiety	12.5 12.5	GAD-7, PHQ-9, UCLA scale of lonliness	1388
Xu et al.	2021	China	Cross-sectional	General population	33.8±10.5 years	Male Female	Marital status, education,Place of residence,Medication, Somatic symptoms, Self efficacy, fear or percieved risk of infection, self rated negative influence due to the pandemic	Depression Anxiety PTSD	11.3 7.6 33.9	PHQ-2 GAD-2, PTSD Scale	1456
Zheng R et al. 2020	2020	China	Cross-sectional	Healthcare workers (Nurses)	Less than 30 to above 50	Male Female	Gender, age, education level, hospital department, job position, type of hospital, city of residence, and exposure level.	Depression Anxiety	34.3 18.1	SDS,SAS	3228

Table 1 : Table showing characteristics of the included studies

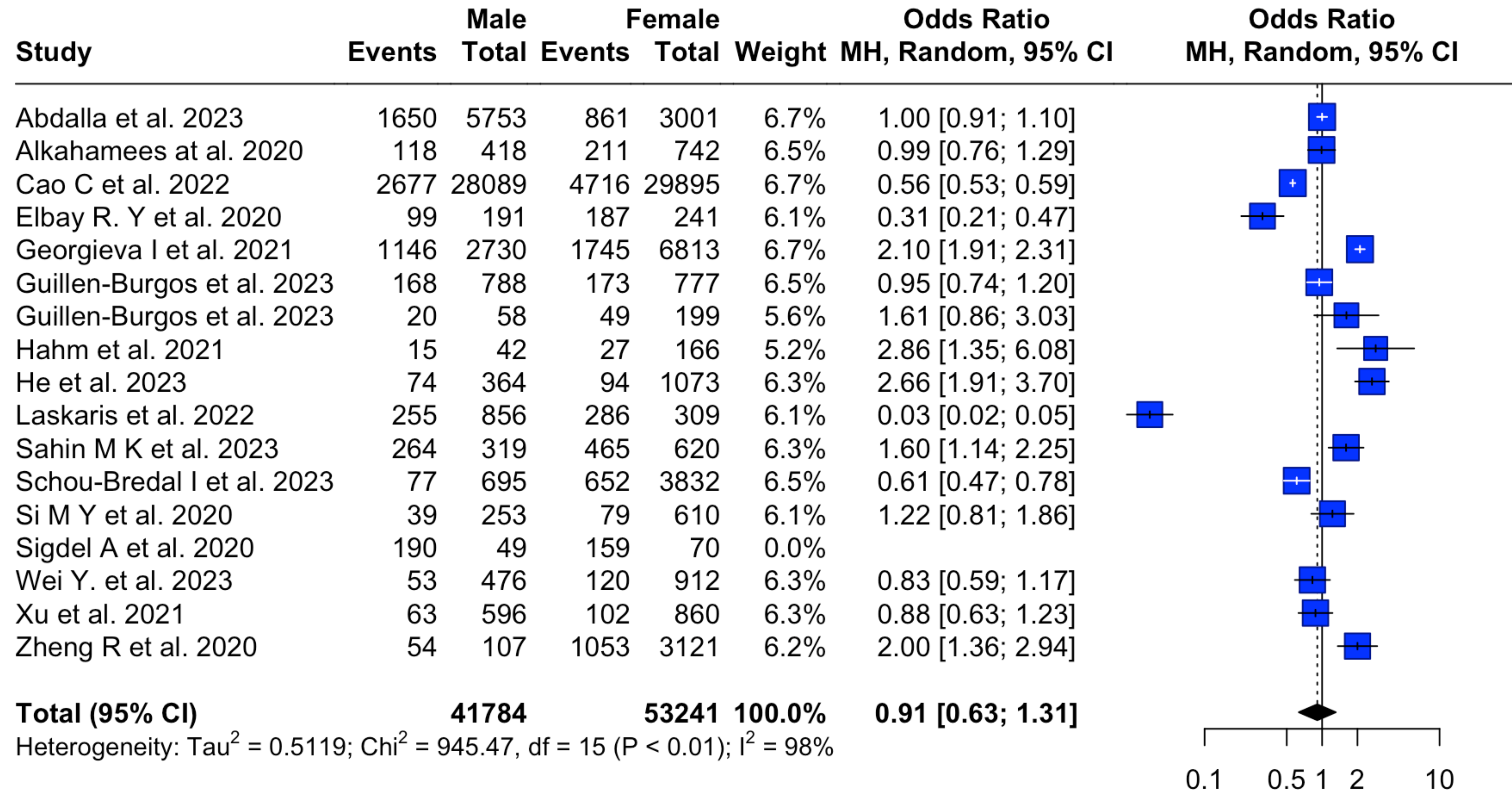


Figure 4: Forest plot showing pooled prevalence of depression of 18 studies by gender

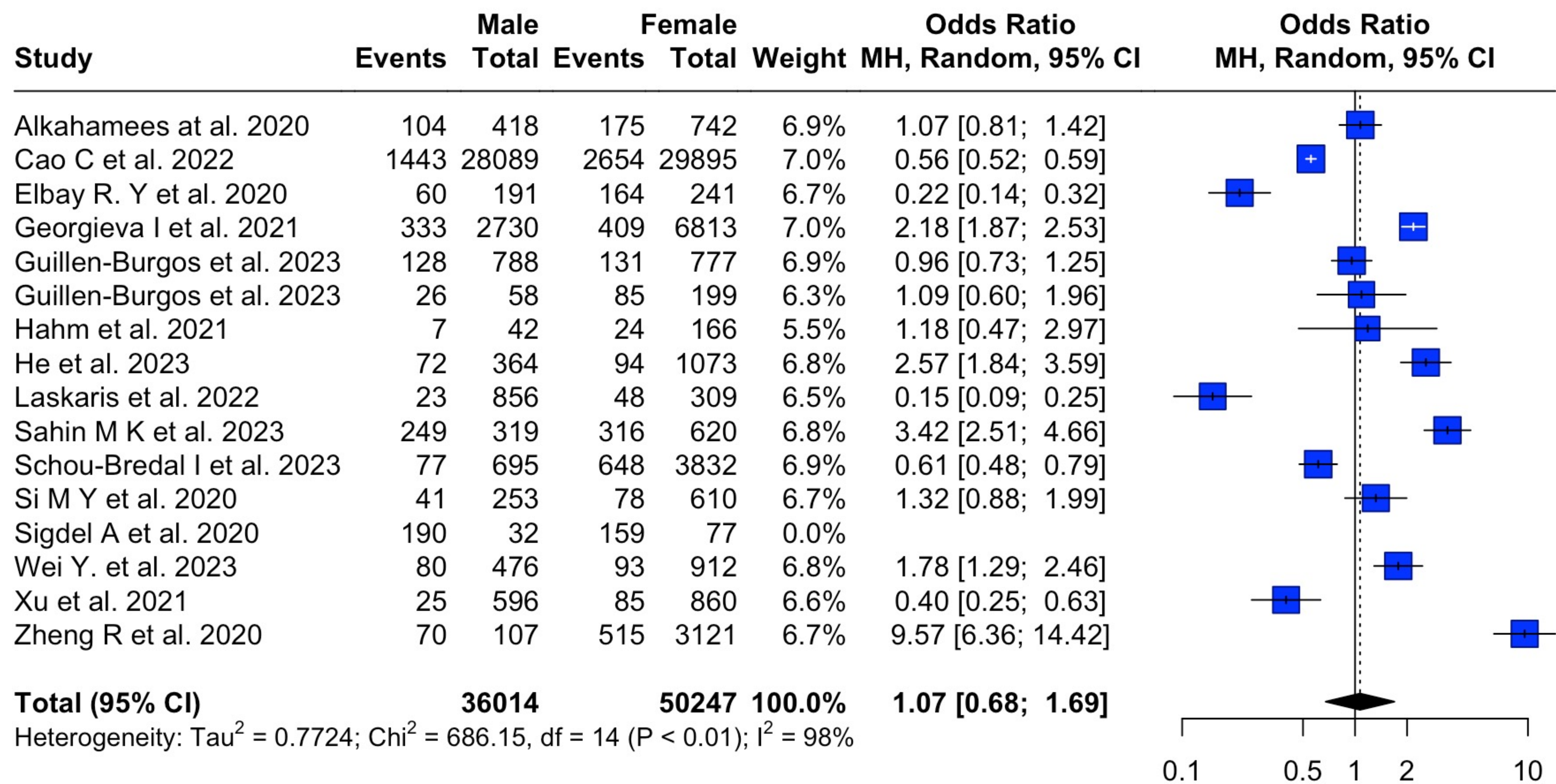


Figure 5: Forest plot showing pooled prevalence of anxiety of 18 studies by gender

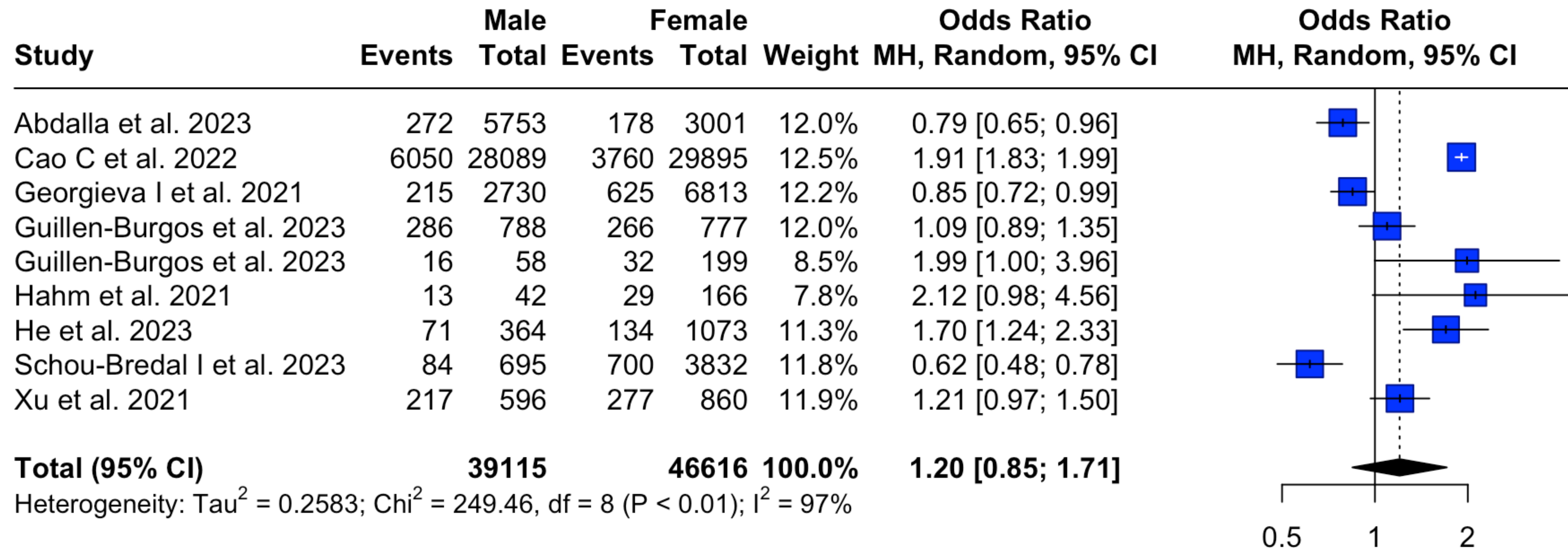


Figure 6: Forest plot showing pooled prevalence of PTSD of 9 studies by gender

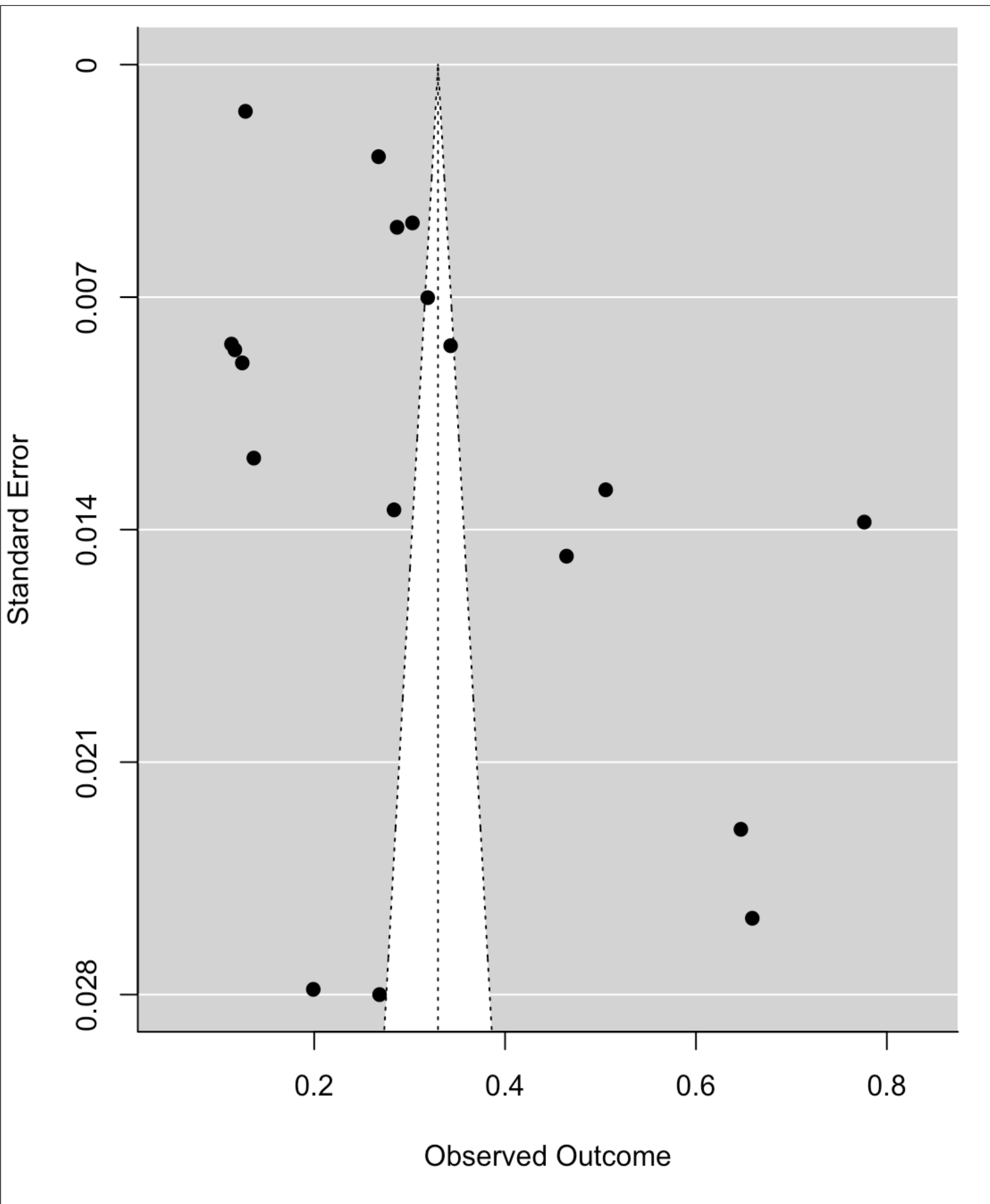


Figure 7 : Funnel plot of Standard Error by Measured Outcome measuring 18 studies by depression

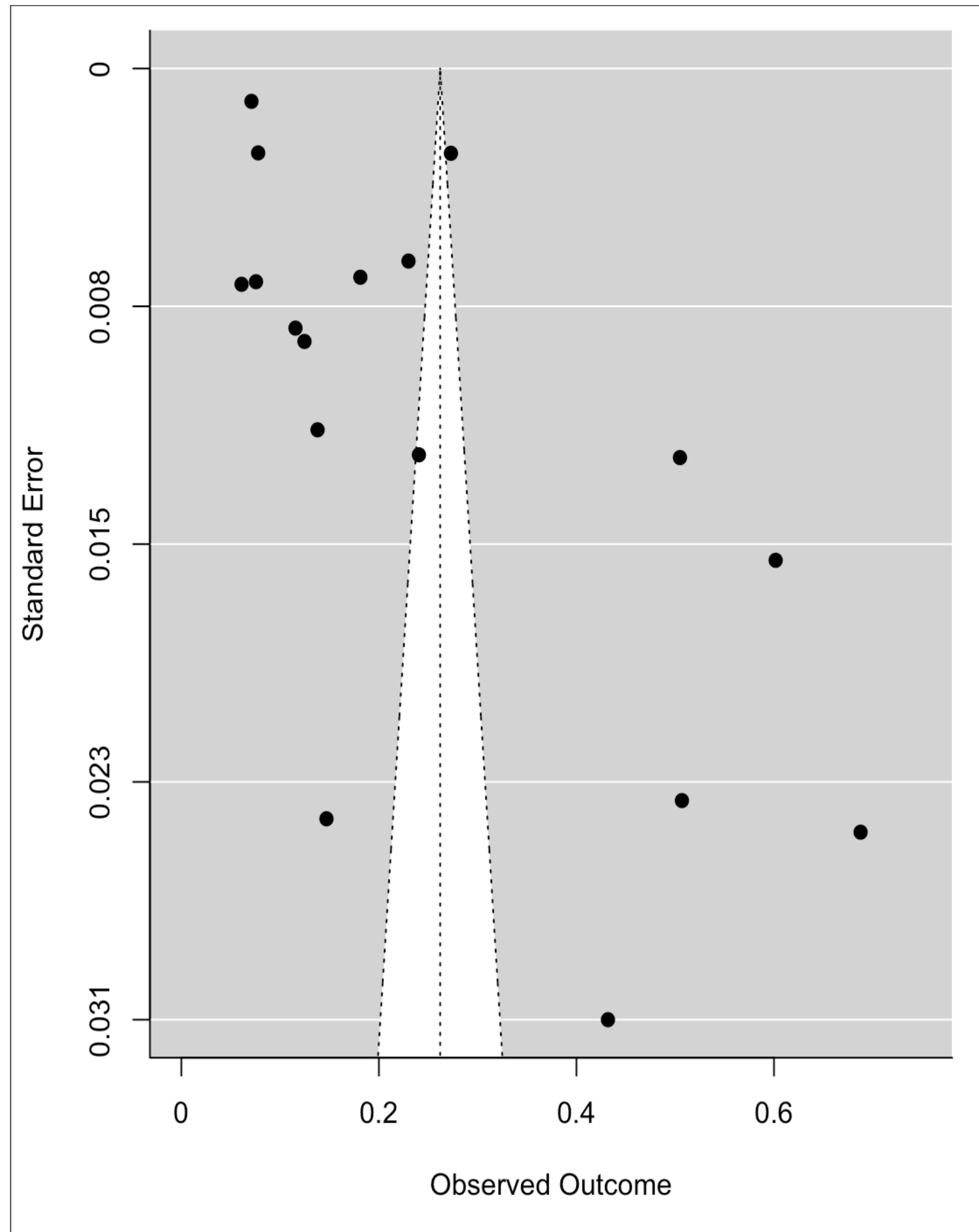


Figure 8 : Funnel plot of Standard Error by Measured Outcome measuring 18 studies by anxiety

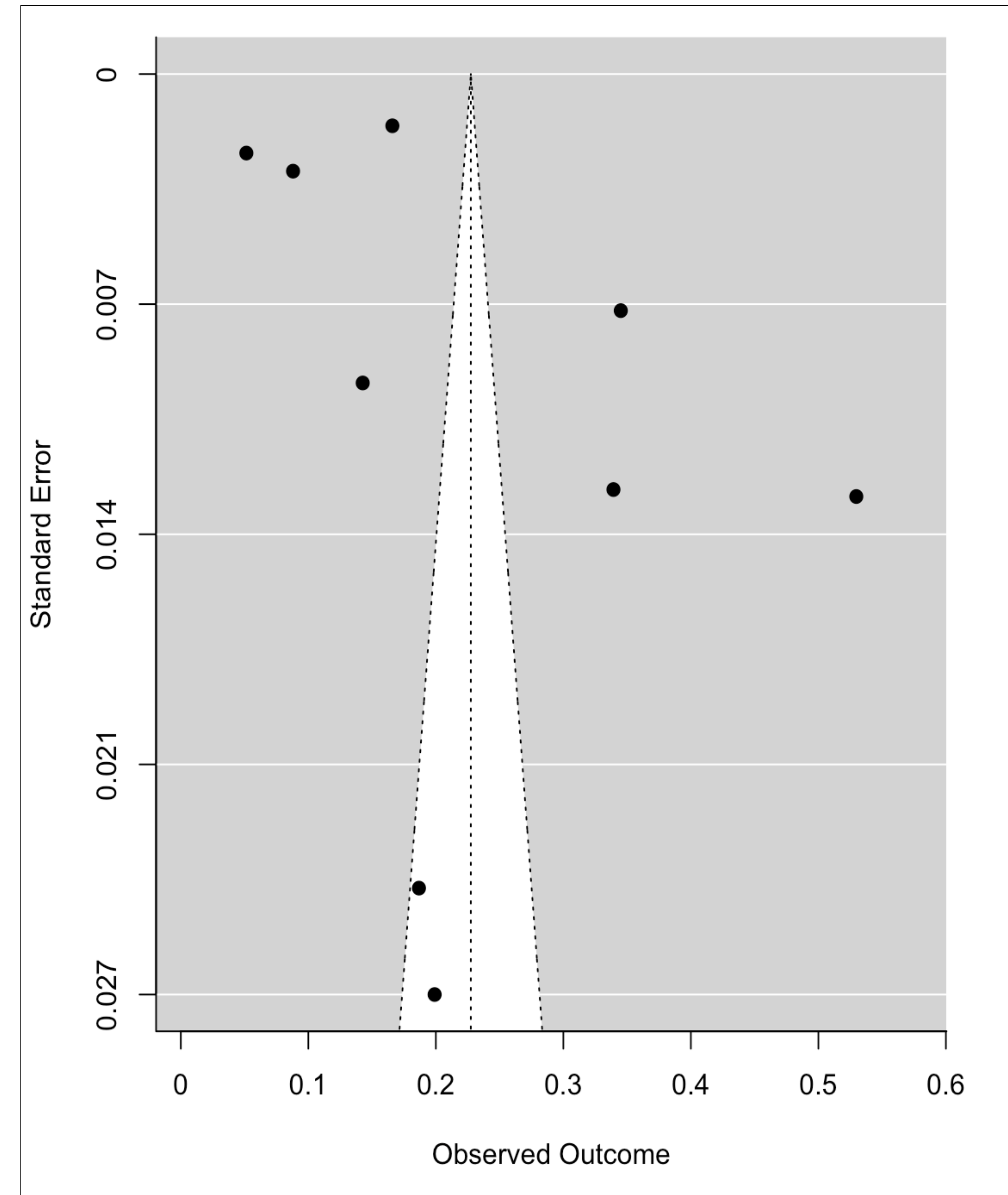


Figure 9 : Funnel plot of Standard Error by Measured Outcome measuring 9 studies by PTSD

THANK YOU FOR YOUR PATIENCE!