A Study on the Meta Analysis Technique Viewing Systematic Reviews of a Broadcast Investigation on Pandemic Disease

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Abstract

Meta analysis is used to collaborate results across the investigation to determine the overall consequence of the study. Meta analysis is concentrated on pragmatic issues of applied research phenomena creation of the research area. The paper deals prospective determination that may be concentrated in systematic reviews and meta-analyses used in social science research and life science research. The main issue are opportunity and destination of research. And identify the various sources of heterogeneity with different confounded moderators. Queries suitable for meta-analysis. Google/ Google scholar was used to access the evidences of government report. The paper presents a critique of the prospective decisions and forces in meta-analysis in medical research. The principal intention of this paper is to afford the improve methodology in systematic reviews is to improve the trans-disciplinary communication and ensures the encourage of the meta-analysis is different point of view. The research provides the more research looking at the stage of infection fatality rate is urgently needed to making the policy on the future.

Keywords: Meta-Analysis; Mortality Rate; Systematic Review; Disappeared Data

Introduction

A systematic review provides solution for the overall effect of the study. Meta analysis provides the recommendations that have been made on how to demonstrate them, the issue of publication or minor-study bias has been conscientiously forward [1]. It is strenuous for even accomplished meta-analyst to follow in progress methodological and scientific arguments and continue with latest discovery, especially across distinct considerable disciplines [2]. The year 2020 saw the exhibition of pandemic SARS-CoV-2 virus, which launch into Wuhan city in China and enlargement all over the world. One of the most searching questions to acknowledge during the COVID-19 pandemic has been regarding the true infection of the mortality rate of the disease. While case fatality rate is exceedingly responsible from abundant advertised data authority [3]. Case fatality rate existence the number of deaths divided by the number of confirmed cases it is a long way further strenuous to extrapolate to the measurement of all infected particular have died due to the infection because those who have very lenient, a representative or asymptotic illness are frequently left and unexposed and therefore excite from fatality rate computation [4]. There is a numerous approach to emphasize the mortality in a population. Retrospective study of the disease influenza has forecast the true number of cases and deaths from influenza like illness documentation and excess mortality estimates [5]. These may not be precise definition that CFR may both overestimate and equally underestimate the true number of illness due to disease in population [6]. The standard test for COVID-19 involve testing of nasopharyngeal swabs from patients suspected of having shrink the virus these arise some false negative [7] with one study demonstrating almost a district of patient's incident a positive result following up to two previous false negatives [8]. The sensitivity of PCR is believed to be around 70% which may lead to the Aunder diagnosis of Covid-19 [9]. In Covid-19 exposure is a pandemic disease. There are conducted by many surveys, but many cases are not reported in the US, Europe and potentially worldwide [10-12].

Various Published Systematic Review on Pandemic Disease Covid-19

In [13] exertion in a Belgium and taken two time period and take a 7307 sample from position around sample and then the aggregate there are taken the units 193 and the total units 3397 sam-

ples take positive and combined effect the overall effect of mortality 1.1%. In [4] exertion in a Northern Italy taken 10 municipalities in Lombardy use the 5 year death data and accumulate the details from Italian Institute of Statistics. The total population incorporated municipalities was 50563. In this phenomenon the Bayesian model is used to evaluation mortality rate. And the conclusion of the month of February and April 1.29% increase to 4.25%. In [14] and the study New York state USA and the study for 9 days. In this investigation we use the cross-sectional studies. And used igg immunoassay approved for covid 19. And found out the result 12.5% specimen were reactive Cumulative Incidence was found to be higher in people. In [15] and studied Diamond Princess Cruise Ship worked in the period for 14-17 days. In this investigation a total of 3711 passenger and staff were tested whilst in quarantine. Utilize the data from world health organization situational reports. In [16] deliberate in Italy and worked from 32 days and accumulate data from Italy's civil protection agency from each of Italy's 20 regions. And final result estimated an infection fatality rate of 1.1% and case fatality rate of 12.7%. In [17] studied in ran and study for 1 month. In this investigation cluster randomized sampling utilized to obtain 551 rapid antibody tests for covid-19. And final outcome of this study finds 22% antibody seropositivity and 18% were asymptotic. There are arise many issues are described as following manner are given below

Issue 1: Opportunity and destination of review

Meta-analysis having been elucidate as a "gold standard" for evidence-based implementation in medicine. Deciding whether confirmation is suitable for meta-analysis is, at present, an interrogation of judgement and what is suitable evidence in one discipline may be unacceptable in another [18,19]. for inquiry which meta-analysis is not suited may be better addressed using a traditional narrative review, such as best-evidence synthesis, interpretive synthesis [20] or scoping reviews [21].

Issue 2: Taking the hypothesis for primary studies in reference to study designs

Social research used the systematic reviews and for emphasizing the use of the non-randomized designs. In social sciences trials with a indicative population may be considered more favorable than laboratory studies because of their ecological validity [22]. It is a random allocation to contemplation condition in social science experiments. The medical literature generally combines the laboratory trials, randomized designs and non-randomized designs [1,23]. And various sampling technique use such as non-random sampling and lack of treatment integrity introduce alternate explanations for treatment effect used in randomized trials [22,24,25]. Some authors work in a validity of research question [26]. Social researchers have developed detailed method for the purpose of concern in systematic review [27].

Issue 3: Suitability for effect of result

Systematic review furnishes the solution of contrasting measure use in every field like political science use popular authority used a very specific deterministic approach. As illustration most questions arise in the consideration of proceeding review of [28]. Some authors provide a reported solution used as a Statistics tool for different items while the other authors worked in a Statistical tool as jointly scale [29].

Issue 4: Finding the reporting in the reference of primary studies

The various journals use the unpublished thesis and use the distinct report for the evaluation purpose. Many statistical studies provide the solution of center of attention in the terms of the level of significance while in further studies we used the descriptive statistics to emphasize the report of the results. The various author pioneer work in the field of meta-analysis used in the systematic review of published research data [30]. The various reporting exists the solution for the randomized controlled trials.

Issue 5: Antecedent of heterogeneity

The fundamental research question arises in social science research as well life science research how the impact of an individual treatment for instance if we have a university-based study in the reference of drug prevention program different for colleges in reference to the income such as high-income region and low-income region. In this situation Meta- analysis provides a solution to examine the response of these questions by contrast of treatment of results across a different source of study. The various authors recognition the problems in many disciplines embrace the social sciences like [31], epidemiology [32] and ecology. In meta-analysis a very deliberate issue in reference to heterogeneity to determine the various effect size of the study. In meta- analysis we use the term standard regression, in this phenomenon we use the predictor variable and referred as "Confounded". The term confounded is appropriate the following conversation specifically investigation-level characteristics that very scientifically use to some degrees are considered "confounded" [31]. In meta-analysis used the perception tool such as meta regression tools and prepared the meta- regression plot may be useful in attempting to estimate the confounding. In present phenomena the various complex and statistically opportunity options include network meta-analysis [33] Bayesian meta-analysis [34], and individual level data meta-analysis [35].

Methods

This investigation adopted an unadorned systematic assessment protocol. During the pandemic it has been an essential antecedent advice and accommodate many of the most recent estimates for epidemiological facts about the covid-19. The inclusion criteria for the studies were referencing the Covid-19 or the Sars-cov-2. Commenced an estimated population contagion destructiveness rate. Titles and abstracts were abandoned for acceptability and elimination if did not appropriate the inclusion criteria. If these messed the inclusion criteria, they were indicate the systematic review and meta -analysis. Estimates for contagion destructiveness rate and the confidence interval were concentrate
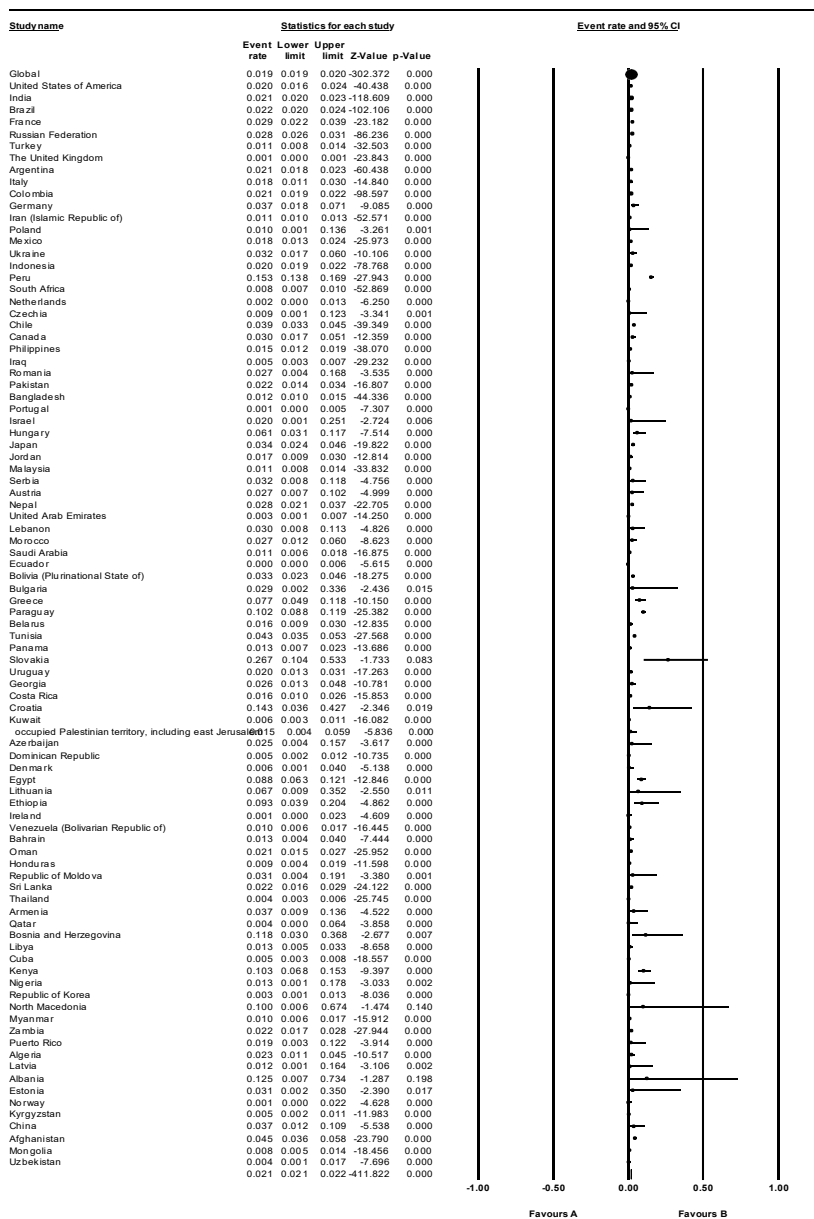
for each study. All analysis and data conversion were execute in CMA. Sensitivity analysis were execute the stratum the results into description of study-serological vs non - by country and the month of calculation. In research to investigate the publication bias we use the funnel plot. An individual analysis was conducted using only survey results to investigate the stratification to determine the risk of bias.

Discussion

As pandemic covid-19 situation progresses it is very important to use the various indicator data sources when reporting the figures of the infection mortality rate. In general, some countries start the enhancing screening and surveillance and observe the increase in positive cases. That are the asymptotic and mild enough that they have so far avoided testing [36]. It has been concern that covid-19 is often spread from symptomatic cases. generally, up to 50% of all patients- and transmission may also be possible with covid-19 [37,38]. The main finding of the research is that there is very high heterogeneity. One reason that may the outcome of the government report with more prepared country suffering from the lower death rate those have efficient resources to combat a large outbreak. [39]. Some included studies [4,40] compared infection fatality rate (Table 1 & 2).

Table 1: Meta Analysis of the Infection Mortality Rate of Covid-19 Disease published Research Data of the Various Countries.

Study name	Event rate	Lower limit	Upper limit	Z-Value	p-Value
Global	0.019	0.019	0.020	-302.372	0.000
United States of America	0.020	0.016	0.024	-40.438	0.000
India	0.021	0.020	0.023	-118.609	0.000
Brazil	0.022	0.020	0.024	-102.106	0.000
France	0.029	0.022	0.039	-23.182	0.000
Russian Federation	0.028	0.026	0.031	-86.236	0.000
Turkey	0.011	0.008	0.014	-32.503	0.000
The United Kingdom	0.001	0.000	0.001	-23.843	0.000
Argentina	0.021	0.018	0.023	-60.438	0.000
Italy	0.018	0.011	0.030	-14.840	0.000
Colombia	0.021	0.019	0.022	-98.597	0.000
Germany	0.037	0.018	0.071	-9.085	0.000
Iran (Islamic Republic of)	0.011	0.010	0.013	-52.571	0.000
Poland	0.010	0.001	0.136	-3.261	0.001
Mexico	0.018	0.013	0.024	-25.973	0.000
Ukraine	0.032	0.017	0.060	-10.106	0.000
Indonesia	0.020	0.019	0.022	-78.768	0.000
Peru	0.153	0.138	0.169	-27.943	0.000
South Africa	0.008	0.007	0.010	-52.869	0.000
Netherlands	0.002	0.000	0.013	-6.250	0.000
Czechia	0.009	0.001	0.123	-3.341	0.001
Chile	0.039	0.033	0.045	-39.349	0.000
Canada	0.030	0.017	0.051	-12.359	0.000
Philippines	0.015	0.012	0.019	-38.070	0.000
Iraq	0.005	0.003	0.007	-29.232	0.000
Romania	0.027	0.004	0.168	-3.535	0.000
Pakistan	0.022	0.014	0.034	-16.807	0.000
Bangladesh	0.012	0.010	0.015	-44.336	0.000
Portugal	0.001	0.000	0.005	-7.307	0.000
Israel	0.020	0.001	0.251	-2.724	0.006
Hungary	0.061	0.031	0.117	-7.514	0.000
Japan	0.034	0.024	0.046	-19.822	0.000
Jordan	0.017	0.009	0.030	-12.814	0.000
Malaysia	0.011	0.008	0.014	-33.832	0.000
Serbia	0.032	0.008	0.118	-4.756	0.000
Austria	0.027	0.007	0.102	-4.999	0.000
Nepal	0.028	0.021	0.037	-22.705	0.000
United Arab Emirates	0.003	0.001	0.007	-14.250	0.000
Lebanon	0.030	0.008	0.113	-4.826	0.000
Morocco	0.027	0.012	0.060	-8.623	0.000
Saudi Arabia	0.011	0.006	0.018	-16.875	0.000
Ecuador	0.000	0.000	0.006	-5.615	0.000
Bolivia (Plurinational State of)	0.033	0.023	0.046	-18.275	0.000
Bulgaria	0.029	0.002	0.336	-2.436	0.015
Greece	0.077	0.049	0.118	-10.150	0.000
Paraguay	0.102	0.088	0.119	-25.382	0.000
Belarus	0.016	0.009	0.030	-12.835	0.000
Tunisia	0.043	0.035	0.053	-27.568	0.000
Panama	0.013	0.007	0.023	-13.686	0.000
Slovakia	0.267	0.104	0.533	-1.733	0.083
Uruguay	0.020	0.013	0.031	-17.263	0.000
Georgia	0.026	0.013	0.048	-10.781	0.000
Costa Rica	0.016	0.010	0.026	-15.853	0.000
Croatia	0.143	0.036	0.427	-2.346	0.019
Kuwait	0.006	0.003	0.011	-16.082	0.000
occupied Palestinian territory, including east Jerusalem	0.015	0.004	0.059	-5.836	0.000
Azerbaijan	0.025	0.004	0.157	-3.617	0.000
Dominican Republic	0.005	0.002	0.012	-10.735	0.000
Denmark	0.006	0.001	0.040	-5.138	0.000
Egypt	0.088	0.063	0.121	-12.846	0.000
Lithuania	0.067	0.009	0.352	-2.550	0.011
Ethiopia	0.093	0.039	0.204	-4.862	0.000
Ireland	0.001	0.000	0.023	-4.609	0.000
Venezuela (Bolivarian Republic of)	0.010	0.006	0.017	-16.445	0.000
Bahrain	0.013	0.004	0.040	-7.444	0.000
Oman	0.021	0.015	0.027	-25.952	0.000
Honduras	0.009	0.004	0.019	-11.598	0.000
Republic of Moldova	0.031	0.004	0.191	-3.380	0.001
Sri Lanka	0.022	0.016	0.029	-24.122	0.000
Thailand	0.004	0.003	0.006	-25.745	0.000
Armenia	0.037	0.009	0.136	-4.522	0.000
Qatar	0.004	0.000	0.064	-3.858	0.000
Bosnia and Herzegovina	0.118	0.030	0.368	-2.677	0.007
Libya	0.013	0.005	0.033	-8.658	0.000
Cuba	0.005	0.003	0.008	-18.557	0.000
Kenya	0.103	0.068	0.153	-9.397	0.000
Nigeria	0.013	0.001	0.178	-3.033	0.002
Republic of Korea	0.003	0.001	0.013	-8.036	0.000
North Macedonia	0.100	0.006	0.674	-1.474	0.140
Myanmar	0.010	0.006	0.017	-15.912	0.000
Zambia	0.022	0.017	0.028	-27.944	0.000
Puerto Rico	0.019	0.003	0.122	-3.914	0.000
Algeria	0.023	0.011	0.045	-10.517	0.000
Latvia	0.012	0.001	0.164	-3.106	0.002
Albania	0.125	0.007	0.734	-1.287	0.198
Estonia	0.031	0.002	0.350	-2.390	0.017
Norway	0.001	0.000	0.022	-4.628	0.000
Kyrgyzstan	0.005	0.002	0.011	-11.983	0.000
China	0.037	0.012	0.109	-5.538	0.000
Afghanistan	0.045	0.036	0.058	-23.790	0.000
Mongolia	0.008	0.005	0.014	-18.456	0.000
Uzbekistan	0.004	0.001	0.017	-7.696	0.000
	0.021	0.021	0.022	-411.822	0.000

Meta Analysis

Table 2: Hetrogeneity of various country in reference of various indicator.

Model		Effect size and 95% interval			Test of null (2-Tail)		Heterogeneity				Tau-squared	
Model	Number Studies	Point estimate	Lower limit	Upper limit	Z-value	P-value	Q-value	df (Q)	P-value	I-squared	Tau Squared	Standard Error
Fixed	92	0.021	0.021	0.022	-411.822	0.000	2773.904	91	0.000	96.719	0.321	0.189
Random	92	0.019	0.017	0.022	-53.276	0.000						

In this study we have the 92 study and find out the tau squared value is 96.719 and the standard error 0.189 and the p value is 0.000 which is less than the value is 0.05 than we can say that the result is significant, and it is true for evidence-based medicine than the pooled estimate is performed by the comprehensive meta-analysis software tool. In the fixed model we the single value lie between the range classified as lower limit 0.021 and upper limit 0.022. and the random model we find out the confidence interval lies between the 0.017 and the 0.022. And then the perform the various study of the states and in the study is 36 and find the tau squared value is 99.898. and the confidence interval between the value for random model is 0.008 and 0.010 and the value for the fixed model are 0.012 and 0.012. and the p value is less than 0.05 than we can say that the result is true for effective medicine. And the results are true for evidence -based medicine. And we find out the standard error is 0.074. In this study we have find out the graph shows the starting variability increasing and then the variability decreasing (Table 3 & 4 & 5) (Figure 1 & 2).

Table 3: Table shown that starting variability increasing and then the variability decreasing.

Heterogeneity	Heterogeneity of country	Heterogeneity of state
Q	2773.904	34255.704
p_q	0	0
I^2	96.719	99.898
T^2	0.321	0.161
Standard error	0.189	0.074

Interpretation

In meta-analysis the effect size is about contrasting studies and then amalgamate all the studies into a separate exploration. We acquisition that Q is very broad it measures the larger deviation across countries. As I2 is major origin which informs that the expanse of heterogeneity, hence for broad I2 give voice to distinguished than 25% then the meta-analysis should not explode the integrate combined effect size as meaningful. In this investigation we make the hypothesis that in selected countries the incorporate effect is not significant. We find the z value is -411,822 and the value of p is <0.00. Now we contrast the value of 95% CI or 0.05 level of significance. The result value is less than 0.05. So, we can say that combined effect is significant, now it is referred to as derived pooled estimate as an approach to true effect size. Tau (T) is a beneficial to extent the dispersion. The 95% prediction interval gives the range in which the point estimate of 95% of future studies will fall under the assumption that the true effect size is normally distributed [41].

Conclusion

The paper has epitomize enlightenment of an extensive assortment the origin of sources on how to trade in with four issues that may be come up against in systematic reviews and meta-analysis of appeal in social science research. A numerous literature provided from statistics, ecology, psychology, epidemiology has assemble a set of expedients for demonstration of researchers who may be focused these issues on the process of covenant their own systematic review and meta-analysis. Various disciplines include the members of advisory group ensure that the address of reviewers. The advisory group proposes every phase of research, specifically the review question help in methodological methods and the decision making. Experienced reviewers demonstrate the one or more issues that provide the solution of unpredictable with the current method. This paper provides the intentional as expedient research of the covid-19 disease.

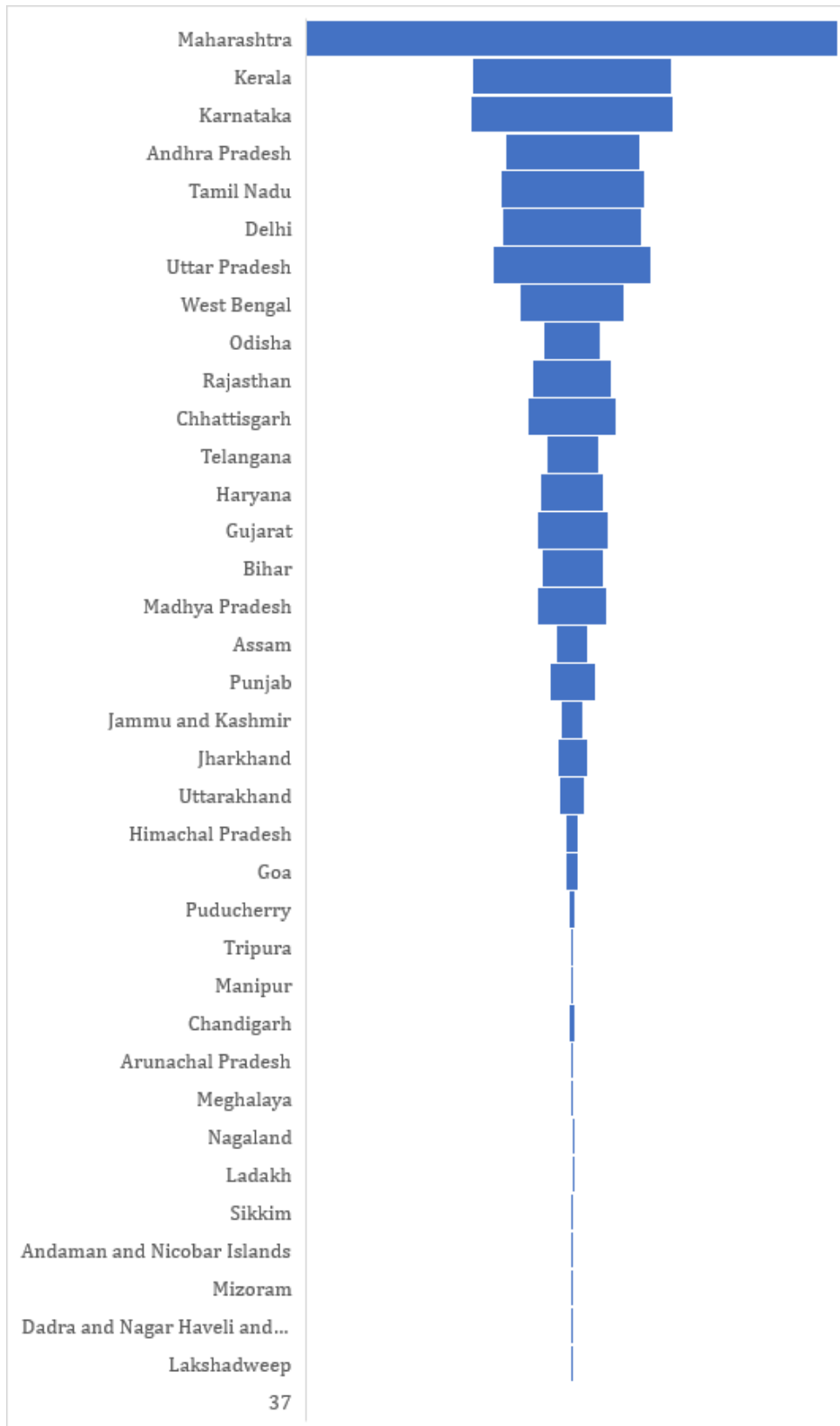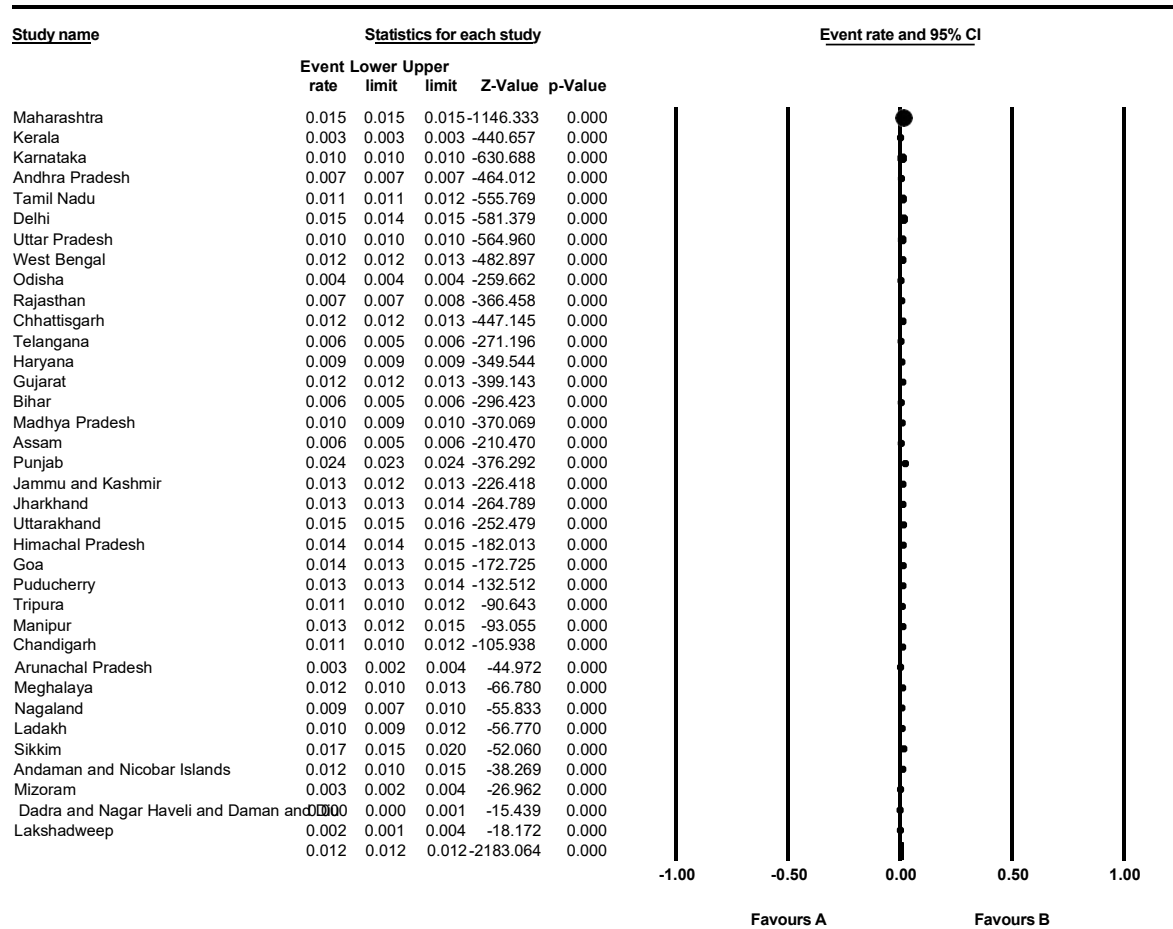Figure 1: The Funnel plot of various stats.

Table 4: Meta- analysis of infection mortality rates of Covid-2 by states where data originated.

Study name	Event rate	Lower limit	Upper limit	Z-Value	p-Value	Event rate and 95% CI
Maharashtra	0.015	0.015	0.015	-1146.333	0.000	
Kerala	0.003	0.003	0.003	-440.657	0.000	
Karnataka	0.010	0.010	0.010	-630.688	0.000	
Andhra Pradesh	0.007	0.007	0.007	-464.012	0.000	
Tamil Nadu	0.011	0.011	0.012	-555.769	0.000	
Delhi	0.015	0.014	0.015	-581.379	0.000	
Uttar Pradesh	0.010	0.010	0.010	-564.960	0.000	
West Bengal	0.012	0.012	0.013	-482.897	0.000	
Odisha	0.004	0.004	0.004	-259.662	0.000	
Rajasthan	0.007	0.007	0.008	-366.458	0.000	
Chhattisgarh	0.012	0.012	0.013	-447.145	0.000	
Telangana	0.006	0.005	0.006	-271.196	0.000	
Haryana	0.009	0.009	0.009	-349.544	0.000	
Gujarat	0.012	0.012	0.013	-399.143	0.000	
Bihar	0.006	0.005	0.006	-296.423	0.000	
Madhya Pradesh	0.010	0.009	0.010	-370.069	0.000	
Assam	0.006	0.005	0.006	-210.470	0.000	
Punjab	0.024	0.023	0.024	-376.292	0.000	
Jammu and Kashmir	0.013	0.012	0.013	-226.418	0.000	
Jharkhand	0.013	0.013	0.014	-264.789	0.000	
Uttarakhand	0.015	0.015	0.016	-252.479	0.000	
Himachal Pradesh	0.014	0.014	0.015	-182.013	0.000	
Goa	0.014	0.013	0.015	-172.725	0.000	
Puducherry	0.013	0.013	0.014	-132.512	0.000	
Tripura	0.011	0.010	0.012	-90.643	0.000	
Manipur	0.013	0.012	0.015	-93.055	0.000	
Chandigarh	0.011	0.010	0.012	-105.938	0.000	
Arunachal Pradesh	0.003	0.002	0.004	-44.972	0.000	
Meghalaya	0.012	0.010	0.013	-66.780	0.000	
Nagaland	0.009	0.007	0.010	-55.833	0.000	
Ladakh	0.010	0.009	0.012	-56.770	0.000	
Sikkim	0.017	0.015	0.020	-52.060	0.000	
Andaman and Nicobar Islands	0.012	0.010	0.015	-38.269	0.000	
Mizoram	0.003	0.002	0.004	-26.962	0.000	
Dadra and Nagar Haveli and Daman and Diu	0.000	0.000	0.001	-15.439	0.000	
Lakshadweep	0.002	0.001	0.004	-18.172	0.000	
	0.012	0.012	0.012	-2183.064	0.000	

Event rate and 95% CI: -1.00 -0.50 0.00 0.50 1.00

Favours A   Favours B

Meta Analysis

Table 5: Heterogeneity of various states in terms of various indicators.

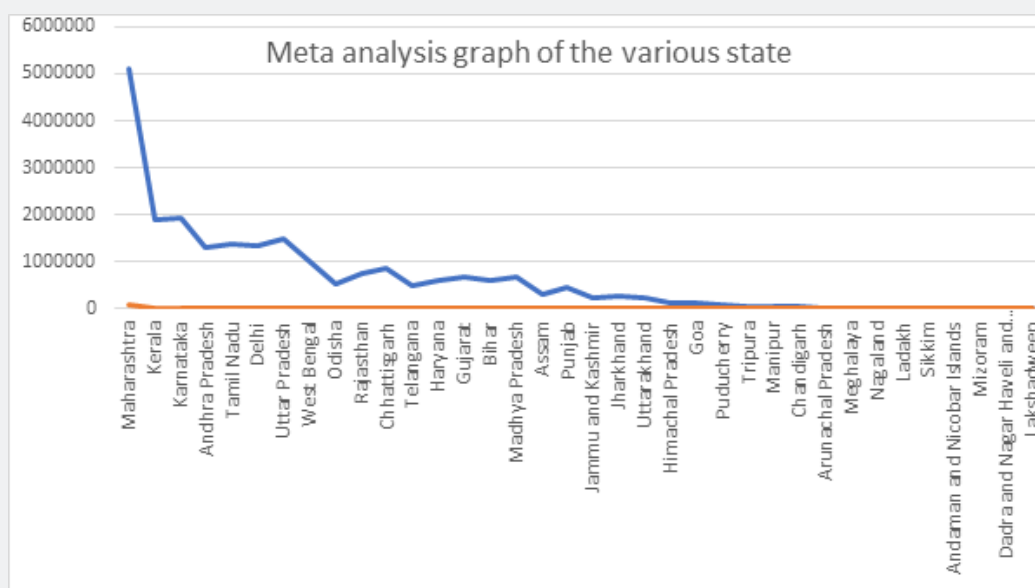| Model	Number Studies	Point estimate	Lower limit	Upper limit	Z-value	P-value	Q-value	df (Q)	P-value	I-squared	Tau Squared	Standard Error
		Effect size and 95% interval			**Test of null (2-Tail)**		**Heterogeneity**				**Tau-squared**	
Fixed	36	0.012	0.012	0.012	-2183.064	0.000	34255.754	35	0.000	99.898	0.161	0.074
Random	36	0.009	0.008	0.010	-68.483	0.000						

Figure 2: The graph of the various states is shown above.

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