Can the COVID-19 pandemic increase health care workers' anxiety? Protocol for a meta-analysis

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Abstract

Background: The Coronavirus disease 2019 (COVID-19) pandemic has been declared a public health emergency of international concern, which causes excessive anxiety in health care workers. In addition, publication bias and the low quality of publications are widespread, which can cause unreliable results.

Objective: The first aim of this meta-analysis is to examine the prevalence of anxiety among health care workers and determine whether it had increased due to the COVID-19 pandemic. In addition, our second aim is to investigate whether there has been an increase in publication bias and a deterioration in the quality of publications due to the pandemic.

Methods: All related studies that were published/released from 2015 to 2020 will be searched in electronic databases. The risk of bias in individual studies will be assessed using the STROBE checklist. The heterogeneity of the studies will be assessed using the I2 statistic. The effect size (prevalence rates of anxiety) and a 95% confidence interval for each research will also be calculated. We shall use moderator analysis to test for the effect of COVID-19 on health care workers' anxiety, and detect publication bias in COVID-19 studies. We shall also assess publication bias using the funnel plot and Egger's regression. In the presence of publication bias, if studies have no homogeneity, the trim-and-fill procedure will be applied to adjust the missing studies.

Results: We are required to complete this meta-analysis within two months, if our submission is accepted.

Conclusions: This study presents a protocol for meta-analysis targets to provide comprehensive evidence about whether COVID-19 pandemic increases the prevalence of anxiety among health care workers and whether there has been an increase in publication bias and a deterioration in the quality of publications due to the pandemic. The result of this review can provide evidence to help health managers to make informed decisions for preventing anxiety of health care workers.

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managers to make informed decisions for preventing anxiety of health care workers.

Introduction

The Coronavirus disease 2019 (COVID-19) pandemic has affected more than 18,900,000 individuals and resulted in over 709,000 deaths globally [1]. It has, therefore, been declared a public health emergency of international concern [2]. To tide over this crisis, it is important to maintain an adequate health care workforce, which requires not only an adequate number of health care workers but also the maximization of each health care worker's ability to care for a greater number of patients. Since the outbreak can last for several months, it is also critical that health care workers are able to perform to their full potential, over an extended time interval [3].

While health care workers have to concurrently cope with the societal shifts and emotional stressors faced by the general population; additionally, they face greater risks of exposure, extreme workloads, moral dilemmas, and a rapidly evolving practice environment that differs greatly from what they are familiar with [4, 5]. Moreover, facing hitherto unknown challenges in both physical and mental health causes excessive tension and anxiety in health care workers [6]. While anxiety is a common mental condition that can cause emotional distress, obsessive thinking, and compulsive behavior; long-term anxiety results in psychological distress and even affects the daily lives of individuals [7]. Anxiety also impairs the executive functions that underlie our ability to control and focus on our thoughts [8]. Consequently, studying and accurately grasping the anxiety of health care workers is necessary to take more appropriate and corrective measures to deal with public health and safety.

Although some researchers have investigated health care workers' anxiety during the COVID-19 pandemic [9, 10], many new articles on COVID-19 are being released rapidly since the pandemic still poses a serious threat. The present meta-analytic study includes the latest articles, as well as aims at having a more comprehensive understanding of the prevalence of anxiety among health care workers. Furthermore, to date, a comparison has not been established between studies on health care workers' anxiety, related and unrelated to COVID-19. In the current outbreak situation,

will studies conducted in two different periods have different effect sizes? Will the levels of anxiety increase significantly? Accordingly, the first aim of our meta-analysis is to examine health care workers' anxiety status and determine the COVID-19 pandemic's influence by comparing COVID-19 related studies with unrelated studies.

In addition, since the onset of the outbreak, medical journals have drastically accelerated the publication process for COVID-19 related articles [11, 12]. While journals' acceleration of their publication process is laudable from the perspective of quick information dissemination, it also raises concerns relating to the quality of the publications and publication bias. Many COVID-19 related articles were retracted, when criticized as being highly flawed [13]. Since the quality of articles on COVID-19 is a widespread problem [14] and publication bias has always been a major concern in psychological research [15]; the second aim of our meta-analysis is to investigate both publication bias and the quality of the publications by collecting studies—published and unpublished (i.e., preprints)—on the prevalence of anxiety among health care workers during COVID-19, using STROBE checklists, and then performing meta-analysis and sensitivity analysis to assess the quality of the articles.

Method

Search strategy

This study will follow the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines [16]. We shall search through electronic databases—Web of Science, PubMed, PsyArXiv, and medRxiv—for all published journal papers (related versus unrelated to COVID-19) and preprints (relevant to COVID-19), whose titles and abstracts include: ("health care workers" OR "health professions" OR "health care professionals" OR "health professionals" OR "health workers" OR "medical staff") AND ("anxiety").

Inclusion and exclusion criteria

Studies will be included only if they meet the following inclusion criteria: (1) Only studies written in English which will be decided based on the research team's unified consideration; (2) Articles related to "anxiety among health care workers;" (3) Only quantitative research designs; (4) Studies submitted during 2015 to 2020; (5) Studies which include standardized measures of anxiety with published psychometric data and reasonable evidence of reliability and validity; (6) Studies which include a clear description of methods used to assess and score standardized measurement instruments; and (7) Studies which include publicly available effect sizes (prevalence) or values that can be calculated (the number of health care workers with anxiety and the sample size).

The exclusion criteria are: (1) Studies with insufficient data, (2) Duplicate sources, (3) Pieces of research with unclear methods, and (4) Publications about any other outbreaks.

Data extraction

Initially, duplicate articles that were repeatedly found in multiple databases will be removed. Then, screening of the titles and abstracts will be conducted, and articles will be removed based on the inclusion and exclusion criteria. Furthermore, the remaining full text of articles will be checked, and article information will be extracted using a pre-prepared extraction table that includes the article's title, authors' names, scales used, year of submission, country, sample size, whether the study has been published, whether the study relates to COVID-19, and the effect size (prevalence of anxiety). The article review and data extraction processes will be performed independently by two of the present authors. When there is a disagreement between them, the other authors will resolve the conflict.

Study assessment criteria

We shall use STROBE (Strengthening the Reporting of OBservational Studies in Epidemiology)

checklists to assess the quality of observational studies [17]. The checklist consists of six scales—title, abstract, introduction, method, results, and discussion—each of which, includes some items, comprising a total of 32 items. Each item is scored as 0 or 1. In the modified STROBE, scores range from 0 to 32, with scores ≥ 16 indicating a low risk of bias and scores < 16 indicating a high risk of bias. Finally, articles that exhibit a low risk of bias are selected for the analysis.

Statistical analysis

Initially, the heterogeneity of the studies will be determined using the I^2 statistical index, which ranges from 0 to 100; the larger the index, the more heterogeneous are the findings. The categories encompassed by the index will be defined based on the test developed by Professor Julian Higgins to measure the extent of heterogeneity: low (25%), moderate (50%), and high (75%) [18]. A study with a heterogeneity > 50% prompts the use of random effects models. For each research, we shall calculate the effect size (prevalence rates of anxiety) and a 95% confidence interval around the effect size. For the data reported, if the original paper does not list the effect size or the number of health care workers with anxiety (which can be used to calculate the effect size), the authors of the paper will be contacted and requested to provide this information. If they are unable to do so, the study will be excluded from the analyses.

Then, we shall use moderator analysis to test for the effect of COVID-19 on health care workers' anxiety (related versus unrelated to COVID-19), and publication bias in COVID-19 studies (preprints versus published journal papers). We shall also assess publication bias using the funnel plot and Egger's regression [19]. If the p-value for Egger's regression is smaller than the significance level (α = 0.05), it suggests that publication bias is present. In the presence of publication bias if studies have no homogeneity, the trim-and-fill procedure will be applied to adjust these missing studies [20].

Finally, sensitivity analyses will be performed to assess the influence of each individual study

on the pooled effect size. The statistical significance level is defined as α = 0.05.

Results

We are required to complete this meta-analysis within two months, if our submission is accepted.

Discussion

This manuscript presents a protocol for meta-analysis targeting to provide comprehensive evidence about whether COVID-19 pandemic increases the prevalence of anxiety among health care workers and whether there has been an increase in publication bias and a deterioration in the quality of publications due to the pandemic. The result of this review can provide a evidence to help health managers to make informed decisions for preventing anxiety of health care workers. We will finish discussions based on the results in Stage 2.

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