INPLASY PROTOCOL

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Review Stage at time of this submission: Formal screening of search results against eligibility criteria.

Conflicts of interest:
None declared.

Socioeconomic and Occupational Safety and Health Impact of Airborne and Droplet Borne Infectious Diseases in Industries: A Systematic Review

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Review question / Objective: A structured, systematic review and qualitative synthesis of peer-reviewed publications will be formed to explore the socioeconomic and occupational safety and health impacts of airborne and droplet borne infectious disease and outbreaks in industries.

Information sources: We will be using three biomedical electronic database (PubMed, Scopus, and Web of Science), one economic database (IDEAS/REPEC) and three occupational safety and health databases (OSHLINE, HSELINE, and NIOSHTIC-2).

INTRODUCTION

Review question / Objective: A structured, systematic review and qualitative synthesis of peer-reviewed publications will be formed to explore the socioeconomic and occupational safety and health impacts of airborne and droplet borne infectious disease and outbreaks in industries

Condition being studied: Socioeconomic and Occupational Safety and Health Impact of Airborne and Droplet Borne Infectious Diseases in Industries. After searches will

be performed, articles will then organize into EndNote 20 Software and duplicates will be identified and removed. This was performed by one reviewer, via the "Find and Remove Duplicate References" function at first, and will be followed by manual screening, as some of the same articles were entered slightly differently into different databases. After duplicates are then removed, articles are then assessed for eligibility independently by two reviewers in two stages. In stage one, the title and abstract of search results will screen and assess for relevance. In stage two, the full-text of potentially relevant publications will be retrieved and reviewed for inclusion. Any primary studies in English examining socioeconomic and occupational safety and health impacts of airborne and droplet borne infectious disease and outbreaks in any industry will then include. Studies that were non-human studies, reviews, editorials, commentaries, forewords, opinion pieces, and books, studies that will be examine infectious diseases transmitted via routes other than airborne and droplet borne transmission, as well as studies examining variables others than socioeconomic and occupational safety and health impact will be exclude. The reason for excluding a publication following title and abstract review as well as full-text review will be noted. The list of studies that will be included and excluded based on the inclusion and exclusion criteria will be described earlier and then cross-validated to assess for disagreements. For any disagreement that was present, consensus was sought where possible, and in cases where that will not be possible, a third reviewer will then assign. The percent agreement and Cohen's Kappa for the study selection process were X% and X, respectively. Attempts to contact authors for articles that were not available in full text were made, and only full text articles will be included in the review to enable quality assessments. Hand searching will not be attempted due to resource limitations.

METHODS

Search strategy: A comprehensive search of the literature was undertaken in August 2021 using three biomedical electronic database (PubMed, Scopus, and Web of Science), one economic database (IDEAS/ REPEC) and three occupational safety and health databases (OSHLINE, HSELINE, and NIOSHTIC-2). The search is aimed to identify relevant articles published in peer-reviewed journals written in English, with the assumption that most of the important findings will be reported in English regardless of country of origin. Boolean search will be formed on each database as following: Search terms for PubMed, Scopus, and Web of Science: i) ("socioeconomic impact" OR "safety and health impact" OR "understaffing" OR "reduced workforce" OR "service disruption" OR "financial loss" OR "increased expenses" OR "productivity" OR "absenteeism" OR "presenteeism" OR "mental disorder" OR "burnout") AND ii) (infection OR "infectious disease" OR "communicable disease" OR outbreak OR epidemic OR pandemic OR COVID-19 OR SARS OR MERS OR coronavirus OR influenza OR adenovirus OR enterovirus OR rotavirus OR measles OR mumps OR smallpox OR tuberculosis OR diphtheria OR anthrax OR legionellosis OR meningococcus OR pneumococcus OR Bordetella OR aspergillosis OR blastomycosis OR cryptococcosis) AND iii) (industr* OR workplace OR organization OR organisation OR compan*). Search terms for IDEAS/REPEC: i) ("socioeconomic impact" OR "social impact" OR "economic impact") AND ii) (infection OR "infectious disease" OR "communicable disease" OR outbreak OR epidemic OR pandemic OR COVID-19 OR SARS OR MERS OR coronavirus OR influenza OR adenovirus OR enterovirus OR rotavirus OR measles OR mumps OR smallpox OR tuberculosis OR diphtheria OR anthrax OR legionellosis OR meningococcus OR pneumococcus OR Bordetella OR aspergillosis OR blastomycosis OR cryptococcosis) AND iii) (industr* OR workplace OR organization OR organisation OR compan*). Search

terms for OSHLINE, HSELINE, and NIOSHTIC-2: i) impact AND ii) (infection OR "infectious disease" OR "communicable disease" OR outbreak OR epidemic OR pandemic OR COVID-19 OR SARS OR MERS OR coronavirus OR influenza OR adenovirus OR enterovirus OR rotavirus OR measles OR mumps OR smallpox OR tuberculosis OR diphtheria OR anthrax OR legionellosis OR meningococcus OR pneumococcus OR Bordetella OR aspergillosis OR blastomycosis OR cryptococcosis) AND iii) (industr* OR workplace OR organization OR organisation OR compan*) The terms included in the Boolean search will be chosen after careful consideration and consensus of terms identified from literature review, in view of the variation in keywords of interest. The first combination of keywords includes various terms denoting socioeconomic and occupational safety and health impacts of infectious disease at the workplace will be described by previous studies (Tortorella et al, 2020; Narayanamurthy & Tortorella, 2021; Novitasari et al, 2020; Mi et al, 2020, Duan & Zhu, 2020; Koonin, 2020). The second combination of keywords includes key terms related to infectious disease and common pathogens that may spread via droplets and airborne transmission (Ather et al, 2020). Finally, the third combination of keywords includes terms that specify workplace settings. The Boolean search operator "OR" will be used to broaden the search with multiple analogous terms, while "AND" was used to narrow the search to studies examining socioeconomic and occupational safety and health impact of infectious disease and outbreaks in industries. The search will be conducted by one reviewer and will be performed without restriction to date or publication. All searches were concluded by 29th August 2021.

Participant or population: Workers.

Intervention: Not Applicable.

Comparator: Not Applicable.

Study designs to be included: We will include studies will be assessed by examining the level of evidence according to the Table of Evidence Levels from Cincinnati Children's Hospital Medical Center (CCHMC) (2012) and quality of study according to the Newcastle-Ottawa Scale (NOS). The CCHMC classifies level of evidence for individual studies by domain, study design, and quality, with level 1 representing the highest level and signifying the strongest evidence, and level 5 representing the lowest level and signifying the weakest evidence. Additionally, studies at each level are further subclassified to either "a" or "b".

Eligibility criteria: After searches will be performed, articles will then organize into EndNote 20 Software and duplicates will be identified and removed. This was performed by one reviewer, via the "Find and Remove Duplicate References" function at first, and will be followed by manual screening, as some of the same articles were entered slightly differently into different databases. After duplicates are then removed, articles are then assessed for eligibility independently by two reviewers in two stages. In stage one, the title and abstract of search results will screen and assess for relevance. In stage two, the full-text of potentially relevant publications will be retrieved and reviewed for inclusion. Any primary studies in English examining socioeconomic and occupational safety and health impacts of airborne and droplet borne infectious disease and outbreaks in any industry will then include. Studies that were non-human studies, reviews, editorials, commentaries, forewords, opinion pieces, and books, studies that will be examine infectious diseases transmitted via routes other than airborne and droplet borne transmission, as well as studies examining variables others than socioeconomic and occupational safety and health impact will be exclude. The reason for excluding a publication following title and abstract review as well as full-text review will be noted. The list of studies that will be included and excluded based on the inclusion and exclusion criteria will be

described earlier and then cross-validated to assess for disagreements. For any disagreement that was present, consensus was sought where possible, and in cases where that will not be possible, a third reviewer will then assign. The percent agreement and Cohen's Kappa for the study selection process were X% and X, respectively. Attempts to contact authors for articles that were not available in full text were made, and only full text articles will be included in the review to enable quality assessments. Hand searching will not be attempted due to resource limitations.

Information sources: We will be using three biomedical electronic database (PubMed, Scopus, and Web of Science), one economic database (IDEAS/REPEC) and three occupational safety and health databases (OSHLINE, HSELINE, and NIOSHTIC-2).

Main outcome(s): A structured, systematic review and qualitative synthesis of peer-reviewed publications will be formed to explore the socioeconomic and occupational safety and health impacts of airborne and droplet borne infectious disease and outbreaks in industries.

Quality assessment / Risk of bias analysis: Quality assessment will be refer according to the NOS, which denotes good quality study and lesser quality study respectively in terms of methodological quality. The NOS is a widely used and validated tool developed by Wells et al. (2000) and incorporates the assessment of three broad perspectives for cohort and case-control studies: the selection of the study groups, the comparability of the groups, and the ascertainment of exposure or outcome of interest. The NOS has also been adapted for use in cross-sectional studies by Herzog et al. (2013), which was further adapted for this study in two areas: 1) For ascertainment of outcome, we will assign two stars for validated measurement tool and/or organisational records, one star for non-validated measurement tool that is based literature review or previous studies and/or self-

report data, and no star for no description of the measurement tool, as our study will concern with impact which relies on study instruments and records rather than clinical outcome assessment, and 2) Included ascertainment of exposure under "Exposure, outcome and analysis" instead of "Selection". Based on a 'star system', a star will be awarded for every quality criterion met by the study and the quality rating will be assign as follows: a) Cohort studies: 13 maximum stars and a final rating of 0-3 stars as "poor", 4-6 stars as "moderate", 7-9 stars as "good" and 10-13 stars as "excellent" b) Case-control studies: 10 maximum stars and a final rating of 0-3 stars as "poor", 4-5 stars as "moderate", 6-7 stars as "good", and 8-10 stars as "excellent" c) Cross-sectional studies: 10 maximum stars and a final rating of 0-3 stars as "poor", 4-5 stars as "moderate", 6-7 stars as "good", and 8-10 stars as "excellent" In the final quality rating, studies under the categories "excellent" and "good" were rated as "a" and those under the categories "poor" and "moderate" were rated as "b". The quality assessment was performed independently by two reviewers. Data extraction and analysis will be cross validated to assess for disagreements. For any disagreement that will not present, consensus will seek where possible. In cases where that will not be possible, a third reviewer will be assigned.

Strategy of data synthesis: For each of the included study, data on author, year of publication, study design, type of infectious disease, study population, location of study, number of participants that will be included, study instruments that will be use, study variables will be examine, socio economic impact, occupational and safety health impact, and study conclusion will be extracted. The data extraction will be performed independently by two reviewers. For any disagreement that was present, consensus will not seek where possible, and in cases where that will be not possible, a third reviewer will then be assign. Data will then analyse qualitatively due to the heterogeneity of studies that will be included in the systematic review, and

meta-analysis will not attempt. Where applicable, data will not analyse using descriptive statistics using Statistical Package of Social Science Version 27. The numerical data will be analysed using mean and standard deviation, while the categorical data will be analysed using frequency and percentage.

Subgroup analysis: Not Applicable.

Sensitivity analysis: Not Applicable.

Language: English.

Country(ies) involved: Malaysia.

Keywords: socioeconomic; occupational; safety; health; impacts; infectious; disease; workplace.

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