

Systematic Review

Cite this article: Majid U, Hussain SAS, Wasim A, Farhana N, Saadat P. A systematic map of non-clinical evidence syntheses published globally on COVID-19. *Disaster Med Public Health Prep*. doi: <https://doi.org/10.1017/dmp.2021.236>.



Keywords:

covid-19; pandemic planning; systematic review; mental health; prevention; health service delivery; economy; environment

Corresponding author:

Umair Majid,
Email: majidua@mcmaster.ca.

A Systematic Map of Non-Clinical Evidence Syntheses Published Globally on COVID-19

Umair Majid MSc, MEd, PhD (c)¹ , Syed Ahmed Shahzaem Hussain MBBS²,
Aghna Wasim BSc³ , Nusrat Farhana MPA, PhD¹ and Pakeezah Saadat MSc^{1,4}

¹Institute of Health Policy, Management and Evaluation, University of Toronto, Ontario, Canada; ²Allama Iqbal Medical College, Lahore, Pakistan; ³Department of Psychology, University of Toronto, Ontario, Canada and ⁴Applied Health Research Centre (AHRC), Li Ka Shing Knowledge Institute of St. Michael's Hospital, Toronto, Ontario, Canada

Abstract

Study objective: Evidence syntheses perform rigorous investigations of the primary literature and they have played a vital role in generating evidence-based recommendations for governments worldwide during the Covid-19 pandemic. However, there has not yet been an attempt to organize them by topic and other characteristics. This study performed a systematic mapping exercise of non-clinical evidence syntheses pertaining to Covid-19.

Methods: This study conducted a systematic search on December 5, 2020 across 10 databases and servers: CINAHL (EBSCO Information Services, Ipswich, Massachusetts, United States), Embase (Elsevier, Aalborg, Denmark), Global Health (EBSCO Information Services, Ipswich, Massachusetts, United States), Healthstar (NICHSR and AHA, Bethesda, United States), MEDLINE (NLM, Bethesda, United States), PsychINFO (APA, Washington, DC, United States), Web of Science (Clarivate Analytics, London, UK), Research Square (Research Square, Durham, North Carolina), MEDRxiv (Cold Spring Harbor Laboratory, New York, United States), and PROSPERO (NIHR, York, United Kingdom). Only full evidence syntheses published in a peer-reviewed journal or preprint server were included.

Results: This study classified all evidence syntheses in the following topics: health service delivery (n = 280), prevention and behavior (n = 201), mental health (n = 140), social epidemiology (n = 31), economy (n = 22), and environment (n = 19). This study provides a comprehensive resource of all evidence syntheses categorized according to topic.

Conclusions: This study proposes the following research priorities: governance, the impact of Covid-19 on different populations, the effectiveness of prevention and control methods across contexts, mental health, and vaccine hesitancy.

Introduction

The SARS-CoV-2 pandemic has affected over 190 countries and regions. As of January 25, 2021 nearly 100000000 cases and 2000000 deaths have been recorded globally. The covid-19 pandemic has devastated systems, and dramatically changed the livelihood of individuals and communities around the world. As such, countries, governments, and organizations have dedicated a considerable amount of attention to identifying, examining, and researching the various impacts of the pandemic on systems, communities, and individuals. This research agenda has led to the publication of a myriad of primary studies and evidence syntheses on prevention and control methods,¹ redesigning health services,² challenges with using telemedicine,³ mental health issues among health care providers,⁴ risk perceptions and behavior of the general population,⁵ and more. Evidence syntheses perform rigorous and systematic investigations of the primary literature to provide knowledge about an unknown topic in order to augment decision-making. Evidence syntheses have played a vital role in generating evidence-based recommendations for governments worldwide during the Covid-19 pandemic and have thus been a pivotal resource in creating policies in moments of decision-making uncertainty. Evidence syntheses have contributed to reducing the potential negative outcomes of the pandemic on systems, communities, individuals, and the environment. Evidence syntheses also provide us with a view of what is known and unknown. However, while there have been numerous evidence syntheses published on Covid-19, there has not yet been an attempt to organize them all. Organizing these evidence syntheses based on discipline, topic, and review type is therefore important for countries around the world that continue to struggle with ongoing Covid-19 pandemic planning, including vaccination procurement and distribution, sustaining preventive behaviors in the population, and post-pandemic recovery. It is necessary to reflect on global efforts to synthesize primary research evidence. This study performed a systematic mapping exercise of non-clinical evidence syntheses pertaining to Covid-19.

Table 1. Eligibility criteria

Inclusion	Exclusion
<p>Non-clinical systematic reviews or evidence syntheses on anything related to Covid-19</p> <p>Must have Covid-19 (or a variation) and review (or a variation) in the title</p> <p>Non-clinical reviews can include, but are not limited to the following: mental health, equity, behavior change, policymaking, intervention design, knowledge and attitudes, research gaps, changes to health service delivery, the impact of Covid-19 on vulnerable populations</p> <p>Reviews that include non-clinical and clinical topics in the same paper (but we focused on the non-clinical sections)</p>	<p>Primary qualitative, quantitative, and mixed- methods studies</p> <p>Non-empirical studies: commentaries, editorials, posters, theses, book chapters, and review protocols</p> <p>Any systematic reviews or evidence syntheses on previous pandemics or global outbreaks (with the exception of reviews that compare Covid-19 to previous pandemics)</p> <p>Studies that were too broad in their focus (i.e., did not specify a specific research objective)</p> <p>Studies related to the diagnosis, prognosis or treatment of Covid-19 with the exception of testing technologies, virtual care technologies, and mental health of populations</p> <p>Any clinical studies related to the mental illness comorbidities of Covid-19</p> <p>Any epidemiological studies related to transmission rates, prevalence, and incidence of Covid-19 with the exception of studies specific to social factors such as prevalence across ethnicities and vulnerabilities</p> <p>Any studies on the vaccine development processes that were primarily related to physiology or clinical treatment</p>

Methods

Approach

This study conducted a systematic mapping analysis of published, non-clinical, evidence syntheses on topics about the Covid-19 pandemic. The aim of this approach was to present the characteristics, topics, and trends of evidence syntheses published globally for the purposes of identifying both gaps in the current research literature, and important priorities for future research. Due to the diversity of topics, we performed descriptive quantitative statistics and qualitative thematic analysis to classify the characteristics and topics of included studies.^{6,7} This exercise was performed to get a high-level overview of the topics of evidence syntheses. The discussion section lists a number of priorities to guide future research in this area. An in-depth analysis of the content of these evidence syntheses will be a logical step for future research.

Search process

This study conducted a systematic database search on December 5, 2020 using 'Covid,' 'Sars-CoV-2,' 'review,' and 'evidence syntheses' as keywords mentioned in the title. This study conducted the search on the following databases: CINAHL, Embase, Global Health, Healthstar, MEDLINE, PsychINFO, and Web of Science.

Database screening

This study was interested in finding all published evidence syntheses on Covid-19 related to non-clinical topics. This study defined 'clinical topics' as comprising of research related to the diagnosis, prognosis, and treatment of Covid-19 disease, including physiological and biomedical studies. However, this study also included a number of exceptions to 'clinical topics' in our scope to ensure that our mapping exercise was comprehensive and relevant. The full list of our eligibility criteria can be found in [Table 1](#). This study excluded all protocols of evidence syntheses, but searched google.com to determine whether their full studies were published.

Preprint screening

A total of 2 researchers extracted relevant studies from 2 preprint servers and 1 evidence synthesis repository: Research Square,

MEDRxiv, and PROSPERO. All reviews that were available as a preprint or published in a journal were included in our analysis as long as they fulfilled our eligibility criteria and were not duplicates of published studies found from the database search.

Data extraction and analysis

This study extracted a number of methodological and topic characteristics from eligible studies. This study categorized all studies based on the following: journal type (i.e., medicine, technology, environment, policy, and management), review type (i.e., systematic review, rapid review, scoping review, critical review, narrative review, integrative review, or literature review), and study topic (i.e., economy, environment, health service delivery and safety, mental health, preventive strategies and behavior change, and social epidemiology). This study presents the descriptive proportions of each of these characteristics. In addition, this study lists the citations for evidence syntheses published on each topic and subtopic in Additional File 1.

Results

Search results

This study found 2912 unique citations from our database search after removing duplicates. After title and abstract screening, 2201 were excluded because they were clinical evidence syntheses, and 711 were eligible for inclusion. From the alternative list, this study found 138 studies (n = 2 published studies of protocols from database search; n = 23 from Research Square; n = 88 from MEDRxiv; and n = 25 from PROSPERO). Collectively, 849 evidence syntheses were screened from both search approaches, of which 156 were excluded because they were either duplicates or were deemed to be on clinical topics. In total, the characteristics of 693 evidence syntheses are depicted in analysis. Our screening and selection process is shown in [Figure 1](#). Of the 693 studies included in this analysis, 280 (40.4%) were on health service delivery topics, 201 (29.0%) on prevention and behavior, 140 (20.2%) on mental health, 31 (4.5%) on social epidemiology, 22 (3.2%) on economy, and 19 (2.7%) on environment.

Figure 1. Screening and selection process

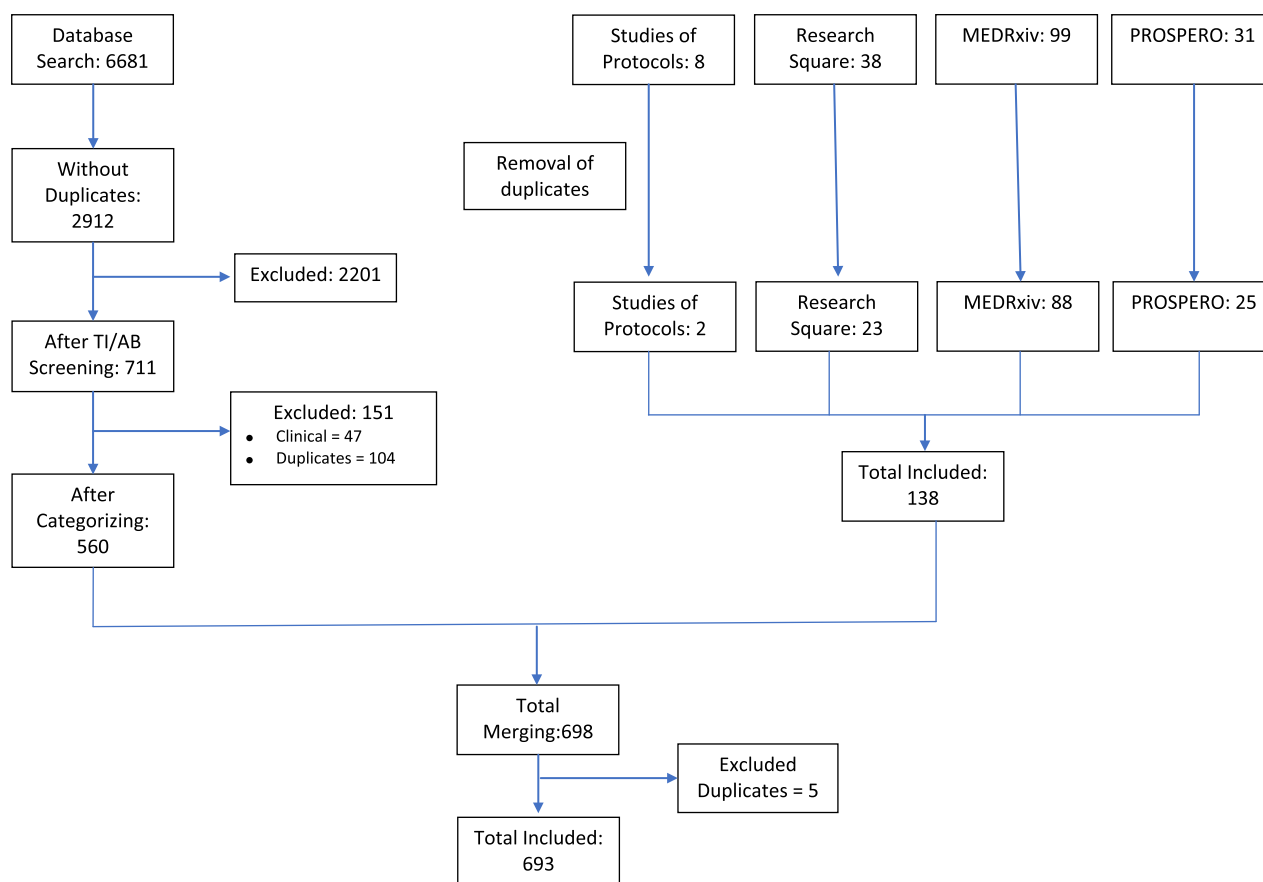


Figure 1. PRISMA diagram.

Prevention and behavior (n = 201)

Topic

Evidence syntheses covered a variety of topics, including prevention and control methods (n = 160; 79.6%), general attitudes and behavior (n = 25; 12.4%), lifestyle changes and physical activity (n = 7; 3.5%), misconceptions and social media (n = 3; 1.5%), leadership and governance (n = 3; 1.5%), and pregnancy (n = 3; 1.5%). Evidence syntheses on prevention and control methods discussed general national and institutional responses to the Covid-19 pandemic (n = 52; 32.5% of 160), personal protective equipment (n = 37; 23.1%), technological tools for tracking and controlling Covid-19 spread (n = 18; 11.3%), modes of transmission (n = 15; 9.4%), statistical modelling of Covid-19 spread (n = 10; 6.3%), and quarantine or lockdown measures (n = 10; 6.3%). Other studies discussed environmental disinfection procedures (n = 6; 3.8%), reopening from lockdown (n = 6; 3.8%), air travel during Covid-19 pandemic (n = 4; 2.5%), community engagement (n = 2; 1.3%), and safe handling of bodies (n = 1; 0.6%).

Review type

Evidence syntheses were primarily non-systematic literature reviews (n = 74; 36.8%), systematic reviews (n = 55; 27.4%), and rapid reviews (n = 37; 18.4%). There were also some scoping reviews (n = 12; 6.0%), critical reviews (n = 4; 2.0%), integrative reviews (n = 2; 1.0%), and a qualitative review (n = 1; 0.5%).

Journal discipline

Most studies were published in medical journals (n = 127; 63.2%) and as preprints (n = 41; 20.4%), followed by technology journals (n = 11; 5.5%), environment journals (n = 10; 5.0%), policy and management journals (n = 7; 3.5%), as entries on PROSPERO (n = 4; 2.0%), and 1 in a research methods journal (n = 1; 0.5%). Among medical journals, evidence syntheses were most commonly published in infectious disease or public health journals (n = 42; 33.1% of 127) and in journals that did not specify the medical discipline (n = 38; 30.0%).

Country and continent of publication

A large proportion of evidence syntheses were published in Asia (n = 88; 43.8%) and Europe (n = 55; 27.4%), followed by North America (n = 27; 13.4%), Africa (n = 14; 7.0%), Oceania (n = 10; 5.0%), and South America (n = 7; 3.5%). In terms of countries, the greatest number of evidence syntheses were from India (n = 26; 12.9%), the United Kingdom (n = 23; 11.4%), China (n = 17; 8.5%), Iran (n = 16; 8.0%), the United States (n = 15; 7.5%), and Canada (n = 10; 5.0%).

Health service delivery (n = 280)

Topic

Evidence syntheses in this category primarily investigated topics related to health service delivery or reorganization (n = 228;

81.4%) and prevention and control methods in a clinical setting (n = 35; 12.5%). We have separated evidence syntheses about health service delivery or reorganization across medical specialties in Additional File 1. We found 54 (23.7% of 228) studies on tele-medicine and remote health service delivery mechanisms. Other evidence syntheses covered medical education (n = 10; 3.6%), grief counselling (n = 2; 0.7%), risk to health care workers (n = 2; 0.7%), and impact of Covid-19 on research activities (n = 2; 0.7%).

Review type

The included studies were mostly non-systematic literature reviews (n = 123; 43.9%), systematic reviews (n = 50; 17.9%), rapid reviews (n = 40; 14.3%), narrative reviews (n = 33; 11.8%), and scoping reviews (n = 25; 8.9%). Other review types included critical reviews (n = 4; 1.4%), integrative reviews (n = 4; 1.4%), and qualitative evidence synthesis (n = 1; 0.4%).

Journal discipline

Evidence syntheses were most frequently published in medical journals (n = 229; 81.8%). Medical specialties with the greatest number of published evidence syntheses included surgery (n = 31; 13.5%), infectiology and public health (n = 17; 7.4%), anesthesia (n = 13; 5.7%), and pharmaceutical sciences (n = 12; 5.2%). Studies were also published as preprints (n = 23; 8.2%), in policy and management journals (n = 15; 5.4%), and in technology journals (n = 13; 4.6%).

Country and continent of publication

The greatest number of evidence syntheses were published by researchers in Europe (n = 100; 35.7%), Asia (n = 86; 30.7%), and North America (n = 56; 20.0%). A smaller proportion of studies were from South America (n = 20; 7.1%), Oceania (n = 11; 3.9%), and Africa (n = 7; 2.5%). Moreover, most publications about health service delivery were from the United Kingdom (n = 42; 15%), the United States (n = 41; 14.6%), India (n = 26; 9.3%), and Italy (n = 24; 8.6%).

Mental health (n = 140)

Population or focus

A majority of studies focused on the general public or an unspecified population (n = 49; 35.0%), followed by health care workers (n = 42; 30.0%), children and adolescents (n = 17; 12.1%), Covid-19 patients (n = 9; 6.4%), older people (n = 7; 5.0%), and females or pregnant women (n = 5; 3.6%). Each of the following populations had only 1 evidence synthesis: athletes, bereaving relatives, cancer survivors, patients in palliative care, people with mental illness, people who use drugs, medical students, non-health care workers, and young adults.

Review type

Evidence syntheses on mental health were primarily systematic reviews (n = 38; 27.1%), rapid reviews (n = 37; 26.4%), non-systematic literature reviews (n = 35; 25.0%), and narrative reviews (n = 18; 12.9%). There were also scoping reviews (n = 9; 6.4%), integrative reviews (n = 2; 1.4%), and 1 critical review (n = 1; 0.7%).

Journal discipline

The greatest number of mental health evidence syntheses were published in medical journals (n = 118; 84.3%), specifically in medical journals on mental health and addictions (n = 60;

50.8% of 118), and infectiology and public health (n = 17; 14.4% of 118). Some of the included studies were also published in basic science journals (n = 9; 7.6%), neurology journals (n = 7; 5.9%), emergency medicine journals (n = 2; 1.7%), geriatrics and palliative medicine journals (n = 2; 1.7%), OB/GYN journals (n = 2; 1.7%), and rehabilitation and sports medicine journals (n = 2; 1.7%). Each of the following medical journal disciplines published only a single evidence synthesis on mental health: anesthesia, critical care, dentistry, endocrinology, medical education, oncology, pediatrics, pharmaceutical sciences, and nursing. Out of the remaining evidence syntheses, 5 (3.6%) were published in policy and management journals, 16 (11.4%) were preprints, and 1 (0.7%) was published in a research methods journal.

Country and continent of publication

Most studies were published in Europe (n = 49; 35.0%) and Asia (n = 47; 33.6%), followed by North America (n = 26; 18.6%), Oceania (n = 8; 5.7%), South America (n = 7; 5.0%), and Africa (n = 3; 2.1%). Countries with the highest number of publications included the United Kingdom (n = 15; 10.7%), Canada (n = 14; 10.0%), India (n = 12; 8.6%), the United States (n = 12; 8.6%), and Iran (n = 10; 7.1%).

Social epidemiology (n = 31)

Perspective or population

Most studies on social epidemiology explored the differences in Covid-19 across ethnicities (n = 7; 22.6%), gender and biological sex (n = 6; 19.4%), and age (n = 5; 16.1%). For studies on ethnicities, 5 did not specify any particular ethnicity, 1 was on the Black community in Brazil, and 1 was on Mexican indigenous peoples. Evidence syntheses also reviewed increased Covid-19 transmission risk or the unintended impacts of the pandemic on health care workers (n = 4; 12.9%), migrants (n = 2; 6.5%), cancer survivors (n = 1; 3.2%), patients diagnosed with Covid-19 (n = 1; 3.2%), people with physical disabilities (n = 1; 3.2%), and volunteers (n = 1; 3.2%). A total of 2 studies (6.5%) included a comparison between countries and regions, while 1 (3.2%) study investigated the impact of Covid-19 on unspecified minorities.

Review type

Evidence syntheses that we classified in the social epidemiology category were non-systematic literature reviews (n = 11; 35.5%), systematic reviews (n = 10; 32.2%), rapid reviews (n = 5; 16.1%), narrative reviews (n = 3; 9.7%), a scoping review (n = 1; 3.2%), and a critical review (n = 1; 3.2%).

Journal discipline

The included studies were primarily published in medical journals (n = 26; 83.9%), and specifically in infectiology and public health journals (n = 10; 38.5% of 25). Evidence syntheses were also published as preprints (n = 3; 9.7%), in an environment journal (n = 1; 3.2%), and in a policy and management journal (n = 1; 3.2%).

Country and continent of publication

A majority of evidence syntheses were published in Europe (n = 13; 41.9%) and North America (n = 10; 32.3%), followed by Asia (n = 3; 9.7%), Africa (n = 3; 9.7%), and South America (n = 2; 6.5%). Moreover, researchers from the United Kingdom (n = 6; 19.4%) and the United States (n = 6; 22.6%) published the largest number of studies that we classified under social epidemiology.

Economy (n = 22)

Review type

Evidence syntheses on economy included non-systematic literature reviews (n = 16; 72.7%), systematic reviews (n = 4; 18.2%), 1 critical review (n = 1; 4.5%), and 1 scoping review (n = 1; 4.5%).

Journal discipline

Studies on economy topics were published in policy and management journals (n = 7; 31.8%), medicine journals (n = 6; 27.3%), environment journals (n = 5; 22.7%), technology journals (n = 2; 9.1%), and as preprints (n = 2; 9.1%).

Country and continent of publication

The studies in this category were primarily published by researchers in Europe (n = 7; 31.8%) and Asia (n = 6; 27.3%) with some evidence syntheses from North America (n = 3; 13.6%), South America (n = 2; 9.1%), Africa (n = 2; 9.1%), and Oceania (n = 1; 4.5%). A specific study did not report its country of publication (n = 1; 4.5%).

Environment (n = 19)

Setting

Out of the 19 studies, 5 (26.3%) were in the context of the environmental impacts of health service organizations, and 14 (73.7%) were in non-clinical settings.

Review type

Studies covering environment-related topics were primarily non-systematic literature reviews (n = 13; 68.4%); however, there were also critical reviews (n = 2; 10.5%), systematic reviews (n = 2; 10.5%), a rapid review (n = 1; 5.3%), and a scoping review (n = 1; 5.3%).

Journal discipline

Evidence syntheses were mostly published in environment journals (n = 13; 68.4%), followed by medical journals (n = 3; 15.8%) and technological journals (n = 3; 15.8%).

Country and continent of publication

Publications on the environment were from Asia (n = 9; 47.4%), Europe (n = 4; 21.1%), Africa (n = 3; 15.8%), North America (n = 2; 10.5%), and South America (n = 1; 5.3%).

Discussion

Review of findings

This paper reported on the findings of a systematic mapping exercise of all evidence syntheses published on non-clinical topics related to Covid-19. The topics, populations, review types, and countries and continents of publication of each study were reviewed to provide an overview of the scope of evidence syntheses on Covid-19. Specifically, this study divided evidence synthesis topics into the following categories: prevention and behavior, health service delivery, mental health, social epidemiology, economy, and environment. A comprehensive list of citations for every evidence synthesis identified for each topic is provided in Additional File 1 to serve as a resource for current and future Covid-19 research. This section reflects on global efforts to investigate the economic, environment, psychological, and other

impacts of Covid-19, specifying unique priorities for future research.

Research priorities

Through a collaborative discussion regarding the topics of evidence syntheses, the following research priorities are recommended:

- 1) **Governance:** This study found only 3 evidence syntheses that discussed leadership, policy, and governance mechanisms during the Covid-19 pandemic.⁸⁻¹⁰ Concentrated attention is required on this topic, particularly from the perspective of how to adapt leadership and governance mechanisms to ensure that institutional and national responses to pandemics are rapid, effective, and appropriate.
- 2) **Populations:** Multiple evidence syntheses included in this study investigated the impact of Covid-19 on the lives and mental well-being of a variety of populations. These evidence syntheses were spread across a number of different ethnicities, age groups, and biological sexes, as well as 2 evidence syntheses on indigenous populations living in Mexico and Brazil.^{11,12} While this research is inspiring, there is the need to continue research in this area in order to specifically outline the unique impact of Covid-19 pandemic on different populations across settings and social contexts. This information is necessary for ongoing policy planning and intervention design intended to reduce the adverse pandemic-related outcomes on diverse communities.
- 3) **Prevention and Control:** This study found over 100 evidence syntheses on a variety of prevention and control methods such as personal and protective equipment, quarantine and lockdown, contact tracing, physical distancing, and restrictions on air travel. However, none of these studies systematically compared the effectiveness of all strategies across settings, regions, and populations. As such, there is a strong need for a rigorous attempt to synthesize global evidence on the effectiveness of each strategy and how to best combine different approaches for optimal prevention and control. This research priority would prove useful in developing tailored guidance on containing Covid-19 spread for nations around the world depending on their unique socio-cultural and economic contexts.
- 4) **Mental Health:** Although there is a need to synthesize evidence on the mental health impacts of different groups, this study did not find any attempts to explore mental health and well-being across a number of ethnicities and minority communities, with 2 exceptions (i.e., people who use drugs, people with mental illness).^{13,14} The greatest number of studies pertained to the mental health of health care workers, which emphasizes the need to redirect research attention to under-investigated populations. There is an opportunity to converge between social epidemiological topics and mental health research; there is a need to conduct an investigation of mental health impacts of the pandemic across ethnicities. Similarly, research would benefit from directing attention towards investigating the mental health impacts of families of Covid-19 patients, homeless people, and COVID-19 patients from minority communities.
- 5) **Vaccine Hesitancy:** Vaccine hesitancy is a major ongoing concern as multiple countries pursue mass vaccine administration programs to inoculate the broader population against SARS-CoV-2. While primary research on vaccine hesitancy in the Covid-19 context is growing, this study only found

2 evidence syntheses on this topic that have been published as preprints,^{15,16} but both studies performed a limited search across a restricted set of databases and as a result have missed important studies. More evidence syntheses in this area will augment ongoing vaccine deliberations and planning by suggesting evidence-based practices for communicating and distributing Covid-19 vaccines to optimize their uptake and acceptance in the broader population.

Limitations of this study

Although this systematic mapping exercise reflects a wealth of evidence syntheses, it may have potentially missed several of them as well, simply because a number of evidence syntheses are currently in progress and thus, have not yet been indexed in databases. There is a need to continue updating this systematic mapping exercise monthly to continue monitoring progress towards the priorities we have identified from this research. Furthermore, this study only reviewed evidence syntheses published on 2 major preprint servers. Other preprint servers may have unique evidence syntheses only available there. However, given the number and variety of evidence syntheses found in this study, it is unlikely that a significant number of evidence syntheses were missed. The authors of this study believe that the results are reflective of current Covid-19 research despite certain limitations in the search process. Finally, this study found that 50% of our literature from the initial screening phase pertained to the diagnosis, prognosis and treatment of Covid-19 hence, there is a need to conduct a similar mapping exercise on clinical topics.

Supplementary material. To view supplementary material for this article, please visit <https://doi.org/10.1017/dmp.2021.236>

Conflicts of interest. Umair Majid receives financial support from the Canadian Institute of Health Research and the Government of Ontario, Canada. Neither party was involved in the design and conduct of this research.

References

1. Chu DK, Akl EA, Duda S, *et al.* Physical distancing, face masks, and eye protection to prevent person-to-person transmission of SARS-CoV-2 and COVID-19: A systematic review and meta-analysis. *The Lancet*. 2020; 395(10242):1973-87.
2. Katims AB, Razdan S, Eilender BM, *et al.* Urologic oncology practice during Covid-19 pandemic: A systematic review on what can be deferrable vs. nondeferrable. *Urologic Oncology*. 2020;38(10):783-792.
3. Lieneck C, Garvey J, Collins C, Graham D, Loving C, Pearson R. Rapid telehealth implementation during the COVID-19 global pandemic: A rapid review. *Healthcare (Basel)*. 2020;8(4):517.
4. Shreffler J, Petrey J, Huecker M. The impact of covid-19 on healthcare worker wellness: A scoping review. *West J Emerg Med*. 2020;21(5): 1059-1066.
5. Clavel N, Badr J, Gautier L, Lavoie-Tremblay M. Risk perceptions, knowledge and behaviors of general and high-risk adult populations towards COVID-19: A systematic scoping review. 2021;10.1101/2021.02.09.2125 0257.
6. Clarke V, Braun V, Hayfield N. Thematic Analysis. In: Smith JA, eds. *Qualitative psychology: A practical guide to research methods*. London: Sage Publications; 2015:222-248.
7. Jameel B, Majid U. Research fundamentals: Data collection, data analysis, and ethics. *URNCSST*. 2018;2(4):1-8.
8. Kiwanuka F, Waswa S, Alemayehu YH, Simbeye JA. Policy decisions and response to fight 2019 novel coronavirus disease in Uganda: A review of attributes, comprehensiveness and implications to improve resilience to future pandemics. *Research Square*. 2020;1:1-14.
9. Laufs J, Waseem Z. Policing in pandemics: A systematic review and best practices for police response to COVID-19. *Int J Disaster Risk Reduct*. 2020;51:101812.
10. Lowry E, Taddese H, Bowman LR. Rapid systematic review exploring historical and present day national and international governance during pandemics. *medRxiv*. 2020;20148239.
11. Díaz de León-Martínez L, de la Sierra-de la Vega L, Palacios-Ramírez A, Rodríguez-Aguilar M, Flores-Ramírez R. Critical review of social, environmental and health risk factors in the Mexican indigenous population and their capacity to respond to the COVID-19. *Sci Total Environ*. 2020;733:139357.
12. Santos HL, Maciel FB, Santos KR, Conceição CD, Oliveira RS, Silva NR, Prado NM. Necropolitics and the impact of COVID-19 on the black community in Brazil: A literature review and a document analysis. *Ciência & Saúde Coletiva*. 2020;25:4211-24.
13. Lemieux AJ, Dumais Michaud AA, Damasse J, *et al.* Management of COVID-19 for persons with mental illness in secure units: A rapid international review to inform practice in Québec. *Victims & Offenders*. 2020;15(7-8):1337-1360.
14. Wei Y, Shah R. Substance use disorder in the covid-19 pandemic: A systematic review of vulnerabilities and complications. *Pharmaceuticals (Basel)*. 2020;13(7):155.
15. Galanis PA, Vraka I, Fragkou D, Bilali A, Kaitelidou D. Intention of health care workers to accept COVID-19 vaccination and related factors: A systematic review and meta-analysis. *medRxiv*. 2020;20246041:1-19.
16. Robinson E, Jones A, Lesser I, Daly M. International estimates of intended uptake and refusal of COVID-19 vaccines: A rapid systematic review and meta-analysis of large nationally representative samples. *Vaccine*. 2021; 39(15):2024-2034.