



Review

Mapping the Global Adoption of Mandatory Vaccination against COVID-19: A Scoping Review

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Abstract: The coronavirus (COVID-19) pandemic caused sicknesses ranging from mild to deadly, which disrupted lives and healthcare systems across the globe. Despite the availability of vaccines that are effective in significantly reducing the risks of death and severe disease, misperceptions of COVID-19 vaccine safety, efficacy, risks, and mistrust in institutions responsible for vaccination campaigns have been reported as factors contributing to vaccine hesitancy, leading to an unsatisfactory vaccination rate, which resulted in some countries implementing mandatory COVID-19 vaccination to increase vaccine uptake. This scoping review aimed at mapping global countries that have adopted mandatory COVID-19 vaccination and the reaction of citizens. PRISMA Extension for Scoping Reviews was used. Google Scholar was used to identify papers published in English from December 2019 to February 2022, irrespective of their methodology. A total of 140 studies were identified. After screening for duplication, access, and relevance, 24 were eligible for review. Approximately eleven countries implemented mandatory vaccination, mostly among healthcare workers. Citizens' reactions towards the policy varied, with some in support of the policy but with a preference for the healthcare workers, and some in support but with the condition that it will only apply to travel, schools, and shopping areas, while others rejected the policy. Studies that may be relevant but were excluded due to eligibility criteria may be a limiting factor to this study. Several ethical considerations should be explicitly addressed when evaluating whether mandatory COVID-19 vaccination is an ethically justifiable policy option as recommended by the WHO policy brief.



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1. Introduction

The coronavirus (COVID-19) pandemic accounted for millions of illnesses ranging from mild to deadly, disrupting lives and healthcare systems across the globe [1]. Some of the documented symptoms associated with this highly contagious viral disease may include headache, sore throat, new loss of smell or taste, muscle or body pain, breathing difficulty, cough depending on an individual immune response. It is important to note that COVID-19 is an infectious disease that can be transferred from human to human through respiratory droplets or direct or indirect contact with fomites in the immediate environment of an infected person or object used on the individual. Due to the fact that COVID-19 can be transmitted from both symptomatic and asymptomatic humans to a healthy person, different measures were adopted to contain its transmission [2,3]. While different safety measures have been adopted in order to curtail the spread (including wearing a face mask, maintaining a social distance of at least one meter apart, washing hands with soap and water, or use of an alcohol-based hand sanitizer), the development of vaccines has been indicated to minimize the severity of the disease on an individual basis, hence lead to reduction in hospitalization as well as of death [4]. This is a perspective that Myimkulu-Eyde et al. [5] validated considering the several documented positive impacts of vaccination as a tool employed in the health sector in eradicating diseases such as smallpox

and polio in some countries. The US Department of Health and Human Services [6] emphasizes that COVID-19 vaccination became a critical tool to end the pandemic and prevent new variants of COVID-19. COVID-19 vaccines are messenger RNA vaccines (also called mRNA virus vaccines). These mRNA vaccines make proteins in order to trigger an immune response. According to the US Department of Health and Human Services [6], mRNA vaccines have shorter manufacturing times with no risk of causing disease in the person getting vaccinated.

Thus, the WHO [7] found vaccines to be the safest way to achieve herd immunity, which is defined as a situation when most of the population is immune to infection and bringing an end to this pandemic through vaccines [8]. Vaccines are now widely available for everyone aged six months and older, and the CDC recommends one booster for everyone five years and older and an additional booster for specific immunocompromised individuals and everyone 50 years and older [9]. Thus, as of 11 February 2022, approximately 54.4% of the global population was fully vaccinated, 62.35% had taken one dose of the COVID-19 vaccine [10], and 15.1% had taken the booster shot [11].

1.1. Problem Statement

Despite the availability of vaccines that are exceptionally effective in reducing the risks of death and severe disease, misperceptions about COVID-19 vaccine safety, its efficacy, risks, and mistrust in institutions responsible for vaccination campaigns have been reported as factors contributing to vaccine hesitancy, leading to an unsatisfactory vaccination rate. Hence, some countries around the globe made COVID-19 vaccination ‘mandatory’ to increase vaccination rates in the name of discharging what governments perceived to be duties of care to at-risk populations and achieving public health goals with a limited number of exceptions, such as medical contraindications that are recognized by legitimate authorities. Vaccine mandates are a way to compel people to get vaccinations by either fining people who do not comply or excluding them from certain activities and locations, such as hospitality venues or workplaces [12].

1.2. Research Rationale

What information is available in the literature about mandatory vaccination implementation globally needs to be clarified. This would contribute toward knowledge and guidance on informed decision-making regarding pandemic preparedness and response planning. For these reasons, a scoping review was conducted to systematically map the research in this area and identify any existing gaps in knowledge.

1.3. Objectives

- Describe how countries globally implemented mandatory vaccination.
- Explore the reaction of citizens in countries implementing mandatory vaccination globally.

2. Materials and Methods

The scoping review followed the five steps described by Arksey and O’Malley [13] supported by PRISMA Extension for Scoping Reviews (PRISMA-ScR) [14], which included the following:

1. Identifying the research question.
2. Identifying relevant studies.
3. Study selection.
4. Charting the data/data extraction.
5. Collating, summarizing, and reporting on the data.

Quality assessment of each of the included primary studies was performed as described by Levac et al. [15].

2.1. Identifying the Research Questions

This review aimed to identify current literature on mandatory vaccination against COVID-19 as adopted by several countries globally. The research questions are as follows.

- Which countries have adopted mandatory vaccination against COVID-19?
- How are they implementing it?
- What is the reaction of citizens to mandatory vaccination?

2.2. Search Strategy

Google Scholar was used to search for literature matching the research questions, and keywords such as mandatory, vaccination, COVID-19, attitudes, reactions, and citizen. These keywords were employed in the search for studies from Google Scholar covering Pubmed, ebscohost, europepmc, proquest, scholar.achieve, ceol and Future Medicine publications between December 2019 and January 2022. This scoping review considered all relevant studies, including opinion papers, editorials, and published news analyses, irrespective of research design.

2.3. Selection of Studies

On 31 January 2022, Damian, J.U searched Google Scholar and obtained 140 studies. Two duplicate studies were excluded after the primary reviewer thoroughly screened the studies by title. The two reviewers (Damian, J.U and Takalani, T.G) screened the 138 studies by abstracts. Approximately 85 studies were excluded for non-accessibility [16]. Approximately 53 studies' full texts were screened for relevance, and approximately 29 were excluded for not addressing this study's objectives. The reviewers reached an agreement on the 24 studies that were eligible for the review (see Figure 1):

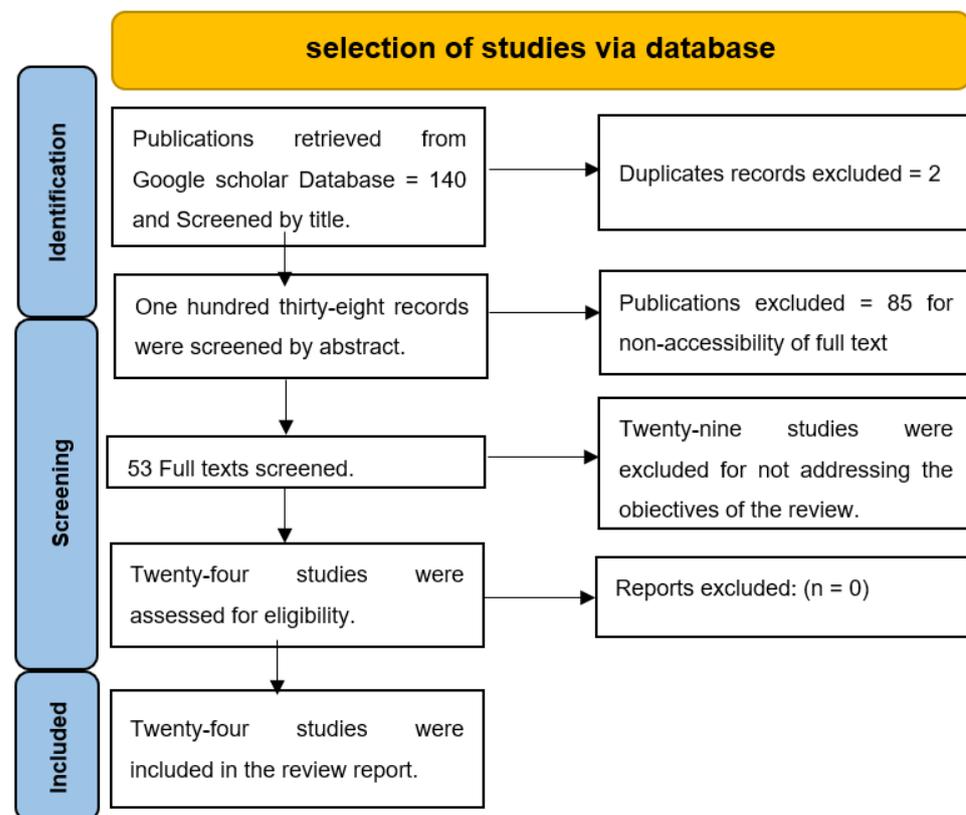


Figure 1. PRISMA flow diagram for the data selection process [17].

2.4. Data Extraction

The data extraction form was designed in agreement with the reviewers on which information is relevant for this study.

1. Citation information.
2. Aim of study and timing for study—before or after policy adoption on vaccine mandate.
3. Participants on whom the vaccine mandate was applicable.

3. Results

A total of 24 publications, irrespective of their methodology, were included in this review after screening. The characteristics of the studies included 10 peer-reviewed studies, 4 opinion papers, 4 commentary, 3 news, 1 news analysis, editorial, 1 research letter, and 1 article. Approximately 3 of the 10 peer-reviewed studies were from Australia, 2 from Saudi Arabia, the rest from Nigeria, Mongolia, France, Greece, and Germany, and 0 from the United Kingdom and the United States of America, respectively. Participants included in the studies were from different sectors of the economy aged 18 years and above. The included publications represented data from nine countries, with eight publications from the United Kingdom; no country from South America was represented (see Figure 2: pie chart below for more information).

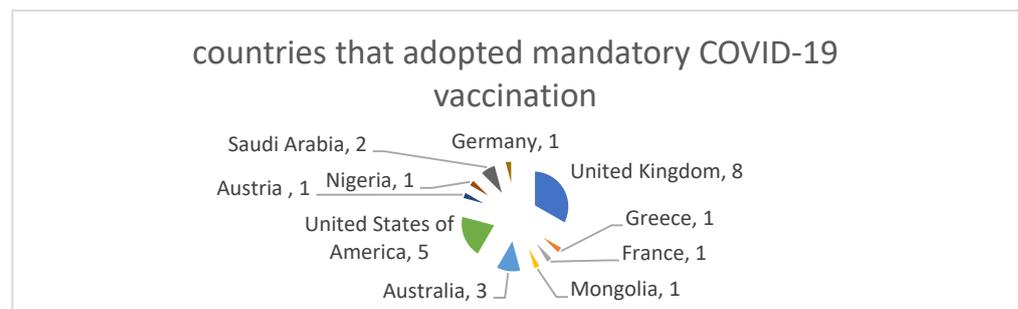


Figure 2. Pie chart showing the distribution of countries that adopted mandatory COVID-19 vaccination as indicated by studies.

With regard to the implementation of mandatory COVID-19 vaccination, 11 studies indicated that these countries, France, Mongolia, the United Kingdom, Australia, United States of America, applied the policy to their healthcare workers, with France extending it to eligible citizens from the general population using vaccine passport. Additional to implementing the policy on healthcare workers, the United States of America adopted the COVID-19 mandatory vaccine in the business sector as well as their military. A summary is provided in Table 1. Table 2 shows the reactions of citizens to mandatory COVID-19 Vaccinations before policy adoption, whereas Table 3 shows the reactions of citizens after policy adoption.

Table 1. Studies showing the implementation of mandatory COVID-19 vaccination on the citizens.

Reference	Implementation of Policy on Mandatory COVID-19 Vaccination (on Whom)					
	Vaccine passport	Eligible citizens from the population eligible for vaccination	Healthcare sector	Business sector	Military	Other exposed professionals
Gagneux-Brunon A. et al. [18] Turbat, B et al. [19] khunti et al. [20] Leask et al. [21] Klompas et al. [22] Gareth Iacobucci [23] Daniel Sokol [24] Jacqui Wise [25] Lydia Hayes and Allyson M Pollock [26] Stokel-Walker. C [27] Marta Paterlini [24] Smith et al. [28] Graeber et al. [29] Giannouchos et al. [30] Leask et al. [21] Largent et al. [31] King et al. [32] Wang et al. [33] Chiedozie et al. [34] Alfageeh et al. [35] Al-Hanawi et al. [36] Stokel-Walker. C [27] Owen Dyer [37] Stokel-Walker. C [27] Gagneux-Brunon A. et al. [18] Krik and Reese [6]	France	Australia, Germany, Greece, Australia, United States of America, Austria, Australia, Nigeria, Saudi Arabia, Saudi Arabia, Russia, the Republic of Ireland	France, Mongolia, United Kingdom, Australia, United States of America, United Kingdom, United Kingdom, United Kingdom, United Kingdom, United Kingdom, Italy	United States of America, Russia	United States of America	France

Table 2. Reaction of citizens on mandatory COVID-19 vaccination before policy adoption.

Authors	Country	Citizen's Reaction to Mandatory COVID-19 Vaccination
Gagneux-Brunon A. et al. [18]	France	43% of the respondents favored the policy, 41.9% opposed it, 30.05% of this group thought that mandatory COVID-19 vaccination should be applied to healthcare workers, while 15.15% were undecided.
Smith et al. [29]	Australia	Respondents in this study reacted positively, with 73% an affirmative response to adopting mandatory COVID-19 vaccines but only for travel, work, and school. There is a 12% decrease in positive responses when compared with previous studies on the same issue.
Graeber et al. [28]	Germany	Study respondents showed 60% approval for mandatory COVID-19 vaccination, and 27% did not approve of the policy.
Giannouchos et al. [30]	Greece	74% of the respondents supported mandatory vaccination.
Savulescu J [38]	United Kingdom	Highlighted mandatory COVID-19 vaccination as the ethical means of achieving herd immunity but should be accompanied by monetary compensation to the individual. Mandatory COVID-19 vaccination on healthcare workers.
Khunti et al. [20]	United Kingdom	<ul style="list-style-type: none"> - It could be perceived as discriminatory. - May cause stigmatization. - Cause a broader gap in the trust of the healthcare workers in the government. - Increase inequalities which are already evident during this pandemic.
Leask et al. [21]	Australia	Regarding healthcare workers, there is justification for the vaccine mandate, especially when there is a high risk of them being infected or infecting others at greater risk of severe effects of COVID-19. In the case of the eligible general population. <ul style="list-style-type: none"> - There is no justification for mandatory COVID-19 vaccination.
Klompas et al. [22]	United States of America	The authors presented support for mandatory COVID-19 vaccination for healthcare workers.
Largent et al. [31]	United States of America	The authors highlighted that the respondents accepted the COVID-19 vaccine mandate and will likely go for vaccination voluntarily.
King et al. [32]	Austria	Authors believe that mandatory vaccination is compatible with human rights law, but care should be taken in designing its requirement so that it does not interfere with individual fundamental rights.
Chiedozie et al. [34]	Nigeria	52% of the respondents rejected the idea of mandatory COVID-19 vaccination.
Jacqui Wise [25]	United Kingdom	The writer perceived that mandating COVID-19 vaccination for healthcare workers may be counterproductive.
Krik and Reese [6]	United States of America	Writers think the call for mandatory vaccination of the United States of America military is justified.
Alfageeh et al. [35]	Saudi Arabia	69.5% of respondents support that the COVID-19 vaccine should be made compulsory for the people of Saudi Arabia, while 30.5% do not support the move.
Al-Hanawi et al. [36]	Saudi Arabia	97.81% of respondents agreed with mandatory COVID-19 vaccination, while 2.19 did not.

Table 3. Reaction of citizens on mandatory COVID-19 vaccination after policy adoption.

Author	Country	Citizen's Reaction to Mandatory COVID-19 Vaccination
Turbat, B et al. [19]	Mongolia	93.7% agreement rate towards mandatory COVID-19 vaccination.
Wang et al. [33]	Australia	Although respondents supported mandatory COVID-19 vaccination in South Australia, it was the least accepted vaccination strategy.
Gareth Iacobucci [23]	United Kingdom—England	<ul style="list-style-type: none"> - The British Medical Association (BMA) supports the move for every healthcare worker to be vaccinated against COVID-19, but it has some reservations about its “complicated and practical issues.” - The Royal College of General Practitioners, along with the Royal College of Nursing, opposes the mandatory vaccination of all healthcare workers.
Daniel Sokol [24]	United Kingdom	The writer believes that healthcare workers in the United Kingdom (unless exempted) should adhere to the mandatory vaccination policy because it will boost vaccine uptake.
Owen Dyer [37]	United States of America	Reaction from the business world to the presidential executive order on the COVID-19 vaccine mandate was muted.
Michael Mittelman [39]	United States of America	A kidney transplant patient comments “I hope mandatory vaccination rules become universal, with only medical exemptions permitted. It would alleviate some of my anxiety in receiving care”.
Lydia Hayes and Allyson M Pollock [26]	United Kingdom	Asserts that making COVID-19 vaccination compulsory for care home workers is “unnecessary”, “disproportionate” and “misguided”
Stokel-Walker, C [27]	United Kingdom	The article mentioned the United States of America, Saudi Arabia, Italy, Russia, the Republic of Ireland (although not adopted by the government, some hospital trusts have already implemented it), and France (but not including care homes as of when this article was published) is a country that has mandated COVID-19 vaccination for their healthcare workers
Marta Paterlini [40]	United Kingdom	Some opinions suggested that, in addition to mandatory COVID-19 vaccination, there should be a legally backed consequence for failure to comply with the rule by healthcare workers.

4. Discussion

Numerous studies have been published about the COVID-19 pandemic, with several about its mode of transmission, safety measures, herd immunity, vaccine safety, hesitancy, and mandatory COVID-19 vaccination policy [4,8,11,41,42].

4.1. Countries That Adopted Mandatory COVID-19 Vaccination

As presented in nine of the studies reviewed, countries mapped out for adopting mandatory COVID-19 vaccination include Mongolia [19], Australia [21], the United States of America [22], and the United Kingdom [23], with France, Russia, Saudi Arabia, Ireland, and Italy, as mentioned by [27]. Although the study by Gagneux-Brunon, A. et al. [18] identified France, the study was carried out before policy adoption to assess citizens' attitudes toward mandatory COVID-19 vaccination in France before the announcement. Countries including Germany [28], Nigeria [34], Greece [30], and Australia [29,33,43] were also mentioned, but these peer-reviewed studies were carried out before the policy on the COVID-19 vaccine mandate was adopted by these countries. Although all were published after COVID-19 vaccine mandate policy adoption, articles that reported that the United States of America and the United Kingdom were either opinion papers, news analyses, editorials, news, or commentary, except a report on the United States of America by Largent et al. [31], which was a research letter based on a completed study carried out on 2730 adults aged 18 years and above—no peer-reviewed studies were retrieved for this scoping review.

4.2. Mandatory COVID-19 Vaccination Policy Implementation and the Reaction of Citizens

On implementing the adopted policy on mandatory COVID-19 vaccination, there were differences in adoption between countries, such as in terms of the types of workers, situations, and strictness in insisting on vaccination [27]. Eleven out of twenty-four studies reported possible or ongoing implementation of the mandatory COVID-19 vaccination policy specifically on healthcare workers in six countries: France [18,25], Mongolia [19], Australia [21,29,43], the United States of America [22,31], the United Kingdom [24,26], and Italy [40]. These reports align with the report by Giannouchos et al. [30], which highlighted that different countries prioritize healthcare workers regarding the COVID-19 vaccine allocation plan. Although 41.9% of study respondents opposed the mandatory COVID-19 policy in France [18], 30.5% of those who are against it are entirely in favor of the vaccine mandate policy being applied to healthcare workers instead of the general public. This decision, according to Mittelman [39], is justified by the healthcare workers' protection right, which is to be protected from occupational infection or the protection of patients from being infected by the healthcare worker, and also because the healthcare workers are also an essential source of information for vaccination for others [27].

In order to protect the healthcare workers, different countries used several methods to implement the vaccine mandate policy [27], the Italian government took a stance on suspending healthcare workers that refused to vaccinate, and the suspension comes without pay for a year. This move was after several hospital infections were linked to unvaccinated healthcare workers. Meanwhile, at the time of the publication by Stokvel-Walker [27], the Irish government did not enforce mandatory COVID-19 on healthcare workers, and some hospitals sent unvaccinated staff home on full pay to protect the patients. khunti et al. [20] wrote a commentary with the opinion that support for mandatory COVID-19 vaccination could be perceived as discriminatory and may lead to stigmatization and a wider gap in the trust from the healthcare workers to the government so instead, approaches should address vaccine hesitancy among healthcare workers; for example, "sharing information about vaccine safety and efficacy, risk perceptions and perceived need of vaccination, and use of trusted, credible sources" should be adopted according to Baskin [44], as it has been proven to increase the rate of uptake of seasonal influenza vaccination among the general public.

A study by King et al. [32] in Austria, which aimed to give guidance on the issue of human rights with regard to COVID-19 by a worldwide network of jurists, opined that

mandatory vaccination is compatible with human rights law, but care should be taken in designing the requirements of the policy so that it does not interfere with individual fundamental rights. The stand of the jurists may be synonymous with the article from the United Kingdom, where Savulescu [38] states that the choice of paying individuals for a vaccination with cash or something in kind as a means of achieving herd immunity may be an ethically superior option when compared to the stance of “no jab no job” for its employees in public, private and also non-governmental agencies in Saudi Arabia [27,35,36].

On the executive order by President Joe Biden of the United States of America for employees to vaccinate or undergo weekly COVID-19 testing, Dryer [37] reported that several governors from the Republican-led state vowed to fight this in court, while the reaction from the business world was muted. Meanwhile, Krik and Reese [6] justify the call for mandatory vaccination of the military in the United States of America based on ethics.

5. Conclusions

This study found that only 11 out of 195 countries were documented for adopting the mandatory COVID-19 vaccination policy. Furthermore, this review also highlighted that most participants’ and authors’ reactions support mandatory COVID-19 vaccination, while few affirmed but on the condition that ethical issues should be considered. This section is not mandatory but may be added if there are patents resulting from the work reported in this manuscript. Policymakers should use less intrusive means or methods to encourage voluntary vaccination against COVID-19 before contemplating mandatory vaccination. In other words, mandates should be considered after people have been allowed to get vaccinated voluntarily. Once there is sufficient reason to believe this alone will not be enough to achieve meaningful societal or institutional objectives, efforts should be made to demonstrate the health risks of not being vaccinated and the benefit and safety of vaccines. Several ethical considerations should be explicitly discussed and addressed through ethical analysis when evaluating whether mandatory COVID-19 vaccination is an ethically justifiable policy option. As is the case for other public health policies, decisions about mandatory vaccination should be supported by the best available evidence and made by legitimate decision-makers in a transparent, just, fair, and non-discriminatory manner involving the input of affected parties. This was the case with the World Health Organization’s policy brief on making COVID-19 vaccination mandatory [45]. These guidelines are 1. necessity and proportionality; 2. sufficient evidence of vaccine safety; 3. sufficient evidence of vaccine efficacy and effectiveness; 4. justice in access and availability; 5. public trust.

Future Directions

We suggest that future reviews should explicitly analyze the medical, scientific, and legal justification in relation to the ethics considered for the adoption of mandatory COVID-19 vaccination of their citizens with respect to the guidelines as highlighted by the World Health Organization. Furthermore, future research should consider a selection of studies categorized by methodologies adopted for the study and also entire articles from other databases. In addition, another avenue for research is conducting a study based on a particular type of article since there may be more publications that have emerged on this topic.

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