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# BMJ Open Impact of COVID-19 pandemic on medical students: a scoping review protocol

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## ABSTRACT

**Introduction** The COVID-19 pandemic has spread globally and has been reported in every known country. The effects can be felt in universities and schools, shifting their learning to online platforms. However, medical schools bear the burden of protecting students and ensuring the continuation of the education process. The rapid transition to online learning, coupled with the lack of preparation from the educational system, leads to stresses that affect students' academic performance, mental health and social life. Nevertheless, no review tried to synthesise the complete picture of the pandemic's effects. Therefore, this scoping review aims to identify and explore the available literature on the effects or impacts of the pandemic on medical students without limiting it to specific dimensions.

**Methods** This review was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews and the Joanna Briggs Institute manual for evidence synthesis. We examine articles reporting data from any country. However, only articles written in English will be included. For studies to be included, they must report any form of impact on medical students, qualitatively or quantitatively. Furthermore, the impact must occur within the context of the COVID-19 pandemic. Searches will be done on Medline, EMBASE, ERIC, the Cochrane Library, CINAHL and PsycInfo. After data extraction, we will narratively synthesise the data and explore the types of impacts COVID-19 has on medical students.

**Ethics and dissemination** No formal ethical approval is required. The scoping review will be published in peer-reviewed journals and as conference presentations and summaries, wherever appropriate.

## INTRODUCTION

The COVID-19 pandemic has caught everyone by surprise. First reported in Wuhan, China, in December 2019,<sup>1</sup> the pandemic has rapidly spread globally in months. As of January 2022, COVID-19 has been reported in virtually every known country, with multiple variants such as Delta and Omicron currently circulating.<sup>2</sup> The devastation of this pandemic was felt in education, with universities and schools reeling from the onslaught and moving to distance learning delivered online. However, medical education bears the unique burden of protecting its students and must ensure the

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This protocol is the first scoping review to synthesise the pandemic's impact without focusing only on a single or particular characteristic.
- ⇒ We used The Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews and the Joanna Briggs Institute Manual for Evidence Synthesis to ensure the validity of our protocol and search.
- ⇒ To maximise the sensitivity of our search and not limit the form of impact, we omit the keywords for the concept of impact in our search term.
- ⇒ This review will miss studies not published in peer-reviewed journals (eg, grey literature).
- ⇒ Due to resource constraints, our review focuses only on the literature published in English and may miss impacts reported in other languages.

continuation of the education process that traditionally relied on face-to-face lectures and patient contacts.<sup>3</sup> In addition to the academic stress of studying medicine, these unique circumstances burden the students with the need to maintain their studies, prevent infection,<sup>4</sup> keep their families safe<sup>5</sup> and prepare for potential volunteerism.<sup>6</sup>

Medical education has been traditionally divided into two sections. The first is the preclinical basic science curriculum, which focuses on basic science and allows students to master the knowledge needed to prepare for the rapidly changing fields of medicine. The second part is the clinical curriculum, which focuses on patient care.<sup>3 7</sup> Since the preclinical curriculum relies on practical laboratory sessions and didactic lectures, it is heavily affected by the COVID-19 pandemic, transforming learnings from face-to-face interactions to online deliveries as emergency measures. Transforming face-to-face learning is not as simple as uploading lectures and videos online. A specific online learning pedagogy must be used to ensure the delivered teaching.<sup>8</sup> However, most teachers were not trained in online learning and were not

used to distance learning pedagogies. Studies found that teachers' readiness was low, especially in online learning and course design.<sup>9–11</sup> The lack of preparation, compounded by the student's rapid transition from on-campus learning to the home environment, presented additional stress that affected their academic performance, mental health and social life.<sup>7 12</sup>

Several studies have reported the impact of COVID-19 on medical students. Noticeably, most studies focus on the mental health impact of COVID-19 on medical students, with mixed results. A meta-analysis had shown that medical students' anxiety level before and after the pandemic was unchanged, although COVID-specific stressors predominated.<sup>13</sup> However, the authors did note that since most of their subjects were Chinese medical students, generalisability might be an issue. Other studies have shown contrary evidence to COVID-19-related disruptions associated with worsening students' anxiety and depression levels.<sup>14–17</sup> Additionally, during the COVID-19 era, digital learning was also associated with deteriorating mental health and increased emotional exhaustion and burnout, especially for students in their final year.<sup>18 19</sup> Nevertheless, several studies have interestingly pointed out better outcomes for students during the pandemic. A study conducted by Bolatov *et al*<sup>19</sup> has shown that burnout symptoms, depression and anxiety were decreased during the transition to online learning. Their findings were also corroborated in a study by Zis *et al*,<sup>18</sup> which showed that students in their early years were less disrupted with decreased burnout symptoms prevalence. These findings showed the heterogeneity of available evidence and may reflect that these impacts may be influenced by the culture and the country where the study is conducted.

Mental health is one of the most researched topics during the COVID-19 pandemic.<sup>20</sup> However, several studies have also reported other impacts besides mental health. For example, Rana *et al*<sup>21</sup> found that the pandemic experiences have allowed students to feel more confident facing future health crises. Corroborating their findings, Choi *et al*<sup>22</sup> have also found that students viewed assisting healthcare services during the pandemic would be a valuable learning opportunity. This view is also supported by a group of researchers from Vietnam who documented their experience mobilising medical students as healthcare providers during the pandemic.<sup>23</sup> However, Choi *et al*<sup>22</sup> have also reported that the pandemic severely limits students' preparedness in treating patients, specifically due to the pandemic's disruptions on exams such as the Objective Structured Clinical Examinations (OSCEs). Other studies also reported less apparent impacts of the pandemic, including career perceptions,<sup>24</sup> worsening of social connection and level of stress,<sup>16</sup> and better time management.<sup>25</sup> Therefore, current evidence shows that the COVID-19 pandemic has pervasive influences on the life of medical students.

Although many studies have covered the impact of COVID-19 on medical students, none have tried to

synthesise its complete picture. Instead, most systematic reviews and meta-analyses have focused on the pandemic's measurable and more noticeable impact, such as increased anxiety or depression measured using instruments or the prevalence of such symptoms.<sup>13 26</sup> However, the pandemic's effects are not limited only to such measurable constructs. Therefore, a complete picture of the impact, including the not-so-obvious ones, is needed to understand the current state of the pandemic on medical students. Nevertheless, since systematic reviews and meta-analyses can only be used to answer a specific question, they cannot be used effectively to synthesise heterogeneous evidence.

### Scoping review objective

Currently, no article wholly synthesises the extent of the impact that the COVID-19 pandemic has on medical students. Therefore, in this protocol, we outlined our plan to systematically review the literature for studies that have measured or observed the impact of the pandemic on medical students. We aim to identify and explore the available literature on the effects or impacts of the pandemic on medical students. Two years have passed since the start of the pandemic. Thus, there should be enough evidence to answer our question. This scoping review will try to answer the following question.

### What is the impact of the COVID-19 pandemic on medical students?

To thoroughly examine the effects, we kept the definition of impact open and did not include it as a keyword in our search to limit our assumptions' impact. The findings of this review will be used as an evidence base regarding the impact of COVID-19 on medical students. This evidence base can be used to make decisions for stakeholders in the field, such as medical schools and government educational bodies. Information from this review can guide medical schools to support and increase students' resilience against potential future pandemics. Additionally, the information might be helpful outside of pandemic situations, as ensuring students' resilience and well-being are essential for their work as healthcare providers. To conclude, evidence gaps and information identified by this review can be used as the basis for future research. Medical students will one day play a significant role during pandemics. Therefore, ensuring the medical education system's resilience is essential even amid a disaster.

### METHODS

We choose to conduct a scoping review due to the varied outcome we are trying to explain regarding the impact of COVID-19. Our review will be conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews published by Tricco *et al*<sup>27</sup> and the Manual for Evidence Synthesis created by the Joanna Briggs Institute (JBI).<sup>28</sup>

**Table 1** Population, Concept, and Context (PCC) criteria used in the scoping review

Criteria	Explanation
Population	Medical students not limited to their current placements or year.
Concept	Any positive or negative impact on medical students either through subjective measurements and interviews or objective tools, including but not limited to anxiety, satisfaction, performance and future outlook.
Context	the research must occur in the context of the current COVID-19 pandemic, or the changes associated with said conditions, including but not limited to social distancing and the use of digital technology and distance learning

### Inclusion and exclusion criteria

This review defines the population as medical students currently taking an undergraduate medical doctor degree. There is no limitation on the year and whether the students are currently undergoing a clinical rotation. Additionally, we do not limit studies on the ground of study designs. Observational studies using questionnaires and interviews may be included if it measures a specific impact and as long as the impact occurs during the COVID-19 pandemic. The primary outcome that will be reported is the form of positive or negative impact, as measured either subjectively or objectively. The expected outcomes will be classified into educational/academic, physical and mental health. We opt for a lenient inclusion criterion since it is currently unknown how pervasive the impact of COVID-19 is on the medical students who will serve as our future healthcare providers. The inclusion criteria for this scoping review are shown in [table 1](#) using the population, concept and context criteria recommended by Aromataris and Munn.<sup>28</sup>

Articles from countries examining the impact of COVID-19 on medical students will be included in the review. Articles must be published in peer-reviewed journals and written in English. We do not consider articles not in English solely due to resource constraints. The search timeframe is from January 2020 to January 2022, reflecting a 2-year experience with the COVID-19 pandemic. Furthermore, reviews, systematic reviews, editorials and other opinion pieces will be excluded.

### Search strategy

We adopted a similar search strategy for this review to identify potential articles across six databases (Medline, EMBASE, ERIC, the Cochrane Library, CINAHL and PsycInfo). Due to resource limitations, we do not opt to search unpublished literature and limit our search to peer-reviewed published literature. Instead, we will search two main topics, 'Covid-19' and 'medical students'. Since we do not want to limit the impact forms, we omit the keywords for impact entirely to increase the sensitivity of our search strategy. After refining the search to optimise the sensitivity and the search and to include both free text and variations of the terms, we arrived at the terms shown in [table 2](#).

**Table 2** Search terms used in the scoping review

Population	Concept	Context
'Medical students'	Purposively	'COVID-19'
'Medical student'	omitted	'Coronavirus disease 19'

### Study selection

Studies collected through the search strategy were first pooled and exported to Endnote, and any duplicate studies were removed. To assure the quality of our screening methodology, we first conducted pilot screening using a random 10 articles screened by AS and CE. Adjustments to the inclusion and exclusion criteria will be made if deemed necessary. The final inclusion and exclusion criteria will be used for the title and abstract screening, which two reviewers will do (AS and CE). Consensus between the two reviewers will solve discrepancies in the reviewer's decision. If no consensus is reached, a third independent reviewer will be sought, and the decision will be made by voting. If the articles cannot be determined by their title and abstract, they will be moved to the full-text screening phase. The full-text screening phase will be conducted by AS and CE using the inclusion and exclusion criteria. DS will rereview any excluded article. Additionally, for transparency, the final article will document and provide reasons for exclusions.

### Data extraction

Data will be extracted using previously created forms modified from the JBI on Microsoft Excel.<sup>28</sup> A pilot run of the form is conducted using a random five articles by AS, CE and DS for quality assurance. Modifications of the extraction form will be done to assure quality. Once agreement is reached, the remaining articles will be divided and extracted by AS, CE and DS. Additionally, no risk of bias is assessed in this scoping review. [Table 3](#) outlines the essential characteristics extracted from each study. A detailed extraction form modified from Aromataris and Munn<sup>28</sup> can be found in the online supplemental materials to this article.

### Data synthesis

We will synthesise the data narratively with the results presented according to their respective themes. Examples of the themes include the countries where the research took place to ascertain whether there is a difference in the magnitude of impacts between countries. We will also explore and group the many types of impacts that COVID-19 has on medical students and their magnitude. No statistical analysis will be done in this review. However, descriptive statistics on the studies and their outcome will be presented.

### Patient and public involvement

Patients, or in our case, students, were not involved in the design of this scoping review. However, this review emphasised their experiences and their perceived impacts as the outcome.



**Table 3** Key information extracted in the scoping review

Key information	Explanation
Article background information	Information regarding the author, article, journal title and the year and country in the research is conducted.
The context in which the research is conducted (including the study objectives)	All articles should already be focused on the context of medical students in the COVID-19 pandemic. However, other aspects of the pandemic, such as whether social distancing is applied, distance learning and quarantines, should be specified.
Population details	A detailed description of the studied population, including placement, year, number of subjects, age, etc.
Results	A detailed description of relevant outcomes, including the methods in which the outcome is assessed. The magnitude of the outcome will also be recorded.

### Detailed search strategy by database

The full search strategies and the limiters used in the search are outlined below.

MEDLINE (Medical Literature Analysis and Retrieval System Online) Database through PubMed

Search terms:

('students, medical'[MeSH Terms] OR 'medical students'[Title/Abstract]) AND ('covid-19'[Title/Abstract] OR 'covid-19'[MeSH Terms])

Limiters:

► Publication year: January 2020 through January 2022  
EMBASE (Excerpta Medica Database) through ProQuest Dialog

Search terms: emb.exact('covid-19' AND ('medical student' OR 'medical students')) OR (('covid-19' AND 'medical students'))

Limiters:

► Publication year: January 2020 through January 2022  
ERIC (Education Resources Information Center) database

Search terms:

('medical students' OR 'medical student') AND ('COVID-19' OR 'Corona virus disease 19')  
pubyearmin:2020 pubyearmax:2022

Limiters:

► Peer-reviewed articles only

Cochrane Library

Search terms:

((medical students):ti, ab, kw OR MeSH descriptor: [Students, Medical] explode all trees) AND ((COVID-19): ti, ab, kw OR MeSH descriptor: [COVID-19] explode all trees)

Notes:

► Word variations were searched for the free text searches (medical students and COVID-19) in the title, abstract, and keywords fields.

Limiters:

► Publication year: 2020 through 2022

APA PsycInfo database through Ovid

Search terms:

((medical students or medical student).mp. or Medical Students/) and (COVID-19 or Corona virus disease 19). mp. [mp=title, abstract, heading word, table of contents, key concepts, original title, tests & measures, mesh word]

Limiters:

► Publication year: 2020 through 2022

CINAHL Plus through EBSCOHost

Search terms:

(MH 'Students, Medical') AND (MH 'COVID-19')

Limiters:

► Publication year: 2020 through 2022

► Source types: Academic Journals

### ETHICS AND DISSEMINATION

Since we will not directly collect the data from the subjects, no formal ethical approval is required. The scoping review will be published in peer-reviewed journals and as conference presentations and summaries, wherever appropriate. Any amendment to the protocol used in the scoping review before publication will be reported and described alongside future publications involving this protocol.

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**Contributors** AS conceived the review idea with inputs from CE and DS. AS designed and drafted the initial protocol. CE and DS drafted the introduction section. AS and CE drafted the methods section. All authors contributed to the final version of the article.

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