

BMJ Open Organisation of care in paediatric intensive care units during the first 18 months of the COVID-19 pandemic: a scoping review protocol

Katie Hill ¹, Catherine McCabe,² Maria Brenner²

To cite: Hill K, McCabe C, Brenner M. Organisation of care in paediatric intensive care units during the first 18 months of the COVID-19 pandemic: a scoping review protocol. *BMJ Open* 2022;**12**:e054398. doi:10.1136/bmjopen-2021-054398

► Prepublication history for this paper is available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2021-054398>).

Received 10 June 2021

Accepted 10 May 2022

ABSTRACT

Introduction The emergence of COVID-19 has had a significant impact on hospital services, particularly care delivered to those in intensive care units (ICUs) and paediatric ICUs (PICUs) across the world. Although much has been written about healthcare delivery and the healthcare setting since COVID-19 began, to the authors' knowledge, this is the first scoping review to investigate the organisation of care and changes implemented in PICUs during the COVID-19 pandemic. The aim is to conduct a scoping review of the literature to map out the existing studies about care delivery in PICUs during the COVID-19 pandemic and the changes made to the organisation of care in these units during the first 18 months of the pandemic. This review will also identify gaps in current knowledge in this area.

Methods and analysis This study will be guided by the Joanna Briggs Institute's methodology for scoping reviews, using Arksey and O'Malley's six-stage scoping review framework: (1) identifying the research question; (2) identifying relevant studies; (3) selecting the studies; (4) data charting; (5) collating, summarising and reporting results; and (6) consulting with experts. A comprehensive search will be conducted using the following databases: CINAHL Complete; MEDLINE; PsycINFO; PsycARTICLES and EMBASE. A search strategy with predefined inclusion and exclusion criteria will be used to uncover relevant research in this area. This study will include quantitative, qualitative and mixed research methods studies published in English from 2019 to May 2021.

Ethics and dissemination Ethical approval is not required for this scoping review. The results from this study will be disseminated through conferences and in peer-reviewed academic journals for those working in the healthcare arena.

INTRODUCTION

The first human cases of COVID-19 were reported from Wuhan, China in December 2019; and since then, COVID-19 has spread rapidly across the globe.¹ The outbreak was declared a Public Health Emergency of International Concern in January 2020, and a pandemic in March 2020 due to the worldwide spread of this new disease.² As a result of COVID-19, there has been a substantial

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This scoping review protocol will provide the basis for a scoping review exploring this critical area of the organisation of care in paediatric intensive care units (PICUs) during the first 18 months of the COVID-19 pandemic; to the authors' knowledge, this is the first of its kind.
- ⇒ This scoping review will conform to the rigorous Joanna Briggs Institute methodology manual.
- ⇒ Limitations of the review include: inclusion of English texts only, due to non-availability of translators for this review; and potential bias towards high-income countries, although the search of grey literature limits this risk.

impact on hospital services, particularly care delivered to those in intensive care units (ICUs) and paediatric ICUs (PICUs) across the world. Globally, children are admitted to PICUs for respiratory and or haemodynamic monitoring for a variety of reasons including post-surgery for continuous monitoring³; with exacerbation of medical conditions^{4,5}; post-severe accident or injury⁶; and children with complex conditions.^{7,8}

PICUs provide an increased level of clinical observation, invasive monitoring, specialised interventions and technical support to care for critically ill children over an indefinite period of time.⁹ PICUs care for children from birth, typically to their 18th birthday, although some children from the age of 16 years will be cared for in an adult ICU.¹⁰ A multidisciplinary team works within a PICU and comprises of professionals such as paediatric intensivists, nurses, pharmacists, physiotherapists, dietitians, speech and language therapists, occupational therapists, social workers and psychologists.¹¹

Since the beginning of the pandemic in December 2019, there have been significant adjustments in some PICUs worldwide, including transitioning into adult ICUs to



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¹School of Nursing, Midwifery & Health Systems, University College Dublin, Dublin, Ireland

²School of Nursing & Midwifery, Trinity College Dublin, Dublin, Ireland

Correspondence to

Katie Hill; katie.hill@ucd.ie

meet the increasing demands of patient needs.^{12–19} Lynn *et al*²⁰ discovered in Ireland and the UK that the COVID-19 pandemic has brought additional challenges to healthcare for children ranging from delays to presenting to the emergency department for fear of contracting COVID-19 and decline in presenting for scheduled hospital appointments leading to serious health consequences for children. Similar findings have been reported in additional studies in Ireland^{21–23} and the UK,^{24–28} and across numerous other countries including Italy,^{29–32} the Netherlands,³³ Germany,³⁴ Canada,³⁵ the USA^{36–38} and Australia.³⁹

COVID-19 has impacted all aspects of healthcare delivery, including the care delivered in PICU, both for children admitted with COVID-19 and associated complications, alongside the general adjustments required for effective care delivery during a pandemic. Recent research has begun to explore the psychological impact of COVID-19 on healthcare staff working within critical care,^{40–45} the challenges faced as a result of COVID-19⁴⁶ and their experiences of working during the pandemic.^{47–50}

AIMS AND OBJECTIVES

The aim of this scoping review is to:

- ▶ Identify the existing studies and explore what is known about the organisation of care in PICUs during the first 18 months of the COVID-19 pandemic.

This review also aims to explore and summarise the evidence available and the diversity of the studies published. This review will also identify any gaps in the literature to identify areas for future research.

METHODS AND ANALYSIS

Knowledge regarding the effects of COVID-19 pandemic within the healthcare system is dynamic, with new research studies rapidly emerging. A scoping review was chosen as the most appropriate approach to collating and critiquing the current research on the transitions in the organisation of care occurring in PICUs as a result of the pandemic. The organisation of care within PICU will consider factors including resources, staffing, equipment and technology.^{51–52} As scoping reviews are useful for examining emerging evidence, this was selected as the most appropriate method for reviewing the evidence in this area.⁵³ This scoping review will follow Arksey and O'Malley's⁵⁴ six-stage scoping review framework: (1) identifying the research question; (2) identifying relevant studies; (3) selecting the studies; (4) data charting; (5) collating, summarising and reporting results; and (6) consulting with experts. This scoping review protocol will outline how each stage will be addressed.

Stage 1: identification of the scoping review research question

The research question and focus of the scoping review was clearly identified through an initial search using the key search terms to capture the most appropriate literature.

As recommended by Anderson *et al*⁵⁵ and Joanna Briggs Institute (JBI),^{56–57} the population, concept and context framework was applied to form the research question.

The research question for this scoping review is exploring:

How was care organised in PICUs during the first 18 months of the COVID-19 pandemic?

Stage 2: identifying relevant studies

Three researchers identified the databases for the literature search process. A comprehensive search will be conducted in the following databases: CINAHL Complete; MEDLINE; PsycINFO; PsycARTICLES and EMBASE. These sources include journals in the area of healthcare. Grey literature will be included in the data searching to ensure all relevant scientific evidence in this arena will be explored. The inclusion criteria for this review will be based on the population–concept–context framework recommended by the JBI.⁵⁶ Discussion among the three researchers regarding inclusion and exclusion criteria at the start of the review process occurred, with each researcher agreeing with the final criteria. The eligibility criteria for this study is outlined in [table 1](#).

Stage 3: selecting studies

There is debate in the literature about the need for additional researchers to undertake the initial screening of reviewing titles and abstracts from the search results.^{58–59} The researchers have agreed that two reviewers will independently undertake all steps in the process as outlined below. Three reviewers will collaborate to create search keywords to uncover relevant research using Arksey and O'Malley's framework.⁵⁴ A brief literature search in journals of relevance will be conducted to identify any additional keywords, in addition to consultation with experts in the area and healthcare professionals working within PICU. These provisional keywords are outlined in [table 2](#).

Arksey and O'Malley⁵⁴ advocate that scoping reviews should retrieve all relevant studies of all design types, thus all design types will be included in this review. Two reviewers will independently screen the results for inclusion based on title and abstract to ensure transparency. Full-text reviews of the selected studies will be conducted based on the prespecified inclusion and exclusion criteria relevant to the research question. The reviewers will meet at each stage of the review process to debate challenges, clarify any inconsistencies and make refinements to the search.⁵⁸ If there are any discrepancies with any of the decisions, an additional reviewer who is an expert in the field will be consulted. A Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow chart will be produced after the completed searches to ensure transparency of reporting⁵⁶ and detail the search strategy and how decisions were made.⁶⁰ Rationale for exclusion of articles will be clearly documented.

Table 1 Eligibility criteria for this study

| Selection criteria | Inclusion criteria | Exclusion criteria |
|--|---|---|
| Population Target group characteristics | Paediatric intensive care units and healthcare staff working in this area. | Other departments within the hospital. |
| Concept Type of activity | Discussion around activity in paediatric intensive care units. | Discussion around activity in any other hospital setting. |
| Context Study location | Paediatric intensive care units both locally and internationally. | Any other healthcare setting, for example, emergency departments, children's wards or outpatient departments. |
| Types of articles | Studies from peer-reviewed journals including papers using qualitative, quantitative, mixed methods and case study examples; grey literature. | Non-peer-reviewed documents. |
| Year of publication | Articles published between December 2019 and May 2021. | Any articles published before the emergence of COVID-19, pre-December 2019. |
| Language | Publications written in English. | Any language aside from English. |

Stage 4: data charting

Data charting will be carried out independently by two reviewers and focuses on details of the individual studies. Data extraction will occur using a checklist or data charting form influenced by the JBI Reviewer's Manual.^{56 58} The charting characteristics and associated data extraction details are outlined in [table 3](#). This process will be flexible to integrate new characteristics of the included studies if this will improve the data analysis, for example, any additional characteristics about the participants within the studies. This stage will support the next stage of reporting results and identifying themes. As recommended by Daudt *et al*,⁶¹ each data charting form will be given a unique code to assist with identification and discussion with the review team. These charts, which have been completed independently by two reviewers, will be compared to pilot the tool, while assessing if the results are consistent with the research question. Daudt *et al*⁶¹ advocate this approach to improve the data charting phase to ensure the review question can be answered. Scoping review processes are iterative processes, and this systematic repetition of tasks will be completed for each study and discussed with the review team. If there are any changes made to the data charting form, these will be noted in addition to any decisions made regarding screening, as a result of meetings with the review team, reflections and actions taken.⁶²

Stage 5: collating, summarising and reporting the results

This scoping review will be reported following the PRISMA Extension for Scoping Reviews⁵³ and the guidelines outlined by JBI Reviewer's Manual for Scoping Reviews.⁵⁶ Quality appraisal and risk of bias of the included articles are not consistent within the conduct of a scoping review.⁵⁸ Subsequently, the methodological quality of each article will be outlined not appraised in detail, and the researcher will report this throughout the discussion and synthesis of findings. As scoping reviews are not aimed at producing critically appraised results to the review question, but more so provide an overview of the available evidence, methodological assessments will not be completed on the studies included in this review.⁶³ Thematic analysis will be used to analyse the findings of the studies, using qualitative descriptive methods to review the literature as advised by Levac *et al*.⁵⁸ Findings will be grouped into thematic categories and the key findings will be presented.

The general characteristics of the studies, relevant to the scoping review aim, will be identified; the data will be extracted and charted and the findings will be described and summarised.⁵⁶ The conclusions, strengths and limitations identified within this review will be documented. This review will illustrate the changes occurring within PICUs during the COVID-19 pandemic.

Table 2 Keywords for the literature search strategy

| Population | Concept | Context |
|--|---|---|
| Paediatric/pediatric intensive care units OR PICU OR intensive care units OR ICU OR high dependency units OR HDU OR critical care unit OR critical care OR CCU OR nurses OR physicians OR healthcare staff | Organisation OR organization OR activity OR development OR changes OR adjustments OR advances OR modifications OR transitions OR transformations OR shift OR revision OR switch OR reversal | Worldwide OR global OR national OR international OR pandemic OR covid-19 OR coronavirus |

Table 3 Characteristics of the studies identified

| Characteristics | Aspects to be identified |
|---------------------------------|--|
| Authors, year, journal, country | Who conducted the study? When was the study conducted? Where was the study conducted? Where was the paper published? |
| Target group | Who were the participants in the study? Who was the target audience? |
| Aim | What was the aim of the study? |
| Primary research question | What was the primary research question of the study? |
| Hypothesis | What was the hypothesis of the study? If appropriate. |
| Setting | Where was the study conducted? What was the setting and context? |
| Activity | What was the activity occurring in the setting during the specified time period? |
| Participant recruitment | How were the participants recruited? |
| Research methods | What types of research methods were applied in the study? |
| Ethical approval | Was there evidence of ethical approval? Were their specific ethical considerations identified? |
| Data analysis | How was the data analysed: what methods were used? |
| Main results | What were the main results of the study? |
| Limitations | What were the main limitations of the study? |
| Strengths | What were the main strengths of the study? |
| Recommendations | What were the recommendations and practical implications of the study? |

Stage 6: consultation

Two of the reviewers are very experienced paediatric nurses, with one having a background in children's intensive care nursing. Consultation will be also made with relevant experts working in the PICUs at the outset of the review for selecting keywords to ensure all relevant areas are covered, for example, a paediatric nurse working in PICU during the pandemic. Networking with relevant individuals will continue to occur virtually, due to the current restrictions associated with COVID-19. As advocated by Levac *et al*,⁵⁸ a cross-disciplinary consultation will occur in the planning of this study, selecting keywords and identification of inclusion and exclusion criteria if required. Further consultation will be sought if necessary at any stage during the review and will be explained in the review where required.

Patient and public involvement

No patient involvement will be sought for this review, but there is patient and public involvement engagement in the wider programme of research of which this review is a part of.

DISCUSSION

A scoping review protocol has been explained in relation to the current literature available.^{56–58 61} This scoping review will contribute to knowledge in this area and inform a research project in this area. The rationale for choosing a scoping review over other reviews is to map the scientific evidence in this area to inform further research as the knowledge base in this area is still being created and evaluated.

This pandemic is not unprecedented, with other pandemics occurring previously including the Spanish Influenza in 1918–1919,⁶⁴ the Asian Influenza in 1957–1958⁶⁵ and the SARS pandemic in 2002.⁶⁶ Previous research has highlighted some guidelines for the management of children with COVID-19 in PICU, although a number of these are acknowledged as weak or having insufficient evidence to make recommendations.⁶⁷ This review offers an opportunity to learn from this pandemic and provide recommendations for future global pandemics in a PICU setting. A scoping review will contribute to ensuring that future research in this area can be planned appropriately to address any gaps in the scientific knowledge.

The authors believe that the information gained through this scoping review will:

- ▶ Contribute to the knowledge in the field about adaptations and transitions occurring in PICUs during a global pandemic.
- ▶ Assist in providing recommendations and planning for the practical implications that may be required in future during another global pandemic.
- ▶ Offer an opportunity for mitigating the negative impact of COVID-19 on the health services and support change and growth in PICUs across the world.
- ▶ Contribute beneficial knowledge in the event of further waves of COVID-19, but also in the face of other inevitable, future healthcare crises through the findings and recommendations resulting from this review.

Research ethics

Ethical approval is not required for this scoping review. However, this study is part of the TechChild Project; 'Just

because we can, should we? An anthropological perspective on the initiation of technology dependence to sustain a child's life'. TechChild, funded by the European Research Council, is a programme of research exploring international influences on the initiation of technological support for children. Ethical approval was previously obtained from the relevant academic and clinical Research Ethics Committees, nationally and internationally for the TechChild Project.

Dissemination

The results from this study will be disseminated through conferences and in peer-reviewed academic journals for those working in the healthcare arena.

Contributors KH provided the original idea and drafted the first manuscript. All authors (KH, CM, MB) made revisions and contributed to the final manuscript.

Funding This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement no. 803051).

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

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ORCID iD

Katie Hill <http://orcid.org/0000-0003-3760-955X>

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