Personal protective equipment implementation in healthcare: A scoping review

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I declare not having a conflict of interest related to the subject of this presentation

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State of the Science Review

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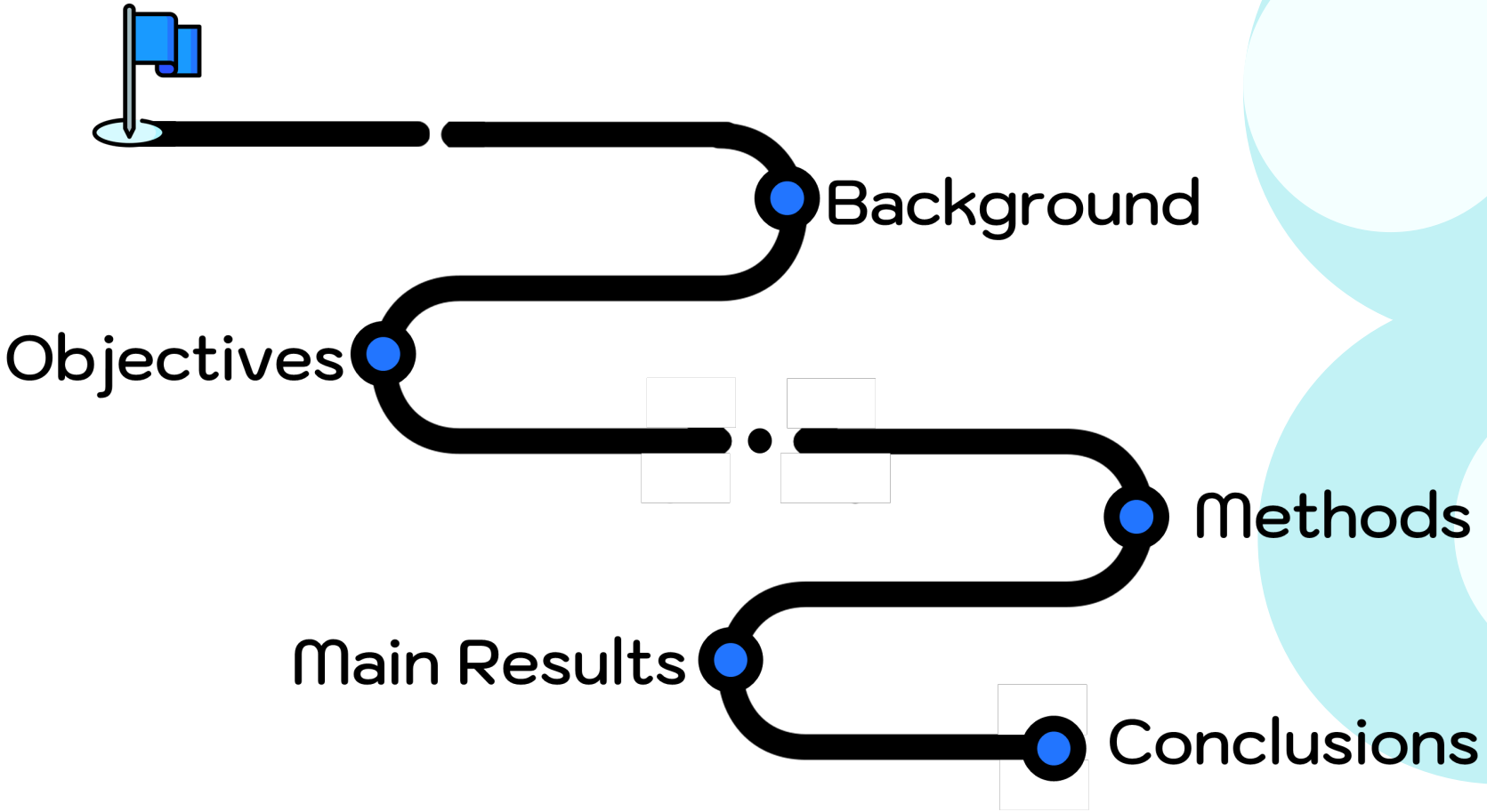
Roadmap of the presentation



Background

7%-8.7% of health workers (HWs) were infected with COVID-19 while working due to:

- inadequate access to or use of personal protective equipment (PPE)
- health facilities' organization and lack of preparedness
- limited availability of PPE
- Low PPE adherence

- Outbreaks: opportunity to reinforce IPC recommendations
- Isolated interventions such as education and training and other behavioral interventions do not have a considerable effect on IPC measures adherence
- PPE adherence is not a matter of only individual HW decision:
- multiple factors influence HW ability and willingness to adhere to IPC guidelines
- Integrated implementation strategies: ensure uptake of evidence-based practices and technologies in health care
- The effective PPE implementation is a complex practice!

Objective

To map how PPE is implemented in health care, focusing on barriers and facilitators.

Methods

Scoping Review

Joanna Briggs Institute methodology, and PRISMA recommendations

14 databases until May 11th 2021

2 independent investigators for data search, selection and extraction and one expert for consensus achievement

Guiding questions:

(1) How is PPE implemented in health care?
(2) What does the process of PPE selection, acquisition, training, maintenance, acceptance, adherence, and assessment entail in health care?
(3) What are the barriers and facilitators to the implementation process for PPE in health care settings?

Results

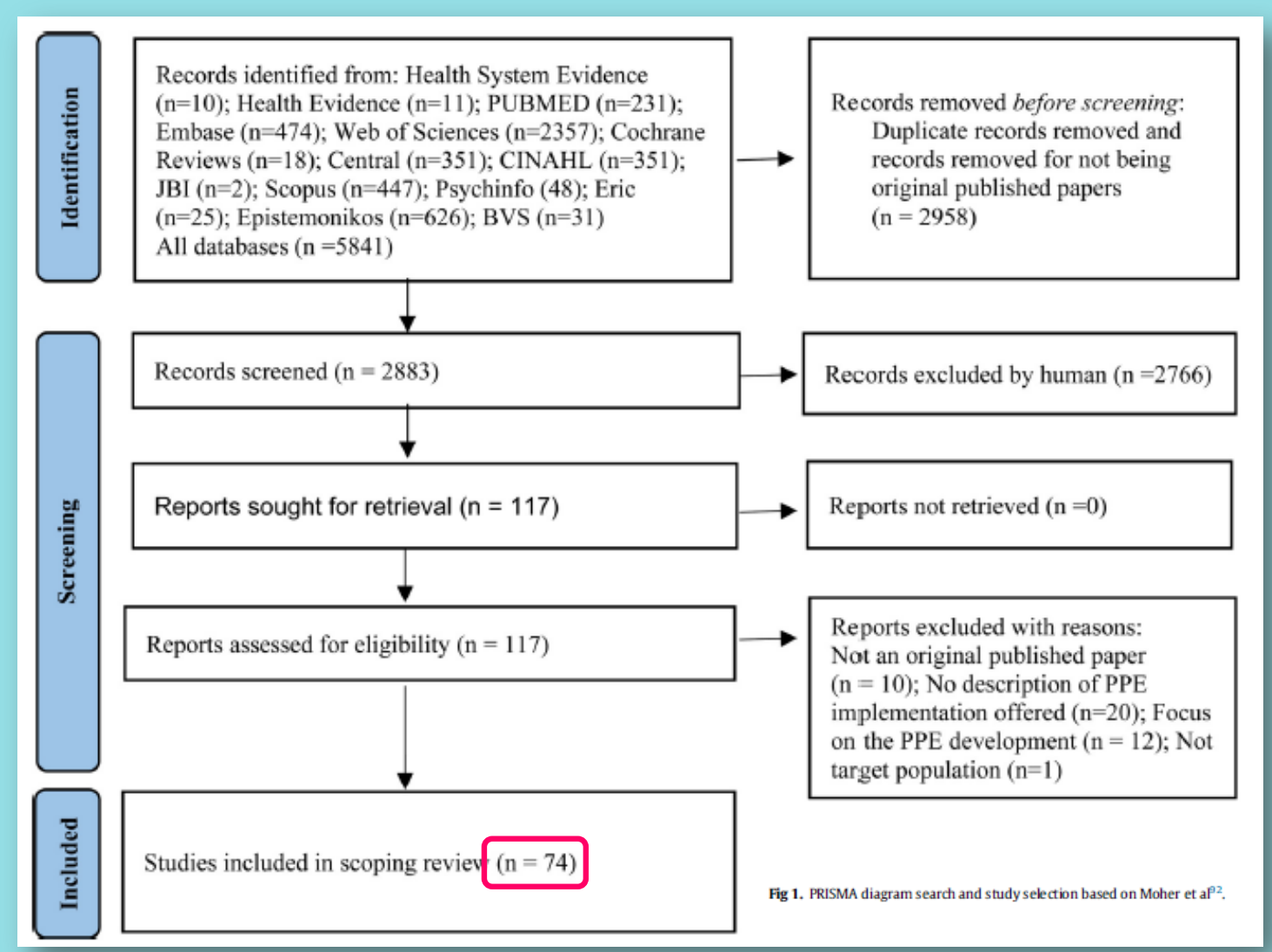


Fig 1. PRISMA diagram search and study selection based on Moher et al[12].

Results

Results of barriers and facilitators were matched with the Consolidated Framework for Implementation Research (CFIR)

Intervention Characteristics

PPE impact on clinical work

Individual characteristics domain

HW anxiety and stress
HWs lack of preparedness, knowledge, or training
PPE non adherence

Outer and inner setting

PPE shortage/unavailability
Supply and logistics problems
HF inadequate infrastructure, lack of preparedness and policies
Policy and procedure communications

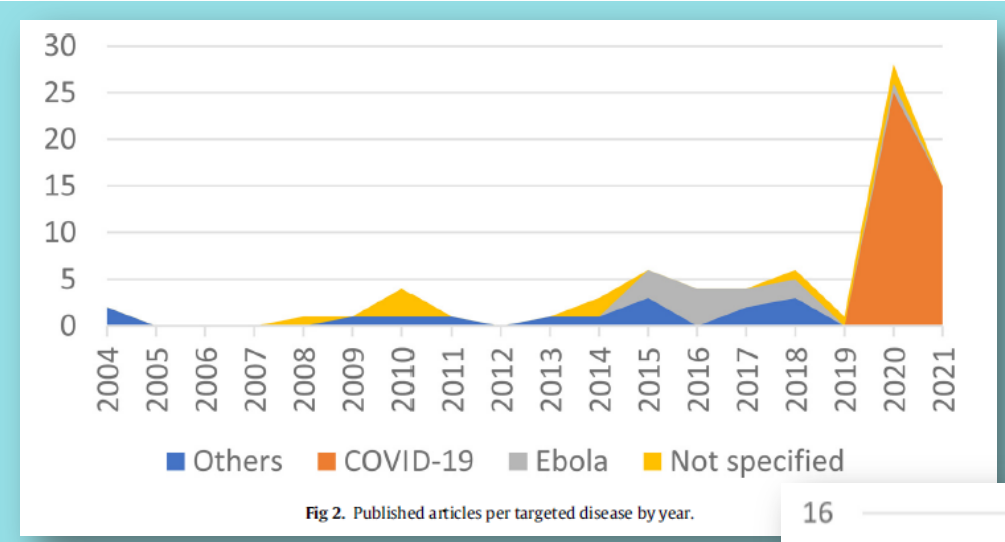


Fig 2. Published articles per targeted disease by year.

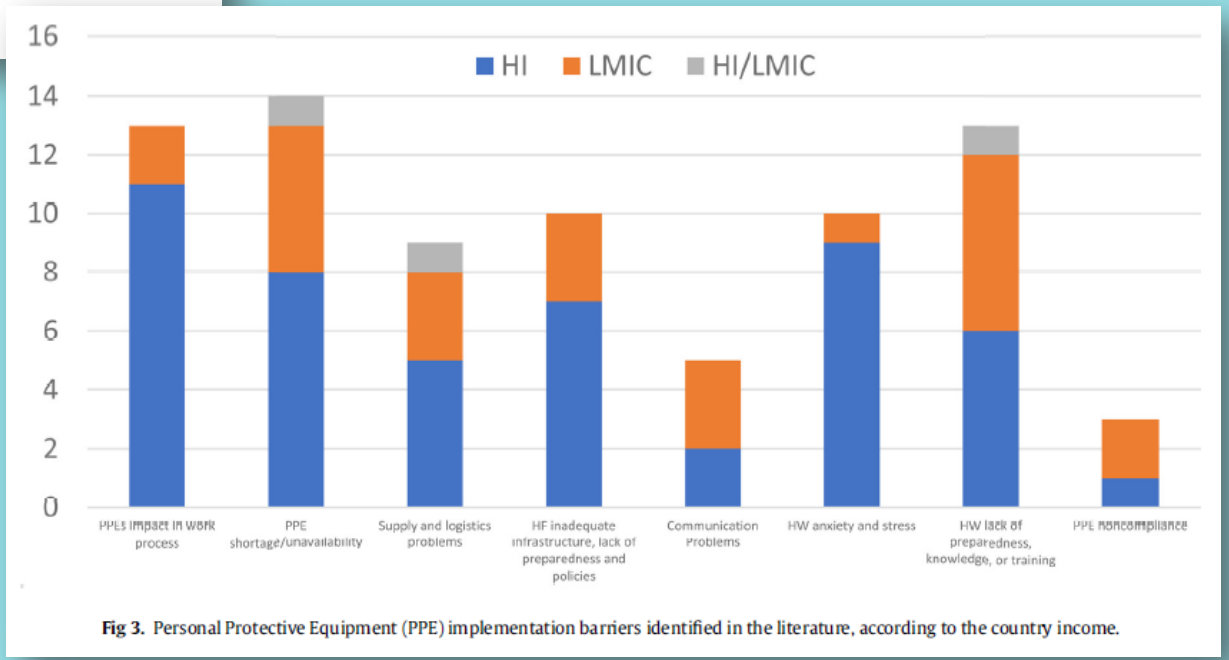


Fig 3. Personal Protective Equipment (PPE) implementation barriers identified in the literature, according to the country income.

Intervention Characteristics

PPE impact on clinical work

Implementation interventions:

- Improvement of personal well-being and minimization of adverse effects of PPE:
- Both HF and HW should co-design and co-produce implementation and sustainability strategies.
- Adjustments in the duty area like temperature control, improvement ventilation in the building, and limiting time spent in the clinical zone
- Comfort should be taken into consideration when PPE is selected and purchased
- HWs be provided with PPE design that allows them to drink water and take breaks as needed

Inner and Outter settings

PPE shortage / unavailability

Barriers

- Shortages in public and private HFs
- Specific sizes needed for adequate protection were unavailable, which led to the use of poorly fitted PPE
- Inadequate adaptations: non-evidence-based reuse, extended use, and reprocessing practices.
- HW to purchase their own PPE

Implementation interventions

- Mobile teams replace PPE actively
- Procedures to reduce the degradation of the equipment
- Education to reduce unnecessary PPE use and waste
- PPE reprocessing systems during extreme conditions
  - Identification and tracking of reprocessed PPE
- Improved implementation of PPE stock control and supply procedures

Inner and Outter settings

Supply and logistics problems

Barriers

- Lack of biocontainment unit to discharge disposable PPE
- Inadequate space layout between clean and contaminated area
- Inadequate donning and doffing zones
- Unavailability fit test performance of respirators
- Conflicting or lack of PPE protocols
- Inefficient communication between HF leaders or managers and frontline HWs
- External influences in the adherence to PPE good practic

Implementation interventions

- Implementation of specific PPE protocols as part of a HF policy, involving HWs.
- Have a response plan in the context of pandemic
- robust regular training and qualifications periodic
- fit testing and appropriate mask sizing
- PPE compliance monitoring
- PPE provision as per the level of risk in different zones
- Use of additional PPE like powered air purifying respirators (PAPRs) in all areas allocated for aerosol-generating procedures
- Donning and doffing area designations

Inner and Outter settings

HF inadequate infrastructure, lack of preparedness

Barriers

PPE supply chain and stockpiling efforts were thwarted by logistics, planning and communication challenges

Implementation interventions

- PPE can be selected and purchased according to HW's body sizes and preferences
- Institutional processes established & monitored for quality and performance
- Processes to manage supply of PPE and maintain a baseline inventory of every critical item
- To conduct a routine facility-level assessment of the PPE supply
- PPE can be allocated and organized to maximize space and to optimize access and distribution

Inner and Outter settings

Policy & procedures communication

Barriers

- PPE policies not consistent or constantly changing
- Too much irrelevant information creates confusion among HWs
- Daily updates were not helpful because HWs needed consistent PPE recommendations and guidelines
- Lack of leadership and team cohesion

Implementation interventions

Alternative communication might be used:

- hand-signs taught to all HWs,
- writing on glass doors with markers,
- creation of laminated cards for use by the team and text messaging apps to discuss key points with the staff

More complex strategies such as:

- routine evaluation and feedback regarding PPE adherence
- departmental bulletins
- and face-to-face briefings

Individual characteristics domain

HW anxiety & stress

Barriers

- HWs were psychologically affected by clinical practice, especially in the context of the COVID-19 pandemic
- Situations like unannounced simulations involving mock patients and others related to risk perception concerning PPE problems engendered anxiety
- HWs were concerned that patients could experience anxiety and distress when they were unable to stay close or even see the face of the person treating them due to PPE use
- HWs were confused and lacked confidence about the available IPC guidelines and protocols

Implementation interventions

- PPE training and simulations more as part of preparedeness decrease latent threats making HWs more confident and more prepared
- Trained problem solving HWs who listen to staff members' concerns about PPE
- Sign post information, and promotion positive attitudes towards PPE and reduce fear and anxiety levels

Individual characteristics

HWs lack of knowledge & preparedness

Barriers

- HWs lack knowledge and preparedness concerning PPE selection, correct use, and decontamination processes (if applicable)
- Lack of regular training programs related to PPE
- Nonmandatory IPC training to all HWs (mainly medical staff)

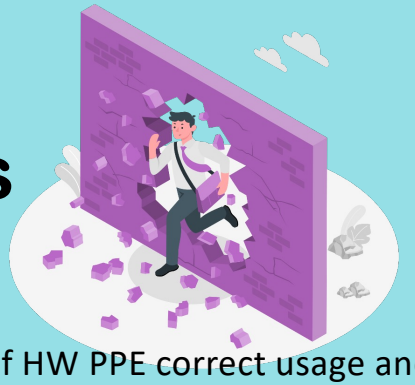
Implementation interventions

- Online and in-person training with practice exercises or simulations improved knowledge, safety and competency of PPE usage among HWs.
- Training must be completed before HWs start working, and be refreshed at regular intervals
- Informing HW practices by making learning materials freely available in repositories group chats, and social media

Individual characteristics

PPE non adherence

Barriers



- Suboptimal levels of HW PPE correct usage and adherence
- Adherence was not consistently monitored

Implementation interventions

- Involvement of stakeholders to develop a culture of safety, a local IPC policy, and training
- Development of PPE monitoring programmes to provide compliance surveillance
- Presence of an observer to periodically inspect the PPE in the clinical area, and monitor HW well being
- Cross-checking of PPE donning, working in red zone, and doffing using a buddy system
- Development of a quality assurance checklist for PPE self monitoring to identify breaches
- Adjustments in the donning and doffing areas, such as mirror installation, designation of step-by-step pictorial instructions

Conclusions

Evidence-based implementation strategies are required to reduce the barriers and strengthen the enablers.

Governments, HF managers, HWs should be engaged

We advocate for sustainable PPE implementation strategies that address its multilevel transdisciplinary complexity, which will enhance safety and health care quality and effectiveness.

We hope the lessons learned in this review can inform decision makers and providers to collectively develop more robust and structured PPE implementation worldwide.

Thank you!

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