**Study Protocol**

**Key Question Development Template**

1. ***Topic / Title:*** Physical Realism - LMIC
2. ***PICO methodology: elements for key question creation:***

|  |  |
| --- | --- |
| **PICO** | **Description** *(with recommended text)* |
| **Population** | Healthcare providers and/or healthcare trainees/students engaging in simulation training in low and middle income/resource countries/settings |
| **Intervention** | Higher physical realism simulator/task trainer |
| **Comparison** | Lower physical realism simulator/task trainer |
| **Outcomes** | Educational (immediate and retention): participant satisfaction, knowledge, skills, attitudes  Clinical: change in healthcare practitioner behavior, patient outcomes  Process: costs |

1. ***Key Question:***

Does the degree of physical realism in simulators/task trainers make any difference to clinical, educational and process outcomes? Is it justified to consider higher physical realism training in low and middle resource settings?

1. ***Study Inclusion and Exclusion Criteria***

Inclusion: RCT, comparative observational studies, prospective and retrospective.

Exclusion: case reports, technical reports, trial protocol, unpublished results, commentaries, editorials, reviews

1. ***Systematic Review Team and Assignments***

|  |  |
| --- | --- |
| **Name** | **Role** |
| Peter Meaney | Supervisor (Expert Panel) |
| Nicole Shilkofski | Supervisor (Expert Panel) |
| Moussa Issa | Systematic Reviewer |
| Francis Furia | Systematic Reviewer |
| Abdallah Whaiba | Systematic Reviewer |

1. ***Definitions:***

Higher physical realism simulators: those that provide physical findings, display vital signs, physiologically respond to interventions (via computer interface) and allow for procedures to be performed on them (e.g. bag mask ventilation, intubation, intravenous insertion)1

Lower physical realism simulators: static manikins that are otherwise limited in these capabilities1

Low and middle income settings: World Bank defines countries as low-income economy with $1135 or less gross national income (GNI) per capita, lower-middle-income economies as $1136 to $4465 GNI per capita, and upper-middle-income economies as $4466 to $13845.2 (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups)

1. ***Outcomes:***

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Kirkpatrick level | Outcome Categories | Specific Outcomes | Immediate \* | Delayed \*\* |
| I | Satisfaction | Learner confidence ratings with procedure | *not important* | *not important* |
| II | Knowledge | Learner scores on procedure associated test | *important* | *important* |
| Skills (Time) | Procedure completion time | *important* | *important* |
| Skills (Process) | Procedure learning curve | *important* | *important* |
| Skills (Product) | Procedure errors | *important* | *important* |
| III | Behaviors/ performance with/ on patients | Procedure completion time in real practice and errors | *important* | *important* |
| IV | Patient outcomes | Patient complications | *critical* | *critical* |
| IVa | System outcomes (e.g. costs) | Patient care costs associated w. procedure by learner | *critical* | *critical* |

\* (<24 hours post intervention)

\*\* If there are sufficient studies, groups may decide to break up delayed outcomes into additional subcategories: (a) up to 2 weeks; (b) 2 weeks to 3 months; (c) >3 months

1. ***Key Recent Studies on the topic:***
   * Delivery of training in low- and middle-income countries/settings

[Using **Simulation** in **Global** **Health**: Considerations for Design and Implementation.](https://pubmed.ncbi.nlm.nih.gov/27902533/)

Pitt MB, Eppich WJ, Shane ML, Butteris SM. Simul Healthc. 2017 Jun;12(3):177-181. doi: 10.1097/SIH.0000000000000209.

[Healthcare **Simulation** in Resource-Limited Regions and **Global** **Health** Applications.](https://pubmed.ncbi.nlm.nih.gov/28151774/)

Andreatta P. Simul Healthc. 2017 Jun;12(3):135-138. doi: 10.1097/SIH.0000000000000220.

1. ***Recent Systematic Reviews on the topic:***
   * Delivery of training in low- and middle-income countries/settings

[Helping Babies Breathe and its effects on intrapartum-related stillbirths and neonatal mortality in low-**resource** **settings**: a systematic review.](https://pubmed.ncbi.nlm.nih.gov/31278145/)

Versantvoort JMD, Kleinhout MY, Ockhuijsen HDL, Bloemenkamp K, de Vries WB, van den Hoogen A. Arch Dis Child. 2020 Feb;105(2):127-133. doi: 10.1136/archdischild-2018-316319. Epub 2019 Jul 5

1. ***Suggested specific search terms / keywords for literature search***

Overarching terms/keywords:

“physical realism”; “procedural skills training”; “low- and middle-income countries”; “team training”; “crew resource management”; “booster training”; “non-technical skills training”; “simulation”; “computer simulation”; “training”; “skill”; “mannequin”; “manikin”; “assessment”;

* + Delivery of training in low- and middle-income countries/settings:

“Limited resource setting/ resource limited setting”; “LMIC”; “Global health and skills training”; “Helping Babies Breathe/Survive program”; “Helping Mothers Survive program”; “Train the trainer cascade/model/program”;

1. ***Notes:***

**References**

1. Cheng A, Lang TR, Starr SR, Pusic M, Cook DA. Technology-enhanced simulation and pediatric education: a meta-analysis. *Pediatrics.* 2014;133(5):e1313-e1323.

2. Bank TW. 2022.