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|  | **Protocol** |
| **Co-designing health interventions with refugee communities – a scoping review.** |
| Rebeccah Bartlett |
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1. **Background (1)**

As of May 2019, there were more than 70.8 million people displaced from their homes globally (1). Despite significantly different lived experiences, access to healthcare services is poor and specific healthcare needs go unmet for most of this population (2). Health literacy is variable and dependent upon pre-transit socioeconomic status, education background and geographic proximity to healthcare and social welfare services (3). Health literacy, defined in this instance as “a person’s ability to access, understand and apply health information” (4), is poor within most displaced communities, contributing to low awareness and uptake of healthcare services and to poor health outcomes as a result (5). Due to the range of security and economic barriers that are present within most humanitarian settings, data on the specific needs of different refugee populations is scant (6). This has a deleterious effect on funding and policy and contributes to the cycle of poverty experienced by most of the world’s displaced communities (6).

Technology and social media are rapidly digitising both the healthcare and humanitarian landscape, connecting people to information and services that are both global and virtual in nature. To ensure technological interventions do in fact ameliorate the poor health outcomes listed above, communities who are directly affected by displacement must be supported to authentically participate in, and where possible lead, efforts to co-design health interventions within this context. Co-designing with communities is not a new concept however it is experiencing a resurgence of interest and support. This is due in part to the rise in human-centred processes often associated with digital platforms and products that equate substantial end-user input with increased acceptability and uptake and ideally, profits.

The human-centred design is an approach marked by three stages (Inspiration, Ideation and Implementation) which diverge and converge repeatedly. These stages are practically applied through concrete steps (Empathise, Define, Ideate, Prototype and Test) in a process called “design thinking” (7). In this review, design thinking studies were considered based on Altman, Huang and Breland’s (2018) criteria that the studies “1) described user/needs assessment, 2) involved iterative prototyping/testing of the intervention with user feedback, and 3) tested the intervention with target users” (8). Authentic co-design means end-user communities (i.e. the beneficiaries of a health or social intervention) are engaged with and listened to and their advice or feedback is acted upon and visible in the final product or program developed. Importantly, co-design can help to increase user acceptance and ownership of intended interventions (9, 10). The terms co-design, co-creation and co-production are often used interchangeably and inconsistently. This scoping review considers co-design the act of defining a problem and designing its potential solution with the intended beneficiaries. Co-production involves developing and delivering that solution to its intended audience and co-creation is the process of working with all stakeholders to achieve this end goal.

Human-centred design within the health and humanitarian context is a rapidly evolving field of both academia and policy application. As with many other areas that cross the implementation science or translational research space, the most relevant discourse in this area can mainly be found within grey literature, at present. Similarly, because recent systematic reviews on the health of displaced communities continue to demonstrate a dearth of literature describing any kind of human-centred design approach, a scoping review was determined more feasible and useful than a systematic review. Within the context of this scoping review, the term “refugee” is being used as an all-encompassing descriptor that includes people with legal refugee status, as well as people seeking asylum, undocumented immigrants (or workers) and people generally considered displaced or stateless, regardless of the temporality of their circumstance.

**2 Objectives**

The aims of this scoping review are to:

1. Examine the current literature on co-designing health interventions with refugee populations in any of the three following ways:
   * Increasing health literacy of refugees
   * Providing refugees with health services
   * Building data on health needs of refugees
2. Determine what gaps persist in the literature surrounding co-designing health interventions with refugee communities?

**3 Methods**

**3. 1 Scoping review team**

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| **Role** | **Name** | **Declaration of potential competing interests** |
| Scoping reviewer | Rebeccah Bartlett | None |
| Clinical Advisor 1 | Assoc Professor Jacqueline Boyle | None |
| Clinical Advisor 2 | Dr Jessica Watterson | None |
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This scoping review has not received funding.

**3.2 Clinical question/s incorporating PICO**

1. What literature exists surrounding co-designing health interventions with refugee populations?
2. What effect (if any) do existing co-designed health interventions have on health outcomes (as defined above) within refugee populations?
3. What gaps persist in co-designing health interventions with refugee communities?

**3.3 Selection criteria based on PICO**

Table 1 outlines the selection criteria using the PICO framework.

**3.4 Search methods**

**3.4.1 Databases to be searched**

The following electronic databases will be used to identify relevant published literature:

* Ovid
* Medline including Medline in-process and other non-indexed citations via Ovid
* PsychINFO via Ovid
* EMBASE via Ovid
* All EBM Reviews, incorporating:
  + Cochrane Database of Systematic Reviews
  + ACP Journal Club
  + Database of Abstracts of Reviews of Effects
  + Cochrane Central Register of Controlled Trials
  + Cochrane Methodology Register
  + Health Technology Assessment
  + NHS Economic Evaluation Database
* CINAHL
* Global Health (CABI)
* Google and Google Scholar
* SCOPUS
* Web of Science

We will also search the bibliographies of relevant studies identified by the search strategy for identification of additional studies.

To identify ongoing trials, we will search the International Clinical Trials Registry Platform Search Portal (<http://apps.who.int/trialsearch/>), which provides access to a central database containing the trial registration data sets provided by 16 different international registries.

**3.4.2 Search strategy**

A scoping search, based on the selection criteria and combining MeSH terms and text words, has been developed using the OVID platform and will be translated to other databases as appropriate. The search strategy will have limits on language (English only) but not on year of publication.

**Health**

* health\*.mp.
* exp "health care facilities, manpower, and services"/
* primary care.mp.
* exp "health care (non mesh)"/
* medic\*.mp.
* exp patient\*/

**Refugee**

* exp Refugees/
* refugee\*.mp.
* asylum adj1 seek\*).mp.
* ((displaced or marginali\* or underserved or vulnerable) adj4 (people\* or person\* or populations\* or individual\*)).mp.
* Undocumented Immigrants/
* ((illegal or unauthori\* or undocumented) adj (migrant\* or immigrant\* or alien\* or worker\*)).mp.
* exp Vulnerable population\*/

**Co-Design**

* (Co-design or codesign or co-creation or cocreation or co-production or coproduction or co-construction or coconstruction).mp.
* (design adj (thinking or approach or science or Lean or method\*)).mp.
* (user centred design or user centered design).mp.
* (person centred design or person centered design).mp.
* design thinking.mp.
* design thinking.m\_titl.
* (human centred design or human centered design).mp.
* (user led experience or user led design).mp.
* (patient led design or patient led experience).mp.
* active partnership.mp.
* community network\*.mp.
* exp Community based participatory research/

**3.5 Screening of search results**

Endnote will be used to manage search results. As this is a scoping review, one reviewer will assess the titles, abstracts and keywords of every article retrieved by the search strategy according to the selection criteria. A second reviewer will verify abstraction results, if needed. Full text of the articles will be retrieved for further assessment if the information given suggests that the study meets the selection criteria or if there is any doubt regarding eligibility of the article based on the information given in the title and abstract. In some cases, there may be more than one article describing the same study and reporting different outcomes.

**3.6 Assessment and classification of included studies**

Included studies will be classified according to the National Health and Medical Research Council (Australia) levels of evidence.

**3.7 Assessment of methodological quality/risk of bias of included studies**

Methodological quality of the included studies will be assessed by first author and verified by at least one other author using a risk of bias assessment template according to study design. Individual quality items will be investigated using a descriptive component approach. The Cochrane Risk of Bias tool, the McGill Mixed Methods Appraisal Tool (MMAT) and the Critical Appraisal Skills Program (CASP) tool will be used to assess risk of bias, as appropriate. Any disagreement will be resolved by discussion to reach a consensus.

**3.8 Data extraction**

Data for outcomes according to the selection criteria will be extracted from included studies using a specially developed data extraction form. Information will be collected on general details (title, authors, reference/source, country, year of publication, setting), participants (age, gender, selection criteria, withdrawals/losses to follow-up, subgroups), results (point estimates and measures of variability, frequency counts for dichotomous variables, number of participants, intention-to-treat analysis) and any other relevant validity results. Any disagreement will be resolved by discussion to reach a consensus.

**3.9 Data analysis and synthesis**

Data will be presented in summary, descriptively, and where necessary, summarised statistically in meta-analyses if sufficiently homogenous. Clinical homogeneity will be satisfied when participants, interventions, outcome measures and timing of outcome measurement are considered to be similar. The Review Manager 5 software will be used for meta-analysis. Results of homogenous trials will be pooled and analysed to provide estimates of the efficacy of the interventions. Meta-analysis results will be expressed as relative risks (RR) with 95% confidence intervals (CI) for dichotomous outcomes and mean differences (MD) with 95% CI for continuous outcomes. Statistical homogeneity will be assessed using the I2 test where I2 values over 50% indicate moderate to high heterogeneity (Higgins 2003). Statistical significance will be set at P < 0.05. For trials that are clinically heterogeneous or present insufficient information for pooling, a descriptive analysis will be presented.

**3.9.1 Subgroup analysis**

Subgroup analysis will be conducted according to PICO inclusion criteria, demography, location (e.g. low/middle- vs. high-income country) and migration pathway status (e.g. time since arrival in host country), where applicable.

**3.9.1 Sensitivity analysis**

Sensitivity analysis will be conducted to explore the influence of risk of bias on effect size. Sensitivity analyses will be performed in which studies with high risk of bias are excluded from meta-analyses.

**4 Discussion**

This scoping review presents an opportunity to explore the intersection of design thinking and healthcare innovation within humanitarian settings. Specifically, it aims to determine what role, if any, co-design can have on increasing health literacy or service uptake within refugee communities and on building data surrounding their specific health needs. It also seeks to determine what gaps persist in the literature surrounding refugee community co-design. The rate of human displacement grows daily and with it the risk to public health and safety on a global scale. This paper has the potential to offer useful and immediately applicable guidance on best practice in working with refugee communities in an effective, efficient and most importantly, ethical way to better health literacy and access for all.

**Table 1. Selection criteria in PICO table**

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|  | **Participants (P)** | **Intervention (I)** | **Comparison (C)** | **Outcomes (O)** | **Study type** | **Limits** |
| **Inclusion criteria** | Refugees and asylum seekers (resettled, urban and/or camp settings)  People who have been forcibly displaced (for any reason) from their homeland regardless of the pathway in which they migrated (e.g. legal refugee, undocumented worker etc.) | Health interventions that have been co-designed, co-created, co-produced or co-developed with refugee populations (as per participant description) | N/A | Increasing health literacy  Connecting to and/or providing health services  Building data on health needs | All studies | English only |
| **Exclusion criteria** | Migrants who were not forcibly displaced (for any reason) from homeland e.g. economic migrants | N/A | N/A | N/A | N/A | Languages other than English |

**References**

1. Figures at a Glace: United Nations High Commission on Refugees 2019 [Available from: <https://www.unhcr.org/en-au/figures-at-a-glance.html>.

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8. Altman M, Huang TTK, Breland JY. Design Thinking in Health Care. Prev Chronic Dis. 2018;15:E117.

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