Community participation strategies to improve health in slum settings: A qualitative systematic review

PHILIP DAMBISYA

DMBPHI001

SUBMITTED TO THE UNIVERSITY OF CAPE TOWN

In partial fulfilment of the requirements for the degree
MASTER OF PUBLIC HEALTH
(Health System Specialisation)

FACULTY OF HEALTH SCIENCES
JANUARY 2023

PRINCIPAL INVESTIGATOR AND SUPERVISOR:

PROFESSOR LUCY GILSON
DIVISION OF HEALTH POLICY AND SYSTEMS
SCHOOL OF PUBLIC HEALTH AND FAMILY MEDICINE
FACULTY OF HEALTH SCIENCES
UNIVERSITY OF CAPE TOWN

Plagiarism Declaration

I, Philip Dambisya, hereby declare that the work on which this dissertation/thesis is based on my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

I empower the university to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Signed: Signed by candidate

Date: January 2023

Abstract

With more than a billion people living in slum settings, the need to better health in slums is ever-growing. Community participation (CP) is continually gaining prominence as integral when addressing the complex challenges of those living in slums. Specific to health interventions in slums, an understanding of "what truly works" and what forms or approaches to CP support such efforts is under-researched. To understand the current knowledge base, this qualitative systematic review addressed the questions: What depth of community participation is seen in slum health improvement interventions, and what enables or constrains the deeper levels of participation?

Through a thematic analysis of the found and synthesised papers, key themes of experiences were identified. The 'depth' of participation of each reported slum health intervention was then assessed using Arnstein's ladder of citizen participation. In addition, the review identified what community participatory strategies were used within interventions in slum health contexts in low- and middle-income countries and analysed what factors enable or constrain CP.

Findings revealed a mix of strategies within each intervention, with the number of CP strategies not appearing to affect the depth of participation in an intervention. Instead, the way in which a strategy was implemented appeared important – for example, establishing committees that represent the views of their constituents versus their own interests impacts on participation depth. In addition, integrating communities into planning and decision-making while engaging the broader social networks within communities in slums may lead to the improved buy-in of interventions. There is a need for an expansion of research in the field of slum health as well as ensuring that ways of assessing CP are included in evaluations of projects speaking to using CP as an underpinning concept of their actions.

Acknowledgements

Firstly, thank you to my supervisor, Professor Lucy Gilson, for not only guiding me through this stage in my academic journey but for also continuing to believe in me when it became difficult to believe in myself. I am eternally grateful for the impact you have made in my life, and I hope to be able to build others up as you have me.

To Mary Shelton and Gill Morgan, thank you both for the technical support availed in developing and refining my literature search strategy.

To my parents, Yoswa and Petua Dambisya, and sister Joanita Dambisya, thank you for always being amazing role models and helping me understand that in working towards any outcome, the process and growth that comes from the pursuit should remain a constant reminder of my development.

To the friends that stood by me through this process, thank you. Your support has been immense and I take none of it for granted.

Contents

PART A: PROTOCOL

Background

The pace of urbanisation is increasing globally, with countries around the world continuing attempts to improve infrastructure in cities, towns, and other urban settlements. Urbanisation is the process by which populations transition from rural to urban settings (1). Trends show that, by 2007, more than half the world's population were residing in urban locales, compared to the estimated 5% in the 1800s (2, 3). However, with limitations in the space available within cities, much of which is also often only financially accessible to individuals of middle to high socioeconomic standing or those formally employed, the increasing tendency is for people to build or move into slums; globally, approximately 900 million people, as of 2015, now live in slums (2).

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), a slum is "a contiguous settlement where the inhabitants are characterised as having inadequate housing and basic services" (4, p. 10). UN-Habitat describes slums as a collection of households in which people are living under the same roof and lack one or more of the following: "access to improved water, access to improved sanitation, sufficient living space, the durability of housing and secure tenure" (4, p. 13). The characteristics of slums are also widely recognised social determinants of health (SDOH) - and include physical environments, income, and social status (2, 5). For example, due to demands like travel distance or the time of day at which they can seek health care- with job demands often meaning this can only be done in the evenings- health services often become inaccessible for slum dwellers (2, 6). The realisation that slum health cannot be defined by a single parameter makes it imperative to approach it through more innovative means, including through the integration of slum residents' perspectives on their contexts as well as possible interventions better to tailor the interventions to citizens' needs and contexts (6, 7).

Community participation is crucial in achieving the Sustainable Development Goals (SDGs), goal 11 in particular. Set in 2015, the SDGs are a set of goals adopted by the 193 United Nations member states to achieve a better quality of life for all by the year 2030. Goal 11 focuses on creating and maintaining cities and communities that are self-sustainable. Amongst the targets for this goal are upgrading slums and enhancing inclusive and sustainable urbanisation. One of the fundamental ways of achieving such inclusion is through engaging cohorts with similar lived experiences and socio-geographical commonalities, i.e. communities, in decision-making processes (8, 9).

For several reasons, there is, then, a need to understand the intersection of community participation and slum health.

Community participation is generally viewed as the involvement of community members not only in the evaluation of their needs but also in strategising and overall decision-making around those needs (10, 11). Participation is widely considered vital to improving health outcomes and the sustainability of health and development activities. This is because, amongst other benefits, it inculcates a more profound sense of responsibility, ownership and empowerment by allowing community members to have greater autonomy in decision-making around how the factors that affect their lives are addressed (10, 12, 13).

Community participation is subject to many interpretations and approaches and, subsequently, ways of being implemented (14). Arnstein (15) showed in her seminal text that "citizen power"- citizens engagement in decision-making processes- can take various forms or levels. A "ladder" of eight (8) levels of participation was illustrated by Arnstein (15) (see figure 1). Arnstein's ladder illustrates that participation may be non-participatory (manipulation and therapy); that participation may embrace varying degrees of tokenism (informing, consultation, and placation) or represent degrees of citizen power (Partnership, Delegated power, and citizen control), depending on the action taken (see table 1 for explanations of stages). Using non-participatory or tokenistic forms of participation may lead communities to feel alienated and distrustful of solutions presented to them (12, 16); see (17). In turn, this could lead to adverse health outcomes as trust is a crucial aspect of any health system and has a bearing on, amongst other facets, health-seeking behaviour (18). Consequently, a study that seeks to explore how community participation has been actualised in slums is an essential step in better tailoring health interventions to slum residents.

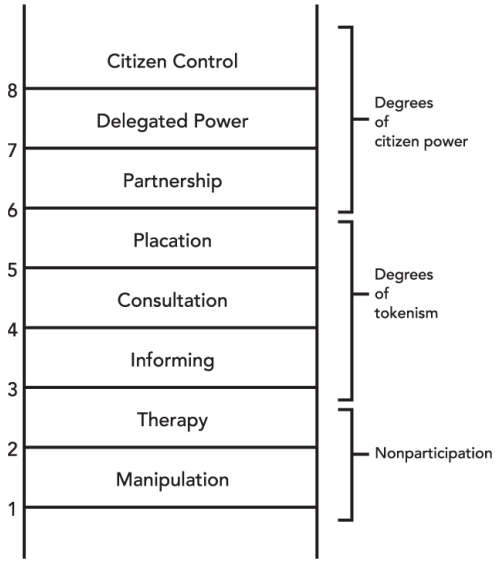


Figure 1: Arnstein's Ladder of Citizen Participation (15)

Table 1: Arnstein's ladder explained

Depth of Participation	Explanation
Degrees of citizen power	
Citizen control	Communities are in full control of a project from its decision-making through to its policy and implementation.
Delegated power	Governance structures have yielded a significant amount of power to communities that are now able to hold parties working on initiatives accountable.
Partnership	Communities are given greater influence and are even part of negotiations.
Degrees of tokenism	
Placation	Communities are given a degree of influence but is tokenistic to some degree.
Consultation	Communities are engaged on their views on certain matters but are not brought in further into potential decision-making.
Informing	Here, one-way communication tends to be the norm with communities not being provided opportunities to engage.
Non-participation	
Therapy	When public officials and governing structures pathologise communities. Taking the stance disempowerment can be addressed by those in positions of power setting the processes, agenda, and tone of "participatory" measures.
Manipulation	A pseudoform of participation where communities are made to believe that they have control in a process when in fact the opposite is true.

Public health and policy development practitioners have long argued that integrating the viewpoints of informal settlement community members and formulating interventions with a participatory

community-focus may yield improved and longer-lasting effects (19). This is considered the case because community members will have more autonomy in the decision-making processes, and by extension, a greater sense of responsibility is felt. In addition to this, knowledge is likely to be disseminated better, and health-seeking behaviour improved (10, 12). According to Gill and Bailey (20), moreover, health system strengthening requires a combination of top-down and bottom-up approaches to the development and implementation of interventions. A bottom-up approach is one that promotes local decision-making and so, helps ensure that the ideas used to address matters within a particular locale come from its residents/users- Degrees of citizen power in the case of Arnstein's ladder (21). In contrast, a top-down approach is one where decisions are made exclusively by stakeholders at higher governance levels, with subsequent processes trickling down to communities- Non-participation and Degrees of tokenism on Arnstein's ladder. For example, a ministry of health mandating a particular health promotion initiative having not consulted with the stakeholders that it seeks to target (21). However, though included as a component of multiple policies and planned initiatives across a range of fields around the world, including health and education, community participation is commonly weak in practice (22, 23).

Community participation in the Health Sector

Within the health sector, community participation has long been considered an imperative for a well-performing Health System and as a foundational principle of comprehensive Primary Health Care (24). Review of empirical evidence in rural and urban settings, both in Low- and Middle- Income Countries (LMICs) and High-Income Countries (HICs), also shows that community participation results in better health outcomes (10, 25, 26). Practically, community participation has been implemented through a variety of approaches such as the formation of Health Facility Committees (HFCs), Community Health Workers (CHWs) Citizen Advocacy groups and networks and Community-based organisations (CBOs).

McCoy, Hall and Ridge (27) define HFCs as a formally constituted structure consisting of community representatives that has an explicit link to a health facility with the goal of improving health service provision and health outcomes through community participation. Community health workers are individuals who are given elementary training to enable to contribute to an aspect of specific health activities. Though often overworked and with evolving scopes of practice, these participatory structures are generally part of the communities they serve, they may have a greater sense of what practices may work, how certain messages may be received and act as a bridge for greater trust between people and their health systems (28, 29). Ultimately, due to the homogeneity that exists within communities, and by extension, informal settlements, community participation has to be utilised with a cognisance of the communities that are engaged.

Efforts towards better health in Slums

Slum health, though not having a universally recognised definition, can be viewed as outcomes and factors that affect the health and wellbeing residing in slum spaces (2). Slum health is an emerging field, that not and the body of research regarding it is minimal, compared to more contemporary fields such as Urban Health (2). This has not helped the progression and upgrading of slum dwellings as less attention has correlated with less financial and resource distribution. If the issues faced in slums were similar to those of more urbanised environments, this would not necessarily be a problem as interventions could be adapted. However, compared to other urban dwellers, individuals living in slums face greater exposure to issues of sanitation, overcrowding as well as communicable and non-communicable diseases.

The emerging discipline, Slum Health, and its practitioners have sought to better the health of slum residents; with government structures, and to a lesser extent, non-governmental organisations (NGOs) leading the process (30). This field, which started to gain prominence in the year 2000 through initiatives such as the UN General Assembly's adoption of the Millennium Declaration (Resolution 55/2), helped establish that slums are highly susceptible to neighbourhood effects (2). This concept proposes that neighbourhoods affect one's behaviour (both directly and indirectly), e.g., should members of a community portray positive health-seeking behaviour, their neighbours will be more likely to follow suit and attempt to access health services when needed. Thus, approaches that maximise these neighbourhood effects require more considerable attention (2, 5).

Justification of Study

Slum upgrading, defined by Corburn and Sverdlik (31, p. 2) as "initiatives seeking to improve housing quality, infrastructure provision, social services, livelihoods, and official recognition for residents", has been poorly actualised. In practice, slum upgrading has been shown to be ineffective based on a systematic review conducted by Turley, Saith, Bhan, Rehfuess and Carter (32). This is due to interventions being ill-tailored to their intended contexts. Turley et al. (32) emphasise this through the example of placing of facilities in locations away from where they are most needed, in the process exasperating and potentially perpetuating social disparities. For example, water collection points being too far away for women and girls to collect and carry water on their own; thus, requiring them to pay males in their community to assist. This is in line with Corburn and Riley (2016), who note that presently, slum upgrading interventions do not adequately consider the contexts of the people they are meant to serve. The combination of poor contextualisation and the inability of residents to exercise agency in their health narratives means that on multiple occasions, interventions fail.

Patel (33) has noted that many different initiatives have been implemented in slums that claim to take the perspectives of slum dwellers into account, but typically do so in a poor or superficial manner. Magalhães (34), showed that although Brazil followed a community-based approach to improving and upgrading slums, there were varying levels of community participation and subsequently, mixed results. Likewise, in South Africa, Lizarralde and Massyn (35) highlighted the damaging effects of poorly implemented community participation in low-cost housing projects - that gained the perspectives of some communities, while excluding others, leading to fractured relations between settlements. Due to the nature of some community participation strategies, as categorised by Arnstein (15), urban authorities or countries at the macro level may continue using methods of weak community participation that in turn promote interventions that are not fit-for-purpose and/or may be more damaging than beneficial.

As slum population numbers increase, slums will become more complex and challenging to manage (5). Delayed responses have already, and will continue to have, the dual effect of creating distrust between slum residents and the stakeholders that generally attempt to help with upgrading efforts, i.e., governments and NGOs. Immediate community-led responses to the needs of slum dwellers are, therefore, crucial for their improved outcomes (23, 33).

Considering the trends towards urbanisation and the move of larger populations to informal settlements and inappropriate interventions, as described above, it is important to review the appropriateness of previous strategies used in addressing the complex challenges of slum improvement in terms of improving the environment and well-being of slum residents. Understanding the strategies and practice of community participation is particularly important, given its potential, as already described, to support sustained and effective slum health improvement. There is then value in a systematic review of the, still limited, literature on community participation as used in slum health and upgrading.

More specifically, this review aims to explore what strategies of community participation have been employed to address the health issues of individuals living in slums and what influences the depth of involvement enabled by these strategies. The review is intended to shed light on how to strengthen strategies for community participation and, ultimately, to inform decision- and policymakers.

Review question

What depth of community participation is seen in slum health improvement interventions and what enables or constrains participation?

Objectives of Review

1. To collate and synthesise current literature related to community participation and Slum Health, considering the depth of participation sought and achieved within interventions/strategies.

2. To provide insight into the enablers and constrainers to community participation in slum settings so as to inform policymakers and practitioners on factors to consider when implementing participatory slum improvement efforts.

Methodology

A systematic review is a type of research study that summarises and analyses the results of available research related to a particular question (36). It aims to identify all primary research, form a standardised appraisal of study quality to measure them against and systematically synthesise those that meet a set standard. It is separated from other review types through its level of rigour. Unlike a traditional review, a systematic review has clearly stated and reproducible methods (37). Moreover, it has the advantage of revealing similarities between contexts and situations through presenting patterns in data. Ultimately, a systematic review ought to highlight the gaps in research to be investigated (37, 38).

Systematic reviews make for versatile study design. They can be quantitative, qualitative or mixed-methods in nature (39). Quantitative systematic reviews examine primary studies whose research methodology aim at addressing particular questions and phenomena in their frequencies and distribution- numerically. A qualitative systematic review examines primary studies whose research methodology seeks to provide detailed descriptions of perspectives and processes (40). A Mixed-methods systematic review uses both quantitative and qualitative methods (41).

A qualitative systematic review shall be used for this study as the goal of the study is to gain an understanding of people's experiences and perceptions as opposed to gain an understanding of how effective an intervention was-as is generally the case when using the more traditional quantitative systematic review (39). This form of study design can allow for assessment of community participation while still maintaining the level of rigour that makes systematic reviews rigorous research. It has the added benefit of being able to translate people's lived experiences and perspectives into a format that is well regarded by policymakers (42).

Khan, Kunz, Kleijnen and Antes (43, p. 118) note that there are five steps to conducting a systematic review (see Figure 2), namely:

1. *Framing questions for a review,*
2. *Identifying relevant work,*

3. *Assessing the quality of studies,*
4. *Summarizing the evidence, and*
5. *Interpreting the findings*.

Briefly, *framing questions for a review is* the process of clearly stating what the study to be conducted is aiming to explore in an unambiguous format (37). *Identifying relevant work* involves the search for articles that will help answer the research question; these are then collected in relation to a set inclusion and exclusion criteria, guided by a clear description of what constitutes evidence and how it will be extracted and summarised. *Assessing the quality of studies* involves an appraisal of all the studies that have met the inclusion criteria in order to gauge how closely a selected study has adhered to the principles, in this case, of good qualitative research – showing appropriate sampling, data collection, data analysis and a recognition of the various ethical considerations throughout the study. Appraisal tools have been developed and are recommended to better allow for concise and critical examination of published articles; ensuring that a higher degree of rigour in the review is sought (39, 44, 45). After that, the final stage, *interpreting the findings*, is performed by collating findings across all selected articles and forming interpretations related to the research question posed. A data synthesis process shall be used (39, 46). This involves bringing interpretations together into a cohesive statement that offers new insight into a particular phenomenon (39).

A wide range of methods for the synthesis of qualitative research exist (47). Examples of these are thematic synthesis and narrative synthesis; with both considered viable options when conducting qualitative systematic reviews (48, 49).

Figure 2: Steps to developing a systematic review. Adapted from (Gough, Oliver and Thomas, 2017)

Narrative synthesis is a way of portraying research and insights gained as stories. It uses words and text to summarise and explain the findings from data collected (50). It is generally used in qualitative research to give voice to what is found. This is achieved through selecting articles providing descriptions of selected studies and grouping said studies based on the research question explored and factors such as the study quality in order to form interpretations from the data collected (51). This form of synthesis has the added benefit of strengthening the chances that studies may be translated in policy and practice; appealing more to people's natural inclination

towards storytelling compared to other forms of synthesis. A significant weakness cited for the narrative synthesis method is that there is currently no universally accepted approach, notwithstanding the availability of texts which offer guidance. Whereas the narrative synthesis approach apparently lacks transparency, this may be averted through providing and following a very thorough description of all the synthesis phases, making them as reproducible as possible (50, 51). Such an approach is achieved through thematic synthesis, as will be applied in this study. A thematic synthesis shares many similarities to narrative synthesis. However, one of the fundamental differences is that where a narrative synthesis aims to give a story to findings, a thematic synthesis allows for inferences to be made through grouping findings in relation to various themes discovered, summarizing findings under various headings. Furthermore, thematic synthesis allows reviewers to unearth particular topics specific to their research question in a manner that allows for new hypotheses to be generated, while a narrative analysis is more descriptive (42, 47, 51). In addition, if relevant, thematic synthesis has the added benefit of being able to integrate qualitative and quantitative data. It can be shaped by a search for specific themes in literature (theory-driven) or may be driven by the themes found within the literature (data-driven) (51). This systematic review will combine a data-driven and theory-driven approach.

As part of this study's audit trail, the dates on which databases were accessed will be recorded as well as the hits and the search terms used so as to strengthen the reproducibility of the study as well as act as a guiding point for any researchers that may wish to update this systematic review. Furthermore, a list of references shall be compiled at each phase of screening to ensure that no duplicates of articles are listed- with the said list being created in an excel spreadsheet. A referencing manager (Endnote 20 to be specific) will be used to create a duplicate database with copies being kept on a password protected cloud drive and a copy provided to the researcher's supervisor.

Literature Search Strategy

To ensure that published work is identified and appropriately integrated into this systematic review exploring community participation in relation to slum health, a literature search must be conducted. A literature search is a process of systematically searching a range of literary types and sources on a particular subject. This search is and will be conducted through the use of databases specific to (public) health as well as those tailored more to other fields, such as developmental studies or psychology. This is due to the fact that using only one database is said to yield a third of articles on a particular subject matter (52). Bown and Sutton (52) recommend Medline, Embase and the Cochrane library for health research. After searching with a University of Cape Town (UCT) librarian, the following health-focused and interdisciplinary databases were identified to yield useful articles:

Academic Search Premier, Africa-Wide Information, Business Source Premier, CINAHL, EconLit, Health Source: Nursing/Academic Edition, APA PsycINFO, SocINDEX, Scopus and Web of Science. Further databases will be explored as new keywords or variations of them are found.

As community participation is a concept that has been explored through many disciplinary lenses and may, therefore, mean or be applied differently depending on the disciplinary context, the use of different databases will also help in finding the most relevant studies per database. Furthermore, searches on slum health, and in combination with community participation will be done to ensure that an exhaustive number of articles are gathered. Other phrases and keywords searched shall be derived from the research question (53). Preliminary searches shall be performed with the aid of Boolean operators. According to Cronin, Ryan and Coughlan (54), Boolean operators are words used as conjunctions to include keywords in a search. The conjunctions to be used will be "AND" and "OR". "AND" allows for the result return of articles with a combination of keywords, e.g., "Community" and "Slum Health". "OR" allows for the result return of articles with one of the provided keywords returned. The keywords to be used include but will not be limited to "Slum Health", "Community Participation", "Slum", "participation", "upgrade", "inequity", "Informal settlements" and "Slum upgrading". Synonyms to these words shall be explored to ensure as comprehensive a search as possible. Searches shall be kept to low- and middle-income countries (LMICs), as those in which slum health is most critical given their overall income levels; with the Cochrane LMIC search term lists being used. Qualitative, quantitative, or mixed methods empirical research shall be included.

The aid of a librarian well versed in search strategies is crucial to ensure the quality of the literature search. After consultation with a librarian, a wide range of databases to ensure a good range of articles will be sought. Guidance on what search terms to use shall also be gained through the information garnered from the literature review, discussions with the University of Cape Town's Health Sciences Library staff and Professor Lucy Gilson of the University of Cape Town's School of Public Health and Family Medicine.

Inclusion and Exclusion criteria

Upon collection of database results, the titles and abstracts shall be screened in relation to inclusion and exclusion criteria. These criteria provide guidance as to what research parameters and populations will be drawn from (55). Where an inclusion criterion highlights the features necessary for one to answer the research question, the exclusion criteria acts as a mechanism to rule out any characteristics that may misrepresent or weaken the study's findings (39).

As a result, in doing a systematic review, the inclusion/exclusion criteria may affect the articles selected and depending on the rigidity of the defined criteria, may not yield enough results to form substantial inferences. Likewise, an inclusion criterion not defined well may lead to an unmanageable amount of data that cannot be used to form any conclusions.

Taking the above into consideration, this systematic review will include articles on the basis that they are:

- original articles in peer-reviewed journal articles with titles and abstracts mentioning any of the keywords found during the search process
- primary research studies.
- use either qualitative or mixed-methods approaches
- studies done in LMICs
- studies published since the year 2000 (as the year community participation started becoming more prominent within Slum health initiatives)
- studies published in English due to the researcher's difficulties in translating from other languages to English.

Articles will be excluded based on the following:

- Studies that use secondary data
- Quantitative studies
- Research focused on clinical efficacy
- Research focused on the effectiveness of treatment
- Studies not related to Slum Health and community participation
- Studies published before the year 2000
- Articles or citations that do not have abstracts available
- Studies in any language other than English
- Studies in HICs (High-income countries)
- Grey literature
- Articles that are unavailable in full-text via the University of Cape Town's subscribed databases

Article selection

Initially, articles will be selected by the study researcher based on the inclusion criteria; with the researcher's supervisor offering guidance throughout the process. Articles included shall be made part of the overall study, while excluded articles shall be placed on a separate list.

Using the referencing manager, Endnote, duplicates will be identified and removed from the list of articles to be screened. From there, the first stage of screening shall begin. This will involve reviewing the titles and abstracts of journal articles to ensure their relevance to the study. Thereafter, a full-text screening will be done. This is where an article is read in its entirety to see if it is appropriate for answering the study question. The articles that pass this stage of the screening shall be read, tabulated and a detailed breakdown sent to the research supervisor who shall be asked to critique the process and provide insight into the appropriateness of the articles selected. Upon reaching consensus with the study supervisor on the suitability of the studies selected, the articles shall be added to the final study database, i.e., a developed database in EndNote.

Article appraisal

As Qualitative research has become increasingly used in the development of systematic reviews, so too has the call for quality appraisal tools (56).To facilitate effective appraisal of any studies included in the review, tools such as the Critical Appraisal Skills Programme (CASP) checklist are typically suggested to ensure articles of a certain quality are selected (57). However, Pawson (58) suggests that articles that may not meet a quality standard may still be helpful for synthesis as certain parts of an article may still offer valuable insights. Further noting that this study will draw from research across multiple disciplines, thus drawing from a diverse range of publications and disciplinary research practices, adhering to a set criteria may prove too difficult or lead to the dismissal of pertinent information (59).

This review will then seek to draw on all papers identified as relevant to the review question. Guidance on decisions made shall be sought from Professor Lucy Gilson during the study process.

Data extraction

Data extraction is the process of drawing out raw data relevant to the research question being explored; allowing for subsequent analysis and interpretations (60). For this study, peer-reviewed journal articles that meet the inclusion/exclusion criteria will be read with relevant data extracted and recorded into a data extraction table. The data extraction table shall consist of:

- *Article Name*
- *Author*
- *Date of publication*

- *Data extraction date*
- *Type of study*
- *Discipline of study*
- *Country situated*
- *Target of improvement intervention Type(s) of community participation strategy used*
- *Outcome(s)*
- *Depth of community participation in intervention* (categorised according to Arnstein's ladder)
- *Facilitators to community participation*
- *Constrainers to community participation noted*

By including the above-mentioned fields, the researcher shall be able to, using a thematic analysis, find out what community participation strategies are used in addressing slum health, each intervention's depth of participation, based on Arnstein's ladder of citizen participation, and the enablers and constrainers to community participation within each study. Since this research shall be conducted by a single researcher, the study supervisor shall be asked to overview each phase of extraction and will be provided with the data extraction table throughout this stage to ensure that consistency is seen, and appropriate extraction performed.

This extraction approach will, finally, also create a 'paper trail' through which to strengthen the studies rigour by showing what was done by the study researcher.

Data analysis and synthesis

A thematic analysis shall be used throughout the study; specifically, an inductive thematic analysis, in which themes are developed from the data extracted (61). Considering rich descriptions of the themes found, the underlying principles behind a particular slum improvement strategy shall be identified, and further interpretations made.

Phase 1: Line by line text coding

A detailed reading of articles, the study findings and the discussion sections shall be performed. Points related to the research question will be noted. Notes shall be made on the strategies used as well as what enabled or constrained community participation in each study.

Phase 2: Developing descriptive themes

From the coding performed, descriptive themes will be formed. Descriptive themes are patterns in data that are intricately linked to the research question. In the case of a systematic review, the themes will be generated from the primary research data presented in the papers (46). At this stage, the themes of each study will be fleshed out; without explicitly trying to answer the research

question. This phase will involve forming themes for different participation strategies (e.g., town hall-style discussions), and considering enablers and constrainers.

Phase 3: Forming analytical themes

From the descriptive themes, analytical themes will be created. Analytical themes are patterns in data found in relation to a framework, principles or a theory that guides research inferences (46). In this step, the findings of each study will be assessed in relation to Arnstein's Ladder (Figure 1) in order to understand the perceived depth seen in each study and what barriers and facilitators led to them.

Rigour

Rigour refers to the quality of the process used in conducting any research, from methodology through to data analysis and result presentation. The more rigorous the research process, the more trustworthy the study findings will be considered (62). Several measures will be taken to ensure rigour in this study. Transparency in research is how well and clearly stated the used methodology is. To achieve a high level of transparency, a clear description of the steps taken (also known as an audit trail) throughout the research process shall be provided in all parts of this study (63). Included in this audit trail shall be, but not limited to, clearly defined research aims, objectives and a justification of the methodology used. As noted by Mays et al. (48), this is crucial in ensuring high study reliability. Reliability refers to the consistency of findings and conclusions. Said reliability of the synthesised research shall be strengthened by critically analysing the raw data gained and providing the list of articles used in the systematic review to allow any other researchers the opportunity to replicate the study (63). The validity of any findings noted shall be linked to the data collected; with enough information provided to any potential reader for them to critique any findings and interpretations.

In reflecting on research proceedings, it is essential to note that the researcher can influence all aspects of the research; but mainly while conducting the synthesis (63). Reflexivity shall, therefore, be achieved and maintained through the researcher improving their research skills through consultations with their supervisor and librarians well-versed in research practices. Cognisance shall be placed on the biases that may affect interpretations, the selection of articles, and whether said articles may be affected by publication bias (63).

Ethical Consideration

A Literature review and systematic review strategy shall be used in conducting this study. As a result, peer-reviewed journal articles that are within the public domain shall be used. This can be categorised as a low or no-risk study; research that has a low to no chance of physical or psychological harm to someone that is no greater than what may be experienced in their daily lives. This is because no human (or animal) participants shall be required. Consequently, no ethical approval is required from the University of Cape Town's Human Research Ethics Committee (HREC). In noting the above, it must be mentioned that there is the potential for the results of this study to have unintended consequences (both negative and positive) for communities and various other health system stakeholders through how the drawn results and conclusions are used; a fact that the study researcher shall recognise.

Dissemination of Findings

Upon completion of the study, results will be disseminated in both a thesis format as well as a manuscript, in accordance with the requirements for the Master of Public Health degree at the University of Cape Town. This will be made available through the University of Cape Town library as well as through the website, OpenUCT. Through this research, the study author aims to help inform policy development and practice; both within and beyond health. As a result, the intended target audience is, but not limited to, policymakers, community development practitioners, health systems practitioners as well as urban and slum health specialists. Urban Health themed conferences shall be targeted for the presentation of the study results. The peer-reviewed journal *Frontiers in Public Health* shall also be contacted with the hope of having the research findings published.

Timeline

Thesis Section	**Activity**	**Completion Date**
Part A: Thesis Proposal	Topic formulation and finalisation	28th of February 2019
	Draft Proposal	June 2020
	Proposal Edits (receiving and working on comments)	July 2020

Part B: Literature Review	Researching and formatting	June 2020
	Draft	August 2020
	Editing (receiving and working on comments)	September 2020
Part C: Systematic Review	Research and draft	August 2020
	Article Edits[1]	June 2022-November 2022
Submission	Intention to submit	December 2022
	Submit	January 2023

Budget

This research is partially supported by a *University of Cape Town Research Masters Scholarship*. The principal investigator declares that they have no conflict of interest. The table below provides the estimated expenses:

Category	Item	Cost	Total Per Category
Stationary			R110.00
	Pens	R50.00	
	Workbooks	R60.00	
Printing			R600.00

[1] Study impacted between 2020-21 due to COVID-19

	Printing and binding of dissertation (x2)	R600.00	
Contingency (%10)		R77.00	R77.00
Total estimated cost			R787.00

Reference list

1. Gong P, Liang S, Carlton EJ, Jiang Q, Wu J, Wang L, et al. Urbanisation and Health in China. *The Lancet* (2012) 379(9818):843-52.
2. Ezeh A, Oyebode O, Satterthwaite D, Chen Y-F, Ndugwa R, Sartori J, et al. The History, Geography, and Sociology of Slums and the Health Problems of People Who Live in Slums. *The lancet* (2017) 389(10068):547-58.
3. Ritchie H, Roser M. Urbanization. *Our World in Data* (2018).
4. UN-Habitat. The Challenge of Slums: Global Report on Human Settlements 2003. *Management of Environmental Quality: An International Journal* (2004) 15(3):337-8.
5. Lilford RJ, Oyebode O, Satterthwaite D, Melendez-Torres G, Chen Y-F, Mberu B, et al. Improving the Health and Welfare of People Who Live in Slums. *The lancet* (2017) 389(10068):559-70.
6. Unger A, Riley LW. Slum Health: From Understanding to Action. *PLoS Medicine* (2007) 4(10):e295.
7. Corburn J, Riley L. *Slum Health: From the Cell to the Street*: Univ of California Press (2016).
8. Olukotun GA. Achieving Project Sustainability through Community Participation. *Journal of Social Sciences* (2008) 17(1):21-9.
9. Imparato I, Ruster J. *Slum Upgrading and Participation: Lessons from Latin America*: The World Bank (2003).
10. Preston R, Waugh H, Larkins S, Taylor J. Community Participation in Rural Primary Health Care: Intervention or Approach? *Aust J Prim Health* (2010) 16(1):4-16.
11. Rifkin SB, Kangere M. What Is Participation. *Community-based rehabilitation (CBR) as a participatory strategy in Africa* (2002):37-49.
12. Bamberger M. The Importance of Community Participation. *Public Administration and Development* (1991) 11(3):281-4.
13. Zakus JDL, Lysack CL. Revisiting Community Participation. *Health policy and planning* (1998) 13(1):1-12.
14. George AS, Mehra V, Scott K, Sriram V. Community Participation in Health Systems Research: A Systematic Review Assessing the State of Research, the Nature of Interventions Involved and the Features of Engagement with Communities. *PLoS One* (2015) 10(10):25. doi: 10.1371/journal.pone.0141091.
15. Arnstein SR. A Ladder of Citizen Participation. *Journal of the American Institute of planners* (1969) 35(4):216-24.
16. Choguill MBG. A Ladder of Community Participation for Underdeveloped Countries. *Habitat international* (1996) 20(3):431-44.
17. Marcil L, Afsana K, Perry HB. First Steps in Initiating an Effective Maternal, Neonatal, and Child Health Program in Urban Slums: The Brac Manoshi Project's Experience with Community Engagement, Social Mapping, and Census Taking in Bangladesh. *Journal of Urban Health* (2016) 93(1):6-18.
18. Gilson L. Trust and the Development of Health Care as a Social Institution. *Social science & medicine* (2003) 56(7):1453-68.
19. Marston C, Hinton R, Kean S, Baral S, Ahuja A, Costello A, et al. Community Participation for Transformative Action on Women's, Children's and Adolescents' Health. *Bulletin of the World Health Organization* (2016) 94(5):376.
20. Gill Z, Bailey PE. Bottom up and Top Down: A Comprehensive Approach to Improve Care and Strengthen the Health System. *health* (2010) 7:9.
21. Panda B. Top Down or Bottom Up? A Study of Grassroots Ngos' Approach. *Journal of Health Management* (2007) 9(2):257-73.

22. Chirenje LI, Giliba RA, Musamba EB. Local Communities' Participation in Decision-Making Processes through Planning and Budgeting in African Countries. *Chinese Journal of Population Resources and Environment* (2013) 11(1):10-6.
23. Williams JJ. Community Participation: Lessons from Post-Apartheid South Africa. *Policy studies* (2006) 27(3):197-217.
24. World Health Organization. *Primary Health Care: Report of the International Conference on Primary Health Care, Alma-Ata, Ussr, 6-12 September 1978*: World Health Organization (1978).
25. Bath J, Wakerman J. Impact of Community Participation in Primary Health Care: What Is the Evidence? *Australian Journal of Primary Health* (2015) 21(1):2-8.
26. Preston R, Waugh H, Taylor J, Larkins S, editors. The Benefits of Community Participation in Rural Health Service Development: Where Is the Evidence? 2009: National Rural Health Conference Proceedings.
27. McCoy DC, Hall JA, Ridge M. A Systematic Review of the Literature for Evidence on Health Facility Committees in Low-and Middle-Income Countries. *Health Policy Plan* (2012) 27(6):449-66.
28. World Health Organization. Community Involvement in Tuberculosis Care and Prevention: Towards Partnerships for Health: Guiding Principles and Recommendations Based on a Who Review. World Health Organization,, (2008) 9241596406.
29. Rifkin SB. Lessons from Community Participation in Health Programmes: A Review of the Post Alma-Ata Experience. *Int Health* (2009) 1(1):31-6.
30. Habib E. The Role of Government and Ngos in Slum Development: The Case of Dhaka City. *Development in Practice* (2009) 19(2):259-65.
31. Corburn J, Sverdlik A. Slum Upgrading and Health Equity. *International journal of environmental research and public health* (2017) 14(4):342.
32. Turley R, Saith R, Bhan N, Rehfuess E, Carter B. Slum Upgrading Strategies and Their Effects on Health and Socio-Economic Outcomes a Systematic Review August 2013. (2013).
33. Patel K. A Successful Slum Upgrade in Durban: A Case of Formal Change and Informal Continuity. *Habitat Int* (2013) 40:211-7.
34. Magalhães F. *Slum Upgrading: Lessons Learned from Brazil*: Inter-American Development Bank (2012).
35. Lizarralde G, Massyn M. Unexpected Negative Outcomes of Community Participation in Low-Cost Housing Projects in South Africa. *Habitat Int* (2008) 32(1):1-14.
36. Boland A, Cherry G, Dickson R. *Doing a Systematic Review: A Student's Guide*: Sage (2017).
37. Gough D, Oliver S, Thomas J. *An Introduction to Systematic Reviews*: Sage (2017).
38. Knoll T, Omar MI, Maclennan S, Hernandez V, Canfield S, Yuan Y, et al. Key Steps in Conducting Systematic Reviews for Underpinning Clinical Practice Guidelines: Methodology of the European Association of Urology. *European urology* (2018) 73(2):290-300.
39. Butler A, Hall H, Copnell B. A Guide to Writing a Qualitative Systematic Review Protocol to Enhance Evidence-Based Practice in Nursing and Health Care. *Worldviews on Evidence-Based Nursing* (2016) 13(3):241-9.
40. Flick U. *Introducing Research Methodology: A Beginner's Guide to Doing a Research Project*: Sage (2015).
41. Gough D. *Qualitative and Mixed Methods in Systematic Reviews*. Springer (2015).
42. Pope C, Mays N, Popay J, editors. How Can We Synthesize Qualitative and Quantitative Evidence for Healthcare Policy-Makers and Managers? *Healthcare Management Forum*; 2006: SAGE Publications Sage CA: Los Angeles, CA.
43. Khan KS, Kunz R, Kleijnen J, Antes G. Five Steps to Conducting a Systematic Review. *Journal of the royal society of medicine* (2003) 96(3):118-21.
44. Katrak P, Bialocerkowski AE, Massy-Westropp N, Kumar VS, Grimmer KA. A Systematic Review of the Content of Critical Appraisal Tools. *BMC medical research methodology* (2004) 4(1):22.
45. Kuper A, Lingard L, Levinson W. Critically Appraising Qualitative Research. *Bmj* (2008) 337:a1035.

46. Thomas J, Harden A. Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews. *BMC medical research methodology* (2008) 8(1):45.
47. Dixon-Woods M, Bonas S, Booth A, Jones DR, Miller T, Sutton AJ, et al. How Can Systematic Reviews Incorporate Qualitative Research? A Critical Perspective. *Qualitative research* (2006) 6(1):27-44.
48. Mays N, Pope C, Popay J. Systematically Reviewing Qualitative and Quantitative Evidence to Inform Management and Policy-Making in the Health Field. *Journal of health services research & policy* (2005) 10(1_suppl):6-20.
49. Bearman M, Dawson P. Qualitative Synthesis and Systematic Review in Health Professions Education. *Medical education* (2013) 47(3):252-60.
50. Popay J, Roberts H, Sowden A, Petticrew M, Arai L, Rodgers M, et al. Guidance on the Conduct of Narrative Synthesis in Systematic Reviews. *A product from the ESRC methods programme Version* (2006) 1:b92.
51. Dixon-Woods M, Agarwal S, Jones D, Young B, Sutton A. Synthesising Qualitative and Quantitative Evidence: A Review of Possible Methods. *Journal of health services research & policy* (2005) 10(1):45-53.
52. Bown M, Sutton A. Quality Control in Systematic Reviews and Meta-Analyses. *European Journal of Vascular and Endovascular Surgery* (2010) 40(5):669-77.
53. Akobeng AK. Principles of Evidence Based Medicine. *Archives of disease in childhood* (2005) 90(8):837-40.
54. Cronin P, Ryan F, Coughlan M. Undertaking a Literature Review: A Step-by-Step Approach. *British journal of nursing* (2008) 17(1):38-43.
55. Patino CM, Ferreira JC. Inclusion and Exclusion Criteria in Research Studies: Definitions and Why They Matter. *Jornal Brasileiro de Pneumologia* (2018) 44:84-.
56. Carroll C, Booth A. Quality Assessment of Qualitative Evidence for Systematic Review and Synthesis: Is It Meaningful, and If So, How Should It Be Performed? *Research synthesis methods* (2015) 6(2):149-54.
57. Voss PH, Rehfuess EA. Quality Appraisal in Systematic Reviews of Public Health Interventions: An Empirical Study on the Impact of Choice of Tool on Meta-Analysis. *J Epidemiol Community Health* (2013) 67(1):98-104.
58. Pawson R. Digging for Nuggets: How 'Bad'research Can Yield 'Good'evidence. *International Journal of Social Research Methodology* (2006) 9(2):127-42.
59. Gilson L. Qualitative Research Synthesis for Health Policy Analysis: What Does It Entail and What Does It Offer? *Health policy and planning* (2014) 29(suppl_3):iii1-iii5.
60. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gøtzsche PC, Ioannidis JP, et al. The Prisma Statement for Reporting Systematic Reviews and Meta-Analyses of Studies That Evaluate Health Care Interventions: Explanation and Elaboration. *Journal of clinical epidemiology* (2009) 62(10):e1-e34.
61. Aronson J. A Pragmatic View of Thematic Analysis. *The qualitative report* (1995) 2(1):1-3.
62. Given LM. *The Sage Encyclopedia of Qualitative Research Methods*: Sage publications (2008).
63. Green J, Thorogood N. *Qualitative Methods for Health Research*: Sage (2009).

PART B: JOURNAL ARTICLE MANUSCRIPT

Community participation strategies to improve health in slum settings: A qualitative systematic review

Philip M Dambisya[1]

Targeted Journal: Frontiers in Public Health[2]

Abstract

With more than a billion people living in slum settings, the need to better health in slums is ever-growing. Community participation (CP) is continually gaining prominence as integral when addressing the complex challenges of those living in slums. Specific to health interventions in slums, an understanding of "what truly works" and what forms or approaches to CP support such efforts is under-researched. To understand the current knowledge base, this qualitative systematic review addressed the questions: What depth of community participation is seen in slum health improvement interventions, and what enables or constrains the deeper levels of participation? Articles were sought across ten databases: Academic Search Premier, Africa-Wide Information, APA PsycInfo, Business Source Premier, CINAHL, EconLit, Health Source: Nursing/Academic Edition, Scopus, SocINDEX with Full Text, and Web of Science. From the 653 unique studies identified, and subsequent citation tracking, reference list evaluation and snowballing further papers, nine articles published between 2000 and 2020 were included for review. Six of the studies were situated in the African region (three in South Africa, two in Kenya and one in Zimbabwe), two in South-East Asia (India) and one in South America (Brazil). Through a thematic analysis of the included papers, key themes of experiences were identified. The 'depth' of participation of each reported slum health intervention was then assessed using Arnstein's ladder of citizen participation. In addition, the review identified what community participatory strategies were used within interventions in slum health contexts in low- and middle-income countries and analysed what factors enable or constrain CP. Six studies revealed that the interventions examined exhibited 'pseudo' forms of participation, with three presenting 'true' forms of participation. Findings revealed a mix of strategies within each intervention, with the number of CP strategies not appearing to affect the depth of participation in an intervention. Instead, the way in which a strategy was implemented appeared important – for example, establishing committees that represent the views of their constituents versus their own interests impacts on participation depth. In addition, integrating communities into planning and decision-making while engaging the broader social networks within communities in slums may lead to the improved buy-in of interventions. There is a need for an expansion of research in the field of slum health as well as ensuring that ways of assessing CP are included in evaluations of projects speaking to using CP as an underpinning concept of their actions.

Keywords: Slums, Slum Health, Community Participation, LMIC, Urban Health

[1] For dissertation purposes, the student appears as the sole author of this journal article.
[2] Author guidelines are presented in Appendix B

Introduction

Globally, approximately 900 million people, as of 2015, lived in slums (1). Described by the United Nations Educational, Scientific and Cultural Organization (UNESCO), as "a contiguous settlement where the inhabitants are characterised as having inadequate housing and basic services" (2), slums are a collection of households in which people are living under the same roof and lack one or more of the following: "access to improved water, access to improved sanitation, sufficient living space, the durability of housing and secure tenure" (2). Also known as informal settlements, favelas and shantytowns among other names, the characteristics of slum settings typically negatively impact social determinants of health (1, 3). For example, slum environments and water may be contaminated with faecal matter and miscellaneous garbage due to a lack of access to toilets and city refuse services (1, 4). The realisation that health in slums cannot be realised through traditional means makes it imperative to approach it through more innovative means, including through the integration of slum residents' perspectives on their contexts as well as possible interventions i.e. Community participation (4, 5).

Executed through a wide range of strategies, community participation is generally viewed as the involvement of community members not only in the evaluation of their needs but also in strategizing and overall decision-making around those needs (6, 7). Participation is widely considered vital to improving health outcomes and the sustainability of health and development activities, due to the sense of responsibility, ownership and empowerment created when community members have greater autonomy in decision-making around how the factors that affect their lives are addressed (6, 8, 9).

Within the health sector, community participation has long been considered imperative for a well-performing Health System and is a foundational principle of comprehensive Primary Health Care (10). Empirical evidence in rural and urban settings, both in Low- and Middle- Income Countries (LMICs) and High-Income Countries (HICs), also shows that community participation results in better health outcomes (6, 11, 12). Community participation and how it is realised is further viewed as a necessity for developing healthy cities (13).

Lilford, Oyebode (3) posit, moreover, that slums can be improved through neighbourhood effects. This concept proposes that neighbourhoods affect one’s behaviour (both directly and indirectly), e.g., should members of a community demonstrate positive health-seeking behaviour, their neighbours will be more likely to follow suit and attempt to access health services when needed. Thus, approaches that maximize these neighbourhood effects require particular attention (1, 3).

To gain a further understanding of how community participation is actualised in informal settlement settings, this qualitative systematic review seeks to provide answers to the questions: What depth of community participation is seen in slum health improvement interventions, and what enables or constrains the deeper levels of participation?

This review aims to

1. Collate and synthesise current literature related to community participation and Slum Health, considering the depth of participation sought and achieved within interventions and the strategies that were used to achieve said depth of participation.

2. To provide insight into the enablers and constrainers to community participation in slum settings so as to inform policymakers and practitioners on factors to consider when implementing participatory health-related slum improvement efforts.

Methodology

This study utilised a qualitative systematic review methodology. Such a review examines primary studies whose research methodology seeks to provide detailed descriptions of perspectives and processes (14). This review approach was deemed appropriate for the study as its goal is to gain an understanding of people's experiences and perceptions, rather than considering how effective an intervention was - as is generally the case when using more traditional quantitative systematic review methods (15). A qualitative systematic review allows for consideration of community participation experiences while still maintaining the level of rigour that makes systematic reviews rigorous research. It also has the added benefit of being able to translate people's lived experiences and perspectives into a format that is well regarded by policymakers (16).

The review followed the five steps of conducting a systemic review outlined by Khan, Kunz, Kleijnen and Antes (17, p. 118) i.e.

1. *Framing questions for a review,*
2. *Identifying relevant work,*
3. *Assessing the quality of studies,*
4. *Summarizing the evidence, and*
5. *Interpreting the findings*.

Literature search

Literature searches were initially conducted between October and November 2020 with an update, using the same search approach, in June 2021 to ensure inclusion of all relevant articles. The

following ten electronic databases were searched: Academic Search Premier, Africa-Wide Information, APA PsycInfo, Business Source Premier, CINAHL, EconLit, Health Source: Nursing/Academic Edition, Scopus, SocINDEX with Full Text, and Web of Science. The following initial keywords were used in searching the databases: “slums” or “informal settlements”, “health” and “health equity”, “community participation” or “community engagement”. Search terms were subsequently expanded to include synonyms for informal settlements and community participation.

Article Inclusion and exclusion

As the goal of this study is to provide insight into the enablers and constrainers to community participation in slum settings, to inform policymakers about community-driven approaches for Slum Health, papers not reporting empirical research were excluded. 2000 was selected as the starting point for the article search as this was the year when addressing slums was made a priority of international importance through the United Nations Millennium Declaration (18). Only articles in English and available in full-text through the University of Cape Town libraries were included due to the limited resources at hand. See Table 1 for full Inclusion/Exclusion criteria.

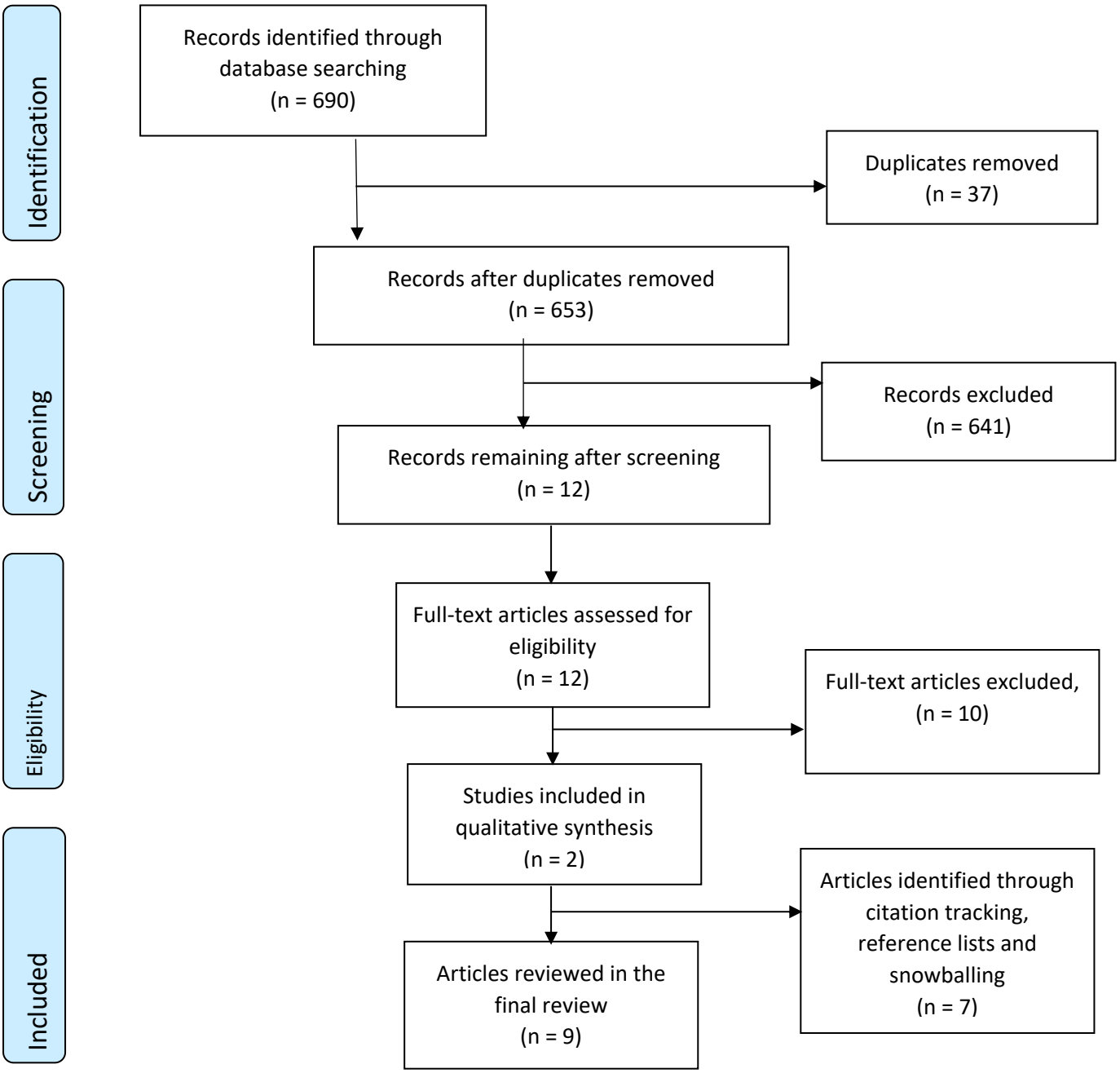
Table 1: Inclusion/Exclusion criteria

Inclusion Criteria	Exclusion Criteria
• **Original articles in peer reviewed journals**	• Studies that use secondary data
• **Publications between 2000 and June 2021**	• Studies published before the year 2000
• **Articles Published in English**	• Studies in any language other than English
• **Use either qualitative or mixed-methods approaches**	• Quantitative studies
• **Available in full-text through the University of Cape Town libraries**	• Articles that are unavailable in full-text via the University of Cape Town’s subscribed databases
• **Studies conducted in LMICs**	• Studies in HICs (High-income countries)
	• Articles or citations that do not have abstracts available
	• Research focused on clinical efficacy
	• Research focused on the effectiveness of treatment
	• Grey literature
	• Studies not related to Slum Health and community participation

Additional literature search

Given the low number (n= 2) of initially identified articles that met the inclusion criteria, the reference lists of all these articles were also checked for additional articles to include. The search for these additional articles was done in Google Scholar to allow for snowballing of further articles through its “related articles” option. In this additional search, keywords were also used with the same date of publication parameter set as the initial database search. A total of seven additional articles were found.

Figure 1: Prisma Diagram summarising the literature search process



From a search performed across 10 databases, 690 records were identified (see table 2). As seen in figure 1, a total of nine articles were identified for study inclusion. Table 3 highlights that four of the included articles were published in the journal, Habitat International; a publication focused on urban and rural human settlement. All other journals listed provided one included study each. Four of the six journals listed are grounded in the social sciences and humanities.

Table 2: Databases searched with number of publications returned

Database	**Number of publications returned**
Academic Search Premier	29
Africa-Wide Information	79
APA PsycInfo	15
Business Source Premier	3
CINAHL	10
EconLit	3
Health Source: Nursing/Academic Edition	7
Scopus	47
SocINDEX with Full Text	11
Web of Science	486
Total	**690**

Table 3: Articles included by journal

Journal	**Number of Articles**
Journal of Planning Education and Research	1
An International Journal for Research, Intervention and Care	1
Habitat International	4
Critique of Anthropology	1
Cultural Dynamics	1
Environmental Hazards	1

Quality Appraisal

As Qualitative research has become increasingly used in the development of systematic reviews, so too has the call to use quality appraisal tools (19). To facilitate effective appraisal of any studies included in the review, tools such as the Critical Appraisal Skills Programme (CASP) checklist or the Standards for Reporting Qualitative Research (SRQR) have typically been recommended (20).

However, as this is an exploratory study drawing from different disciplines that seeks to speak to 'what occurs' rather than 'what is best', the inclusion of a greater breadth of evidence is essential. Subsequently, using article quality as an exclusionary factor runs the risk of omitting articles useful to the overall study. Therefore, recognising that the study draws on multiple disciplines which apply different methodologies and use varied reporting styles, a set quality appraisal approach was avoided so as to ensure that there was no dismissal of potentially pertinent information (21).

Synthesis of selected articles

A thematic analysis approach was used in this review; specifically, one that combines a data-driven and theory-driven approach. This form of thematic analysis allowed for the initial extraction of data, with themes drawn from what was found. Following the outline set by Thomas and Harden (22), as well as Aronson (23), articles were read in their entirety, then coded line by line, after which, codes were organised into descriptive themes. Factoring in the varied reporting styles of the selected articles, data extraction was performed across all sections of the selected studies.

Subsequently, in assessing depth of participation, themes were matched against Arnstein's ladder of participation (see figure 3 below) to see if particular articulations might serve to categorise themes appropriately for this element of the synthesis. However, in identifying the strategies used to facilitate community participation and the factors enabling or constraining these strategies, themes emerged from the data extracted. These themes were, then, developed inductively, using the data presented in each article and were not informed by any prior research of a similar nature.

As noted, in assessing an intervention's depth of participation, Arnstein's ladder of citizen participation was applied (24). First introduced in 1969, this framework was originally used to gauge the depth of community participation in urban housing and planning sector projects in the United States of America. It has subsequently been used beyond its original realm; with its influence being seen within the social sciences and health systems research (25, 26). Considering its use in the two areas mentioned and also, that the research study draws on Health Systems and Development sector knowledge (which serve as the intersecting dimensions of this study), this framework appeared as the best suited framework to use in this synthesis study. Premised on a ladder segmented into three broad categories, Arnstein's ladder of citizen participation provides a list of attributes that can be used to gauge if genuine forms of community participation were used in particular efforts, or if they were forms of pseudo-participation.

Results

All included studies were qualitative studies. Six were set in Africa (27, 28, 29, 30, 31, 32), two in Asia (India: (33, 34) and one in South America (Brazil: (35). Of the African studies, two were based in Kenya (28, 30); three in South Africa (27, 29, 32); and one in Zimbabwe (31).

However, on examination of the country of institutional affiliation of the first and last author of each study, it was found that only one study, Gibbs et al. (27), was conducted by researchers based at institutions in the (upper middle income) country in which the study reported was conducted. All other researchers were based at institutions outside the studies' country of focus, as summarised in table 4. Eight of the nine studies selected were conducted in LMICs, by HIC institution affiliates.

Table 4: A comparison of where authors institution is based versus where their study is situated

Author(s) surname (First author// Last author)	Country of researcher's institution	Country study is situated in
van Horen	Australia	South Africa
Majale	England	Kenya
Cronin // Guthrie	England	India
Patel	England	South Africa
Nuijten	The Netherlands	Brazil
Muchadenyika	South Africa	Zimbabwe
Meredith // MacDonald	Canada	Kenya
Gibbs // Jewkes	South Africa	South Africa
Banerjea	United States of America	India

Seven of the selected articles described informal settlement-focused improvement efforts- those that sought to better the physical and environmental health of informal settlement residents- while two mainly carried a behavioural and community participation vehicle focus (addressing toxic perpetuations of masculinity in a bid to reduce domestic violence: (27); and exploring the role of community health volunteerism: (27, 34). Six of the settlement-focused interventions addressed 'in-situ' upgrading processes; meaning improvements were brought to the community who continued to live in the locality (36). In contrast, Cronin and Guthrie (33) reported a resettlement strategy, in which individuals were moved from their informal settlement to a new area; with the old settlement demolished (36). One study (28) was centred on three settlements in the same town, while all other studies were focused on one informal settlement per city.

The majority of reported projects focused on outcomes for communities as a whole. These outcomes included, but were not limited to, increased employment opportunities (25), access to clean water and improved housing (27, 29) and increased access to schools and places of work (27). These studies highlight both that a single project can have multiple positive outcomes, and that the efforts of a single project can be categorised along multiple stages of progressive informal settlement upgrading. Choguill, Franceys and Cotton (37) highlight three stages of progressive informal settlement upgrading: a) Primary level services aimed to addressing the basic health needs of a community; b) Intermediate level services, mostly concerned with socially and culturally accepted levels of service; and c) Ultimate level services for the convenience of the residents (36, p. 338).

In contrast, the study reported by Gibbs et al. (27), did not consider infrastructural issues. Instead, it targeted toxic behaviour in men with the end goal of affecting communities for the better. Though the intervention cannot be placed within the framing of progressive informal settlement upgrading, Gibbs et al. (27) highlight that behavioural changes can lead to social improvements.

Community participation conceptualised

Three authors clearly present different ways of viewing participation as opposed to what is expected of the community. Drawing on Cornwall (39), Muchadenyika (31) speaks to the concept of invited spaces of participation; questioning who in the community is invited to participate in initiatives pertaining to them and why, and the inclusion and exclusion of stakeholders that may come from it. In their framing, Muchadenyika (31) further expresses the possible need to engage non-state structures as opposed to their government counterparts- noting that communities can become disillusioned by the very processes, designed to integrate their insights and perspectives (40).

Patel (29) frames community participation through Choguill's ladder of community participation (38), itself based on Arnstein's ladder. As a result, Patel (29) positions community participation as a means to achieve the basic needs of people such as housing as well as a means for traditionally marginalised communities to have a say in decision-making as it pertains to them.

Though not explicitly defining community participation, Majale (28) emphasises a bottom-up approach that places an emphasis on participatory processes and decision-making, in tandem with multi-stakeholders, and decries the use of top-down measures of development, improvement and upgrading as inappropriate. This is a different approach than was shown by Nuijten (35) and Banerjea (34).

Rather than defining what CP entails, conceptually, the starting points of Nuijten (35) and Banerjea (34), speak more to the expected responsibilities of communities.

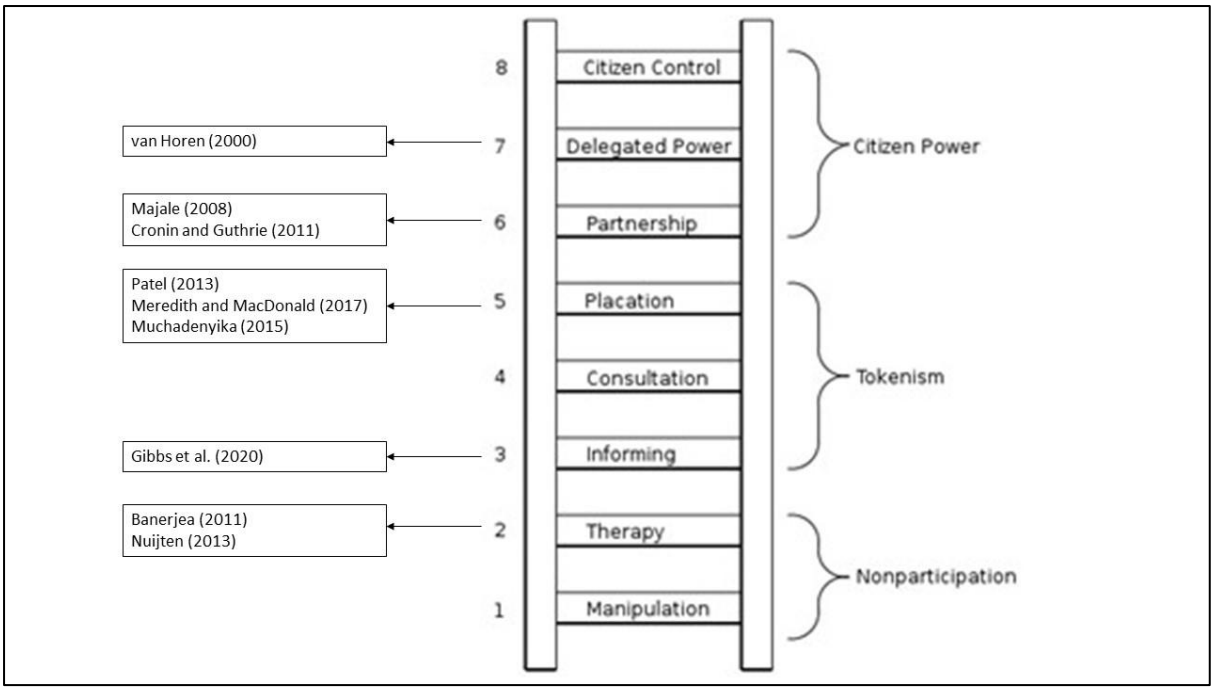
Nuijten (35) speaks of community participation through the lens of neoliberal citizenship discourse, which emphasises that the burden of action lies on informal settlement residents, who are expected to take ownership of the living dynamics that pertain to them.

Banerjea (34), meanwhile, drawing on the work of Taylor (38, p. 300), highlights that, though different per context, community participation in a real-world setting has four principles. Communities are expected to (a) develop social capital and community cohesion (b) improve service delivery, through having a greater voice in service planning and monitoring (c) meet local needs, through delivering their own services and (d) address concerns about the 'democratic deficit' through re-engaging citizens with the institutions of government.

Depth of participation in intervention

Drawing on Arnstein's ladder of citizen participation (24), Figure 3 illustrates at which rung the intervention reported in each paper falls within this framework. The three broad categories of Arnstein's ladder of citizen participation- Nonparticipation, Tokenism and Citizen Power- house eight more nuanced categories. As seen in figure 1, the bottom two rungs are Manipulation and Therapy (Part of Nonparticipation); the middle three rungs are Informing, Consultation and Placation (part of Tokenism) and the top three rungs are Partnership, Delegated Power, and Citizen Control (Citizen Power).

Figure 3: All included studies grouped per depth of participation on Arnstein's framework



Therapy is a form of nonparticipation- where no citizen power is seen. Therapy is characterised as the creation of pseudo-participatory programs that attempt to convince citizens that they are the

problem. In this form of participation, communities are involved in activities, but the overall focus of the project is on "curing" communities of their ailment as opposed to addressing the inequities that negatively affect them (24). Nuijten (35) describes a Brazilian experience in which the community were viewed by external stakeholders as the creators of their own issues and in need of rehabilitation- - with community members left constantly uninformed on decisions about their settlement upgrading and dismissed when they tried to raise matters, they felt were pertinent. Banerjea (34) notes that in the Indian experience reported community participation was sought through the use of volunteer workers; with the volunteers tasked, among other roles, with providing health status records of houses and providing appropriate health education in their neighbourhoods. Though these workers were from the community they served, there was no community influence on the kind of issues they addressed or direct empowerment as a result of their volunteering.

Informing is the lowest level of tokenism- typically characterised by provision of information to people without engagement in the planning and decision-making aspects of a project. In South Africa, Gibbs et al. (27) report that a participatory measure was put in place to rectify toxic masculine practices by youth in informal settlements. The participants and facilitators affected how the intervention was delivered but were not part of the initial planning or decision-making around the intervention or scope of the effort.

Placation is a form of tokenism- a display of counterfeit power. In placation, citizens have a degree of influence, but it is tokenistic in nature. Arnstein (24) gives the example of individuals from a community hand-picked to sit on a board, with people from outside the community making up the majority of the board and subsequently, holding all the decision-making power. Muchadenyika (31) reports an endeavour to improve housing for slum residents in Harare, Zimbabwe, led by a committee made up of four representatives from the city of Harare, two from the NGO Dialogue on Shelter and two from the Federation of the Homeless. Though these NGOs had strong rapport with the community and sought to represent their interests, community members themselves never had the opportunity to elect and exercise individual autonomy in proceedings. Patel (29) speaks of the formation of a Community Development Committee in Durban, South Africa, highlighting that three to four men sat at the core of the committee unchanged over +10-year period. Therefore, wider community engagement was stifled. Furthermore, as no monitoring process was in place, the level of influence over who benefitted from the settlement upgrading process was unclear. No opportunities to influence the initial planning were availed to the community; with community participation being enacted at a stage when a project manager and community liaison officer had already been recruited. As reported in Meredith and MacDonald (30), meanwhile, a committee, called the Settlement Executive Committee (SEC), was tasked with serving as the voice of

communities in Kibera, Nairobi, Kenya. The SEC was a structure created by Kenya's Ministry of Lands and Housing. This structure was meant to be elected democratically by informal settlement residents to represent all project beneficiaries. However, this was perceived not to be the case - focus group discussions (FGDs) with community members revealed that the SEC was selected and not elected. In addition, though highlighting that improvements were seen, views expressed in FGDs suggested that the SEC represented the government, as opposed to the Kibera community. Greater transparency regarding its constitution and the ability to have rotational seats within the SEC were suggested as remedies.

Partnership is a participation level with a genuine degree of citizen power. At this level, power is more balanced between community members and other stakeholders (traditional powerholders). Joint agreements are made on planning and decision-making responsibilities. Once rules have been set, they cannot be changed without all parties agreeing. As reported in Majale (28), galvanised by municipal backing, three communities in Kitale, Kenya set the priorities that they and the government would be working towards within a series of varied interventions, with decisions made mainly by the community members. To ensure alignment with the project vision and long-term sustainability, community members were provided with training in developing and managing the tools that would make their lives better - for example, how to effectively make the material that went into constructing a communal gender-segregated two-storey sanitation block. Cronin and Guthrie (33), meanwhile, report that despite initial government unwillingness, the community members of the Kamgar Putala informal settlement in India, in conjunction with a non-governmental organisation (Shelter Associates), planned a relocation strategy, the designs of the houses to be built, materials to be used, budgetary considerations, developing (and training in) materials for their houses as well as supervising efforts.

Delegated power is another degree of citizen power; higher than that of partnerships. Here, community members tend to hold more decision-making power about programs and projects, with their views being dominant. They also have significant power in terms of assuring accountability of projects and programmes. In Van Horen (32), a locally controlled organisational structure mandated to facilitate upgrading processes in Bester Camp, Durban, South Africa was initially established. Thereafter, development committees comprising mainly of community members were created. These committees, working in multiple small areas, regularly held public meetings with 100 to 1000 community members. Their goal was to engage around pertinent issues and brainstorm ways forward. The participation process was ultimately structured to comprise of the following six layers of interaction: Informal liaison with individuals and households; Local Subarea development

committees; The coordinated development committee; Functional committees (water, health and welfare, employment); Mass public meetings; Workshops.

Community participatory strategies utilised

Further assessment of the interventions reported focused on the strategies of community participation applied within them, as reported in the papers. Strategies can be defined as actions aimed at achieving a particular goal; typically a long-term goal (42). The selected papers yielded six unique strategies used to varying degrees across the reported interventions in facilitating community participation. These were: Volunteering & wagework, Establishing committees, Public Information meetings, Capacity building, planning labs, workshops. The summary provided in Table 5 indicates that the number of strategies applied within any one intervention did not necessarily indicate a greater depth of community participation. For example, Cronin and Guthrie (33) reported an intervention with the second deepest level of participation (partnership) of any study, which used a total of two observed strategies. Meredith and MacDonald (30) reported a greater number of strategies (four) but this intervention showed a lower depth of participation.

Table 5: Strategies seen to foster community participation, per included study

Intervention (paper- in order of participation depth, least to greatest)	Volunteering & Wagework	Establishing Committees	Public information meetings	Capacity building	Planning labs	Workshops
Nuijten (35)			X			X
Banerjea (34)	X					
Gibbs, Myrttinen (27)	X					
Muchadenyika (31)			X		X	
Meredith and MacDonald (30)		X	X	X		X
Patel (29)		X	X			
Cronin and Guthrie (33)			X			X
Majale (28)		X	X	X		
Van Horen (32)		X	X			X

Each strategy is elaborated on below, using examples from the included studies.

Public information meetings

Seven studies reported utilising public information sessions- a means to engage communities on the progression of initiatives and at times, requesting feedback from communities and other stakeholders.

In Nuijten (31), it is initially stated that information sessions, referred to as the public neighbourhood assembly, were regularly held with members of the community, to ask for their views and opinions on matters pertaining to the course of the project. However, later in the paper, it is clarified that this was considered deceptive. Members of the community reported not knowing what they were voting for at times, receiving poor feedback regarding issues raised and being given little flexibility in adapting the overall project. In contrast, Cronin and Guthrie (33) report that an organization called Shelter Associates held frequent meetings with community members and external stakeholders to ensure that the vision communities had of their new accommodation was met; with any issues and changes being raised as soon as possible. In the Nuijten (35) example, Public Information meetings led to a reported weakening of community participation, while in Cronin and Guthrie (33) such meetings strengthened community participation.

Establishing committees

More widely noted as the most popular mechanism for community accountability (43), establishing committees appeared in four studies in this review. In Van Horen (32), three different committees were formed at different levels of the project cycle to ensure that community participation was upheld and community members kept in the loop on project proceedings. In Patel (29), a committee known as the Community Development Committee held multiple decision-making roles and was seen to enable the project's success. However, whilst adopting what may be called a benevolent role, it demonstrated non-participatory levels of community participation. These were shown in a lack of transparency in its election and conduct as well as poor creation of channels for dialogue with the community; ultimately dampening the involvement of the community.

Workshops

Noted across four studies, workshops, or group meetings, focused on intensive discussion, cultivating community engagement through ensuring an ongoing cumulative process enabling relationships and trust to build and strengthen over time (44). For example, workshops were used to great effect in ensuring effective planning and communication during the in-situ upgrading intervention reported by Van Horen (32) to co-create a list of areas to address for community members. As Li et al. (44) and Van Horen (32) note, individual engagement events should be planned and designed with the best ways to facilitate dialogue in mind, and carry the goal of helping progress the overall project aim.

Volunteering and wagework

Though no one universally agreed definition exists, volunteerism can be defined as the social action of intentional acts aimed at helping others, taken on by individuals on their own accord, without any expectation of reward or compensation (42). Seen in two studies, the acts themselves are motivated by the issues that need addressing or by individuals requiring assistance. In Banerjea (34), women volunteered to help in health initiatives in Kolkata, India slums. As the women were from the respective informal settlements to which they were contributing, they understood the cultural nuances that existed in those spaces. They were able, then, to tailor messages to the community and this assisted in securing health information uptake. Overall health impacts were reported as positive across neighbourhoods.

Wagework shares a near identical framing to that of volunteerism with the difference being that financial or reward is provided for the efforts shown (34, 45). In the intervention reported by Gibbs et al. (27), facilitators were selected, trained and paid to carry out a training programme aimed at addressing aspects of toxic masculinity. Gibbs et al. (27) note that facilitators that could be looked at as brothers to the intervention participants were chosen, in that they were of a similar age, relatable and able to engage sensitive topics respectfully.

In the two studies reporting wagework, though the depth of participation was low (displaying forms of therapy and informing respectively), successes were achieved in the interventions due to the connections established and bolstered. In the case reported by Banerjea (34) a combination of neighbourhood effects and relatability drew people, while in that reported by Gibbs et al. (27), the relatability of the facilitators to the participants was a key driver for the initiative's success. This highlights that both volunteering and wagework can have positive impacts if aligned, in terms of community needs and relatability, with the people that are the focus of the efforts.

Capacity building

Seen as an approach to solidarity-based partnership, capacity building (noted in two studies) is typified by the provision of training, be it vocational or otherwise (46), to community members. Eade (43) further explains that for capacity building to mean anything, it must be about enabling those on the margins of society to represent and defend their interests more effectively, beyond their immediate context. In Majale (28), Income Generating Activities (IGAs) were developed to ensure that infrastructure managed by the community could be maintained. Likewise, community members in the same case study were incentivised to contribute to or be part of the interventions put in place through the opportunity to learn skills or be employed.

Planning labs

Driven by the mandate of a 'planning with people first' mindset, planning labs, also referred to as living labs, is a design and implementation process for urban planning. Used in only one reported intervention (31), it entailed collaboration with a combination of urban professionals, communities, and a wide range of other actors in a bid to broaden the sources of knowledge and ideas drawn on, while increasing stakeholder buy-in and engagement. In this intervention, planning labs were supported through cooperation among the University of Zimbabwe's Planning School, City of Harare, and slum dwellers. Informal settlement residents were asked to reflect and map challenges and possible solutions to be integrated into the final slum upgrading process.

Enablers and Constrainers

Enablers are generally understood to be factors that aid a process in taking place, while disablers are factors that inhibit a process from occurring. Specific factors enabling and constraining community participation were identified from each paper included in synthesis, and then grouped into seven overarching factors.

The identification of a factor as an enabler or disabler was based on how the author(s) of the papers described the experience they reported. The same factor could then be an enabler in one experience and a disabler in another experience. Where a factor was not raised in a paper, it was not noted in Table 6. This does not mean that the factor was non-existent in the actual experience, but rather that it was not identified in the respective paper. Some factors may not have been noted due to the particular research question addressed in the study reported, or because the paper did not fully report the wider experience.

Table 6: A summary of enablers and constrainers as reported in included studies

Intervention (paper- in order of participation depth, least to greatest)	Overarching factor groups						
	Trust	The Policy environment and legislation	Funding	Respect	Transparency	Government/Stakeholder Perception	Project stage of community integration
Nuijten (35)	X	✓	✓	X	X		X
Banerjea (34)	✓			✓			
Gibbs, Myrttinen (27)	✓			✓			
Muchadenyika (31)	✓	✓	✓			✓	✓
Meredith and MacDonald (30)	✓	✓	✓		X	✓	✓
Patel (29)	✓	X	✓		X	X	
Cronin and Guthrie (33)	✓	✓	X	✓	✓	X	✓
Majale (28)		✓		✓	✓	✓	✓
Van Horen (32)	✓	X	✓	✓	✓	X	✓

Notes: Tick (✓) indicates the factor was identified as an enabler; a cross (X) indicates the factor was identified as a disabler; a blank block shows that the factor was not present in the experience described within the included paper.

Table 6 reveals differences in the number and range of factors reported in each paper and differences between factors in terms of the number of papers which reported them.

Looking from left to right of the table, 'Trust' refers to the established bonds between stakeholders and community members. It was the most frequently identified factor across the set of papers, and only one paper reported this factor to constrain community participation. The 'policy environment and legislation' factor refers to policies and legal parameters and, as Table 6 shows, was the second most reported factor. It was often identified as allowing, and only sometimes preventing, community engagement in Slum efforts. 'Funding' can be considering as the financial budget of a project as well as monetary contributions made towards implementing a project; funding was, seen as an enabling factor for the most part. Where noted as a disabler, this was because of budgetary restrictions affecting initial planning (33). 'Respect' refers to the regard shown to community members throughout the initiative, and for the most part, although not as widely as for the linked factor of 'trust', was identified as an enabling factor. 'Transparency' reflects how clearly proceedings are communicated to community members, and 'Government/Stakeholder perception' speaks to

how government and external stakeholders viewed the need to integrate community members in slum improvement efforts. For both factors the experience was equivocal, as it was reported as an enabler in as many experiences as it was seen to be a disabler. Finally, the last noted factor is 'Project stage of community integration', referring to the point at which community was integrated into the project activities. In Muchadenyika (31), residents of the Harare, Zimbabwe based informal settlement were brought into the project development proceedings at the earliest stage, leading to greater buy-in from the community and trust throughout proceedings. Only one paper reported this factor to constrain community participation.

The complexity of experiences can be illuminated by considering the factor 'Trust' in more detail. Cronin and Guthrie (33), for example, report this factor as enabling a depth of participation in the resettlement process in Pune, India A high-level of 'Respect' was shown to the communities to be resettled, which bolstered their trust in the intentions of the non-community stakeholders. In contrast, Nuijten (35), reports that informal settlement community members in Recife, Brazil were treated with contempt, undermining the trust the community had in the project management team and limiting the depth of participation achieved in this in situ upgrading process. Meredith and MacDonald (30), meanwhile, illustrate how this factor was considered both an enabler and constrainer within the same initiative. A perceived lack of transparency in committee selection led some community members initially to distrust the initiatives put forward. However, the willingness of government stakeholders to communicate and engage showed a level of transparency that, ultimately, enhanced the community's trust in the non-community stakeholders (30). These experiences also show how the factors identified may well be inter-linked. 'Trust' was linked to 'Respect' in the first two papers considered here, and to 'Transparency' in the third. Ultimately, categorising a factor as an enabler or constrainer appeared to be based on how well they aided community engagement throughout an intervention. For example, a high level of transparency in project proceedings would strengthen community participation, while low levels of transparency would do the opposite.

Finally, Table 6 appears to suggest that a greater depth of participation in slum improvement efforts does not require all identified factors to be enabling. The experience reported by Van Horen (32), listed last, was judged to show a greater depth of participation than papers listed above it, but two of the seven identified overarching factors were noted to be disabling. At the same time, comparing the experience reported in Nuijten (35) (the least depth of participation) with those reported in papers listed at the bottom of the table (a greater depth of participation) might suggest that a greater depth of participation is particularly enhanced by trust, respect, transparency and project stage of community integration.

Discussion

This qualitative systematic review considered research on community participation as experienced in informal settlement initiatives, identifying the ways in which it is conceptualised, the strategies used in such initiatives and the enablers and constrainers of these strategies.

Appearing to be the first of its kind to synthesise studies regarding the depth of community participation in slum improvement initiatives, the review has also filled a knowledge gap by considering what barriers may need to be addressed for community participation of a high depth to be realised in health-related interventions in an informal settlement context. However, one limitation is that it drew on a small number of identified articles. Though this may be due to the criteria set for article inclusion, Slum Health is often neglected in research and as a specific field, separate from Urban Health, is in early development (1, 3). Indeed, in the included studies, Slum Health as a term was never used. Recognising the paucity of research in Slum health, more research is required to better understand the complexities that punctuate this emerging discipline.

Overall, the review revealed that despite community participation being central to the projects reported in the included papers, it was implemented in varying (often weak) ways, leading to mixed responses on how communities valued the interventions intended to help them. It further showed that common strategies, enablers and constrainers exist across projects implemented in different contexts. As a result, the strategies found can be used in a variety of contexts, with how they are implemented apparently being an important influence over the depth of community participation achieved.

Only some included papers provided a framing of community participation and it differed between them, reflecting prior studies (7, 8, 12, 47). Habraken (47), in particular, notes that community participation may either emphasise structural and fundamental change or no change in power and responsibility at all. The different framings of participation suggest that there are multiple ways of approaching or understanding community participation. As the papers included in this study are from a range of fields, it can be assumed that a combination of disciplinary background, the project and the authors perspective may impact how community participation is discussed.

The main forms of participation seen, using Arnstein's categorisation, were degrees of non-participation and tokenism, with only three studies reporting interventions with some degree of citizen power. Though concerning, this is not surprising. In their study focused on the negative impacts of community participation in a South African housing development, Lizarralde and Massyn (48), showed that community participation is often poorly implemented with possible divisions created between community members. This sentiment was also expressed in the work of Magalhães

(49), who showed that a community participatory approach in Brazil slum upgrading was inconsistently implemented, leading to mixed results.

Though the initiatives examined were different and were implemented in different countries (and continents), commonalities existed with respect to the strategies of, enablers and constrainers to, community participation. Examples include Public Information Meetings being a strategy used in the majority of studies, while trust was a noticeable enabling factor in all but one study. Within the limited pool of papers, studies spanned three continents, with no enabler or strategy unique to a country or continent. Furthermore, these strategies and range of influencing factors were apparent regardless of the intervention focus (e.g., housing related, behaviour change and health promotion, or education). The synthesis suggests that a mix of strategies is helpful in fostering community participation but that the depth of participation can be strengthened or stifled regardless of how many strategies are used.

An interconnectedness between the factors Respect, Transparency and Project stage of community integration may together serve as the most crucial enablers of deeper participation - with these factors serving as enablers in all studies that displayed forms of citizen power. This may be due to Arnstein's ladder viewing integration within planning as an aspect of true citizen power, but it is also corroborated by Bracht and Tsouros (42). In their work, these authors note that citizen engagement must begin early to be truly effective. Ultimately, the depth of participation may not necessarily affect the success of a project as articulated by a project mandate, but it will affect whether the community embraces the project or gains any benefit from it.

A focus on social networks and the willingness of communities to take ownership of projects was further highlighted in housing efforts. Studies highlighted either in situ upgrading or voluntary resettlement interventions. This may be reflective of the global trend of transitioning away from forced evictions and involuntary resettlement to in situ upgrading and efforts that are more inclusive of communities' needs and wants (2). In the in-situ upgrades, established community networks and knowledge of individuals' geographic placement helped encourage and coordinate communities to make successes of the initiatives. In the case of the resettlement efforts, particular attention was applied to ensuring that social networks were maintained, with Cronin and Guthrie (33) noting the focus on maintaining social networks was a crucial factor in the resettlement being a success. Emphasis on maximising social networks is said to positively affects social connections, fear and anxiety of possible displacement and community efficacy (50). This is in line with the assertion made by Ezeh et al. (1) that neighbourhood effects need to be better utilised for health in slums to be improved.

Methodological limitations and strengths

In completing this study, a series of limitations must be noted beyond the small number of papers. Non-English studies were excluded. As only primary qualitative research studies published in peer-reviewed journals were used, a future study may improve on this by using a combination of peer-reviewed primary qualitative studies and grey literature. In doing so, more accounts that may add value to answering the questions posed may be found, and may offer more sense of slum dwellers' views. Due to the articles found, the discussion is written mainly from the perspective of those who reside outside slum contexts and what they do to facilitate community participation.

Noting the above, the degree of participation in each experience will be influenced by the represented parties in each author's research. Furthermore, Arnstein's framework does not account for the different forms of involvement that respective stakeholders may have nor recognises that there are moments when different stakeholders may need to exhibit greater power than communities in a process e.g., when an urban planner has to veto a community's ideas due to logistical challenges or when particular decisions have to be made to fit within the mandate of funding agencies.

Despite the limitations mentioned above, strengths in the study and synthesis approach exist. Slum health, and slum upgrading by extension, has been explored through a variety of fields such as Development studies, Urban Health, Civil Engineering and Anthropology. As a result, this review utilised ten databases in an effort to be as comprehensive as possible. In addition, a systematic approach was applied in order to ensure that the synthesis is methodologically sound and reproducible. This study is further bolstered by its application of a framework that has been validated and used in LMICs multiple times. In addition, initially designed for the Urban Development sector and subsequently transposed into other sectors such as Health, this framework appears a sound fit for a study focused on the intersection of health and urban development.

Conclusion

This systematic review provides insights about community participation as a crucial element for the long-term implementation and sustainability of improvement interventions in informal settlements. In doing so, an apparent dearth in, and need for, research on the relationship between community participation and slums is seen. To better aid the nearly 1 billion people living in slums, communities need to be integrated into the plans and interventions that govern elements of their well-being. In doing so, a mix of community participation strategies can be applied, with awareness of what factors are most likely to enable their implementation, and what barriers may need to be offset. A combination of public information sharing and engaging communities on decisions to be made

regarding interventions may help ensure project transparency. Providing decision-making power to community members could lead to greater community buy-in and long-term sustainability of initiatives. Finally, if a representative committee is established, democratic elections that also ensure they are reflective of the community may facilitate better dialogue with community members.

Reference List

1. Ezeh A, Oyebode O, Satterthwaite D, Chen Y-F, Ndugwa R, Sartori J, et al. The History, Geography, and Sociology of Slums and the Health Problems of People Who Live in Slums. The lancet (2017) 389(10068):547-58.

2. UN-Habitat. The Challenge of Slums: Global Report on Human Settlements 2003. Management of Environmental Quality: An International Journal (2004) 15(3):337-8.

3. Lilford RJ, Oyebode O, Satterthwaite D, Melendez-Torres G, Chen Y-F, Mberu B, et al. Improving the Health and Welfare of People Who Live in Slums. The lancet (2017) 389(10068):559-70.

4. Unger A, Riley LW. Slum Health: From Understanding to Action. PLoS Medicine (2007) 4(10):e295.

5. Corburn J, Riley L. Slum Health: From the Cell to the Street: Univ of California Press (2016).

6. Preston R, Waugh H, Larkins S, Taylor J. Community Participation in Rural Primary Health Care: Intervention or Approach? Australian journal of primary health (2010) 16(1):4-16.

7. Rifkin SB, Kangere M. What Is Participation. Community-based rehabilitation (CBR) as a participatory strategy in Africa (2002):37-49.

8. Bamberger M. The Importance of Community Participation. Public Administration and Development (1991) 11(3):281-4.

9. Zakus JDL, Lysack CL. Revisiting Community Participation. Health policy and planning (1998) 13(1):1-12.

10. World Health Organization. Primary Health Care: Report of the International Conference on Primary Health Care, Alma-Ata, Ussr, 6-12 September 1978: World Health Organization (1978).

11. Bath J, Wakerman J. Impact of Community Participation in Primary Health Care: What Is the Evidence? Australian Journal of Primary Health (2015) 21(1):2-8.

12. Preston R, Waugh H, Taylor J, Larkins S, editors. The Benefits of Community Participation in Rural Health Service Development: Where Is the Evidence? 2009: National Rural Health Conference Proceedings.

13. World Health Organization. Healthy Cities Initiative: Approaches and Experience in the African Region. Healthy Cities Initiative: Approaches and Experience in the African Region. (2002). p. 53-.

14. Flick U. Introducing Research Methodology: A Beginner's Guide to Doing a Research Project: Sage (2015).

15. Butler A, Hall H, Copnell B. A Guide to Writing a Qualitative Systematic Review Protocol to Enhance Evidence-Based Practice in Nursing and Health Care. Worldviews on Evidence-Based Nursing (2016) 13(3):241-9.

16. Pope C, Mays N, Popay J, editors. How Can We Synthesize Qualitative and Quantitative Evidence for Healthcare Policy-Makers and Managers? Healthcare Management Forum; 2006: SAGE Publications Sage CA: Los Angeles, CA.

17. Khan KS, Kunz R, Kleijnen J, Antes G. Five Steps to Conducting a Systematic Review. *Journal of the royal society of medicine* (2003) 96(3):118-21.

18. Summit M. United Nations Millennium Declaration. U Nations (Ed) (2000).

19. Carroll C, Booth A. Quality Assessment of Qualitative Evidence for Systematic Review and Synthesis: Is It Meaningful, and If So, How Should It Be Performed? Research synthesis methods (2015) 6(2):149-54.

20. Majid U, Vanstone M. Appraising Qualitative Research for Evidence Syntheses: A Compendium of Quality Appraisal Tools. Qualitative health research (2018) 28(13):2115-31.

21. Gilson L. Qualitative Research Synthesis for Health Policy Analysis: What Does It Entail and What Does It Offer? Health policy and planning (2014) 29(suppl_3):iii1-iii5.

22. Thomas J, Harden A. Methods for the Thematic Synthesis of Qualitative Research in Systematic Reviews. *BMC medical research methodology* (2008) 8(1):45.

23. Aronson J. A Pragmatic View of Thematic Analysis. *The qualitative report* (1995) 2(1):1-3.

24. Arnstein SR. A Ladder of Citizen Participation. Journal of the American Institute of planners (1969) 35(4):216-24.

25. Tritter JQ, McCallum A. The Snakes and Ladders of User Involvement: Moving Beyond Arnstein. Health policy (2006) 76(2):156-68.

26. Collins K, Ison R. Jumping Off Arnstein's Ladder: Social Learning as a New Policy Paradigm for Climate Change Adaptation. Environmental policy and governance (2009) 19(6):358-73.

27. Gibbs A, Myrttinen H, Washington L, Sikweyiya Y, Jewkes R. Constructing, Reproducing and Challenging Masculinities in a Participatory Intervention in Urban Informal Settlements in South Africa. Culture Health & Sexuality (2020) 22(5):535-50. doi: 10.1080/13691058.2019.1614671.

28. Majale M. Employment Creation through Participatory Urban Planning and Slum Upgrading: The Case of Kitale, Kenya. Habitat Int (2008) 32(2):270-82.

29. Patel K. A Successful Slum Upgrade in Durban: A Case of Formal Change and Informal Continuity. Habitat Int (2013) 40:211-7.

30. Meredith T, MacDonald M. Community-Supported Slum-Upgrading: Innovations from Kibera, Nairobi, Kenya. Habitat Int (2017) 60:1-9.

31. Muchadenyika D. Slum Upgrading and Inclusive Municipal Governance in Harare, Zimbabwe: New Perspectives for the Urban Poor. Habitat Int (2015) 48:1-10.

32. Van Horen B. Informal Settlement Upgrading: Bridging the Gap between the De Facto and the De Jure. Journal of Planning Education and Research (2000) 19(4):389-400.

33. Cronin V, Guthrie P. Community-Led Resettlement: From a Flood-Affected Slum to a New Society in Pune, India. Environmental Hazards (2011) 10(3-4):310-26.

34. Banerjea N. Voluntary Participation and Self-Governance: A Study of Community Health Volunteering in Kolkata, India. Cultural Dynamics (2011) 23(3):197-218.

35. Nuijten M. The Perversity of the 'Citizenship Game': Slum-Upgrading in the Urban Periphery of Recife, Brazil. Critique of Anthropology (2013) 33(1):8-25.

36. Del Mistro R, Hensher DA. Upgrading Informal Settlements in South Africa: Policy, Rhetoric and What Residents Really Value. Housing Studies (2009) 24(3):333-54.

37. Choguill C, Franceys R, Cotton A. Building Community Infrastructure in the 1990s: Progressive Improvement∗. (1993) 17(4):1-12.

38. Taylor M. Community Participation in the Real World: Opportunities and Pitfalls in New Governance Spaces. Urban studies (2007) 44(2):297-317.

39. Cornwall A. Introduction: New Democratic Spaces? The Politics and Dynamics of Institutionalised Participation. IDS Bulletin (2004) 35(2):1-10.

40. Edwards M, Gaventa J. Global Citizen Action (Boulder, Co: Lynne Rienner). (2004).

41. Choguill M. A Ladder of Community Participation for Underdeveloped Countries. Habitat Int (1996) 20(3):431-44.

42. Bracht N, Tsouros A. Principles and Strategies of Effective Community Participation. Health promotion international (1990) 5(3):199-208.

43. Rifkin SB. Examining the Links between Community Participation and Health Outcomes: A Review of the Literature. Health policy and planning (2014) 29(suppl_2):ii98-ii106.

44. Li X, Zhang F, Hui EC-m, Lang W. Collaborative Workshop and Community Participation: A New Approach to Urban Regeneration in China. Cities (2020) 102:102743.

45. Wilson J. Volunteerism Research: A Review Essay. Nonprofit and voluntary sector quarterly (2012) 41(2):176-212.

46. Eade D. Capacity Building: Who Builds Whose Capacity? Development in practice (2007) 17(4-5):630-9.

47. Habraken NJ. Towards a New Professional Role. Design Studies (1986) 7(3):139-43.

48. Lizarralde G, Massyn M. Unexpected Negative Outcomes of Community Participation in Low-Cost Housing Projects in South Africa. Habitat Int (2008) 32(1):1-14.

49. Magalhães F. Slum Upgrading: Lessons Learned from Brazil: Inter-American Development Bank (2012).

50. Corburn J, Sverdlik A. Slum Upgrading and Health Equity. International Journal of Environmental Research and Public Health (2017) 14(4). doi: 10.3390/ijerph14040342.

PART C: APPENDICES

Appendix A: Data extraction table

Article Name	Author	Discipline of study	Target of improvement effort	Date of Publication	Data extraction date	Type of study	Country situated	Facilitators present	Barriers noted	Outcomes	Perceived depth	Justification of depth

PubMed history – include ‘favelas’

#36

Search: ((((((health equity)) OR ((health equality OR health equalities OR health disparity OR health disparities))) OR ("Health Status Disparities"[Mesh])) AND (((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters)))) AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh]))) AND (ezeh[Author] OR corburn[Author])

6 06:56:25

#35

Search: (((((health equity)) OR ((health equality OR health equalities OR health disparity OR health disparities))) OR ("Health Status Disparities"[Mesh])) AND (((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters)))) OR Favela AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh])) AND (improvement) OR (development) OR (renewal) OR (uplift) OR (upliftment) OR (upgrade) OR (upgrading) OR (regeneration)

1,309 06:55:38

#34

Search: (((health equity)) OR ((health equality OR health equalities OR health disparity OR health disparities))) OR ("Health Status Disparities"[Mesh])

151,557 06:55:07

#33

Search: (health equity)

24,942 06:54:39

#32

Search: ((((((health equity OR improvement)) OR ("Health Equity"[Mesh])) OR ("Health Status Disparities"[Mesh])) OR ((health equality OR health equalities OR health disparity OR health disparities))) AND (((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters)))) AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh]))

3,318 06:51:46

#31

Search: ((((health equity OR improvement)) OR ("Health Equity"[Mesh])) OR ("Health Status Disparities"[Mesh])) OR ((health equality OR health equalities OR health disparity OR health disparities))

2,657,876 06:51:15

#30

Search: (health equality OR health equalities OR health disparity OR health disparities)

132,677 06:50:40

#29

Search: "Health Status Disparities"[Mesh] Sort by: Most Recent

15,698 06:50:04

#28

Search: history geography sociology slums

24 06:48:16

#27

Search: (((((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh])))) AND (((health equity OR improvement)) OR ("Health Equity"[Mesh])))) AND (ezeh[Author] OR corburn[Author])

11 06:46:51

#26

Search: ezeh[Author] OR corburn[Author]

241 06:46:38

#25

Search: ((((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters))) AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh])))) AND (((health equity OR improvement)) OR ("Health Equity"[Mesh]))

2,581 06:45:21

#24

Search: ((((informal settlement OR informal settlements)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters))

27,925 06:45:00

#23

Search: (((((((township OR townships)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters))) OR ((informal settlement OR informal settlements))) AND ((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh]))) AND (((health equity OR improvement)) OR ("Health Equity"[Mesh]))

2,851 06:43:33

#22

Search: (((((township OR townships)) OR ((ghetto OR ghettos))) OR ("Poverty Areas"[Mesh])) OR ((slum OR slums OR squatter OR squatters))) OR ((informal settlement OR informal settlements))

32,757 06:43:13

#21

Search: (informal settlement OR informal settlements)

2,349 06:42:46

#20

Search: (((((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh])) AND (((health equity OR improvement)) OR ("Health Equity"[Mesh]))) AND (((((((slum OR slums OR squatter OR squatters)) OR ("Poverty Areas"[Mesh])) OR ((ghetto OR ghettos))) OR ("Transients and Migrants"[Mesh])) OR ((transient OR transients OR nomad OR nomads OR migrant OR migrants OR informal settlement OR informal settlements))) OR ((township OR townships)))

3,905 06:10:11

#19

Search: (((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)) OR ("Community Health Services"[Mesh] OR "Community Health Centers"[Mesh])

1,033,940 06:09:51

#18

Search: ((health equity OR improvement)) OR ("Health Equity"[Mesh])

2,557,264 06:09:14

#17

Search: "Community Health Services"[Mesh] OR "Community Health Centers"[Mesh] Sort by: Most Recent

314,499 05:07:16

#16

Search: "Health Equity"[Mesh] Sort by: Most Recent

1,279 05:06:30

#15

Search: (((((((slum OR slums OR squatter OR squatters)) OR ("Poverty Areas"[Mesh])) OR ((ghetto OR ghettos))) OR ("Transients and Migrants"[Mesh])) OR ((transient OR transients OR nomad OR nomads OR migrant OR migrants OR informal settlement OR informal settlements))) OR ((township OR townships))) AND (((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities))) AND ((health equity OR improvement))

3,503 05:05:52

#14

Search: ((community participation) OR ("Community Participation"[Mesh])) OR (community OR communities)

868,376 05:05:28

#12

Search: community OR communities

845,632 05:04:30

#11

Search: "Community Participation"[Mesh] Sort by: Most Recent

42,842 05:04:15

#10

Search: (((((((slum OR slums OR squatter OR squatters)) OR ("Poverty Areas"[Mesh])) OR ((ghetto OR ghettos))) OR ("Transients and Migrants"[Mesh])) OR ((transient OR transients OR nomad OR nomads OR migrant OR migrants OR informal settlement OR informal settlements))) OR ((township OR townships))) AND ((health equity OR improvement))) AND (community participation)

348 05:03:23

#9

Search: community participation

64,644 05:03:12

#8

Search: (health equity OR improvement)

2,557,146 05:02:59

#7

Search: ((((((slum OR slums OR squatter OR squatters)) OR ("Poverty Areas"[Mesh])) OR ((ghetto OR ghettos))) OR ("Transients and Migrants"[Mesh])) OR ((transient OR transients OR nomad OR nomads OR migrant OR migrants OR informal settlement OR informal settlements))) OR ((township OR townships))

388,513 05:02:10

#6

Search: (township OR townships)

4,973 05:01:55

#5

Search: (transient OR transients OR nomad OR nomads OR migrant OR migrants OR informal settlement OR informal settlements)

369,994 05:01:26

#4

Search: "Transients and Migrants"[Mesh] Sort by: Most Recent

11,675 05:00:43

#3

Search: (ghetto OR ghettos)

12,350 05:00:12

#2

Search: "Poverty Areas"[Mesh] Sort by: Most Recent

6,085 04:59:56

#1

Search: (slum OR slums OR squatter OR squatters)

25,612

Scopus, Web of Science, Ebsco (Africa-wide and CINAHL) and Cochrane (Google Scholar for 'grey lit')

Set #1

(slum* OR ghetto* OR squatter* OR (informal AND settlement*) OR favela*)

Set #2

(health AND equity) OR (health AND equality) OR (health AND equalities) OR (health AND disparity) OR (health AND disparities) OR (health AND status)

Set #3

(communit* OR (community AND health) OR (community AND participation))

Then combine sets - #1 AND #2 AND #3

Appendix B: Author Guidelines

Author guidelines

frontiersin.org/guidelines/author-guidelines

General standards

Article type

Frontiers requires authors to select the appropriate article type for their manuscript and to comply with the article type descriptions defined in the journal's 'Article types' page, which can be found under the 'About journal' menu in 'For authors' on every Frontiers journal page. Please pay close attention to the word count limits.

Templates

If working with Word please use our Word templates. If you wish to submit your article as LaTeX, we recommend our LaTeX templates.

For LaTeX files, please ensure all relevant manuscript files are uploaded: .tex file, PDF, and .bib file (if the bibliography is not already included in the .tex file).

During the interactive review, authors are encouraged to upload versions using track changes. Editors and reviewers can only download the PDF file of the submitted manuscript.

Manuscript length

Frontiers encourages the authors to closely follow the article word count lengths given in the 'Article types' page of the journals. The manuscript length includes only the main body of the text, footnotes, and all citations within it, and excludes the abstract, section titles, figure and table captions, funding statement, acknowledgments, and references in the bibliography. Please indicate the number of words and the number of figures and tables included in your manuscript on the first page.

Language editing

Frontiers requires manuscripts submitted to meet international English language standards to be considered for publication.

For authors who would like their manuscript to receive language editing or proofreading to improve the clarity of the manuscript and help highlight their research, Frontiers recommends the language-editing services provided by the following external partners.

Note that sending your manuscript for language editing does not imply or guarantee that it will be accepted for publication by a Frontiers journal. Editorial decisions on the scientific content of a manuscript are independent of whether it has received language editing or proofreading by these partner services or other services.

Editage
Frontiers recommends the language-editing service provided by our external partner Editage. These services may be particularly useful for researchers for whom English is not the primary language. They can help to improve the grammar, syntax, and flow of your manuscript prior to submission. Frontiers authors will receive a 10% discount by visiting the following link: editage.com/frontiers.

The Charlesworth Group
Frontiers recommends the Charlesworth Group's author services, who has a long-standing track record in language editing and proofreading. This is a third-party service for which

Frontiers authors will receive a 10% discount by visiting the following link: www.cwauthors.com/frontiers.

Frontiers推荐您使用在英语语言编辑和校对领域具有悠久历史和良好口碑的查尔斯沃思作者服务。此项服务由第三方为您提供，Frontiers中国作者通过此链接提交稿件时可获得10%的特别优惠: www.cwauthors.com.cn/frontiers.

Language style

The default language style at Frontiers is American English. If you prefer your article to be formatted in British English, please specify this on the first page of your manuscript. For any questions regarding style, Frontiers recommends authors to consult the Chicago Manual of Style.

Search engine optimization (SEO)

There are a few simple ways to maximize your article's discoverability and search results.

Include a few of your article's keywords in the title of the article

Do not use long article titles

Pick 5-8 keywords using a mix of generic and more specific terms on the article subject(s)

Use the maximum amount of keywords in the first two sentences of the abstract

Use some of the keywords in level 1 headings

CrossMark policy

Title

The title should be concise, omitting terms that are implicit and, where possible, be a statement of the main result or conclusion presented in the manuscript. Abbreviations should be avoided within the title.

Witty or creative titles are welcome, but only if relevant and within measure. Consider if a title meant to be thought-provoking might be misinterpreted as offensive or alarming. In extreme cases, the editorial office may veto a title and propose an alternative.

Authors should avoid:

titles that are a mere question without giving the answer

unambitious titles, for example starting with 'Towards,' 'A description of,' 'A characterization of' or 'Preliminary study on'

vague titles, for example starting with 'Role of', 'Link between', or 'Effect of' that do not specify the role, link, or effect

including terms that are out of place, for example the taxonomic affiliation apart from species name.

For Corrigenda, General Commentaries, and Editorials, the title of your manuscript should have the following format.

'Corrigendum: [Title of original article]'

General Commentaries:
'Commentary: [Title of original article]'
'Response: Commentary: [Title of original article]'

'Editorial: [Title of Research Topic]'

The running title should be a maximum of five words in length.

Authors and affiliations

All names are listed together and separated by commas. Provide exact and correct author names as these will be indexed in official archives. Affiliations should be keyed to the author's name with superscript numbers and be listed as follows:

Laboratory, Institute, Department, Organization, City, State abbreviation (only for United States, Canada, and Australia), and Country (without detailed address information such as city zip codes or street names).

Example: Max Maximus1
1 Department of Excellence, International University of Science, New York, NY, United States.

Correspondence

The corresponding author(s) should be marked with an asterisk in the author list. Provide the exact contact email address of the corresponding author(s) in a separate section.

Example: Max Maximus*
maximus@iuscience.edu

If any authors wish to include a change of address, list the present address(es) below the correspondence details using a unique superscript symbol keyed to the author(s) in the author list.

Equal contributions

The authors who have contributed equally should be marked with a symbol (†) in the author list of the doc/latex and pdf files of the manuscript uploaded at submission.

Please use the appropriate standard statement(s) to indicate equal contributions:

Equal contribution: These authors contributed equally to this work

First authorship: These authors share first authorship

Senior authorship: These authors share senior authorship

Last authorship: These authors share last authorship

Equal contribution and first authorship: These authors contributed equally to this work and share first authorship

Equal contribution and senior authorship: These authors contributed equally to this work and share senior authorship

Equal contribution and last authorship: These authors contributed equally to this work and share last authorship

Example: Max Maximus 1†, John Smith2† and Barbara Smith1
†These authors contributed equally to this work and share first authorship

Consortium/group and collaborative authors

Consortium/group authorship should be listed in the manuscript with the other author(s).

In cases where authorship is retained by the consortium/group, the consortium/group should be listed as an author separated by a comma or 'and'. The consortium/group name will appear in the author list, in the citation, and in the copyright. If provided, the consortium/group members will be listed in a separate section at the end of the article.

For the collaborators of the consortium/group to be indexed in PubMed, they do not have to be inserted in the Frontiers submission system individually. However, in the manuscript itself, provide a section with the name of the consortium/group as the heading followed by the list of collaborators, so they can be tagged accordingly and indexed properly.

Example: John Smith, Barbara Smith and The Collaborative Working Group.

In cases where work is presented by the author(s) on behalf of a consortium/group, it should be included in the author list separated with the wording 'for' or 'on behalf of.' The consortium/group will not retain authorship and will only appear in the author list.

Example: John Smith and Barbara Smith on behalf of The Collaborative Working Group.

Abstract

As a primary goal, the abstract should make the general significance and conceptual advance of the work clearly accessible to a broad readership. The abstract should be no longer than a single paragraph and should be structured, for example, according to the IMRAD format. For the specific structure of the abstract, authors should follow the requirements of the article type or journal to which they're submitting. Minimize the use of abbreviations and do not cite references, figures or tables.

For clinical trial articles, please include the unique identifier and the URL of the publicly-accessible website on which the trial is registered.

Keywords

All article types require a minimum of five and a maximum of eight keywords.

Text

The entire document should be single-spaced and must contain page and line numbers in order to facilitate the review process. The manuscript should be written using either Word or LaTeX. See above for templates.

Nomenclature

The use of abbreviations should be kept to a minimum. Non-standard abbreviations should be avoided unless they appear at least four times, and must be defined upon first use in the main text. Consider also giving a list of non-standard abbreviations at the end, immediately before the acknowledgments.

Equations should be inserted in editable format from the equation editor.

Italicize gene symbols and use the approved gene nomenclature where it is available. For human genes, please refer to the HUGO Gene Nomenclature Committee (HGNC). New symbols for human genes should be submitted to the HGNC here. Common alternative gene aliases may also be reported, but should not be used alone in place of the HGNC symbol. Nomenclature committees for other species are listed here. Protein products are not italicized.

We encourage the use of Standard International Units in all manuscripts.

Chemical compounds and biomolecules should be referred to using systematic nomenclature, preferably using the recommendations by the International Union of Pure and Applied Chemistry (IUPAC).

Astronomical objects should be referred to using the nomenclature given by the International Astronomical Union (IAU) provided here.

Life Science Identifiers (LSIDs) for ZOOBANK registered names or nomenclatural acts should be listed in the manuscript before the keywords. An LSID is represented as a uniform resource name (URN) with the following format:
urn:lsid:<Authority>:<Namespace>:<ObjectID>[:<Version>]

For more information on LSIDs please see the 'Code' section of our policies and publication ethics.

Sections

The manuscript is organized by headings and subheadings. The section headings should be those appropriate for your field and the research itself. You may insert up to 5 heading levels into your manuscript (i.e.,: 3.2.2.1.2 Heading Title).

For Original Research articles, it is recommended to organize your manuscript in the following sections or their equivalents for your field.

Introduction
Succinct, with no subheadings.

Materials and methods
This section may be divided by subheadings and should contain sufficient detail so that when read in conjunction with cited references, all procedures can be repeated. For experiments reporting results on animal or human subject research, an ethics approval statement should be included in this section (for further information, see the 'Bioethics' section of our policies and publication ethics.)

Results
This section may be divided by subheadings. Footnotes should not be used and must be transferred to the main text.

Discussion
This section may be divided by subheadings. Discussions should cover the key findings of the study: discuss any prior research related to the subject to place the novelty of the discovery in the appropriate context, discuss the potential shortcomings and limitations on their interpretations, discuss their integration into the current understanding of the problem and how this advances the current views, speculate on the future direction of the research, and freely postulate theories that could be tested in the future.

For further information, please check the descriptions defined in the journal's 'Article types' page, in the 'For authors' menu on every journal page.

Acknowledgements

This is a short text to acknowledge the contributions of specific colleagues, institutions, or agencies that aided the efforts of the authors. Should the content of the manuscript have previously appeared online, such as in a thesis or preprint, this should be mentioned here, in addition to listing the source within the reference list.

Contribution to the field statement

When you submit your manuscript, you will be required to briefly summarize in 200 words your manuscript's contribution to, and position in, the existing literature in your field. This should be written avoiding any technical language or non-standard acronyms. The aim should be to convey the meaning and importance of this research to a non-expert.

While Frontiers evaluates articles using objective criteria, rather than impact or novelty, your statement should frame the question(s) you have addressed in your work in the context of the current body of knowledge, providing evidence that the findings – whether positive or

negative – contribute to progress in your research discipline. This will help the chief editors to determine whether your manuscript fits within the scope of a specialty as defined in its mission statement; a detailed statement will also facilitate the identification of the editors and reviewers most appropriate to evaluate your work, ultimately expediting your manuscript's initial consideration.

Example statement on: Markram K and Markram H (2010) The Intense World Theory – a unifying theory of the neurobiology of autism. Front. Hum. Neurosci. 4:224. doi: 10.3389/fnhum.2010.00224

Autism spectrum disorders are a group of neurodevelopmental disorders that affect up to 1 in 100 individuals. People with autism display an array of symptoms encompassing emotional processing, sociability, perception and memory, and present as uniquely as the individual. No theory has suggested a single underlying neuropathology to account for these diverse symptoms. The Intense World Theory, proposed here, describes a unifying pathology producing the wide spectrum of manifestations observed in autists. This theory focuses on the neocortex, fundamental for higher cognitive functions, and the limbic system, key for processing emotions and social signals. Drawing on discoveries in animal models and neuroimaging studies in individuals with autism, we propose how a combination of genetics, toxin exposure and/or environmental stress could produce hyper-reactivity and hyper-plasticity in the microcircuits involved with perception, attention, memory and emotionality. These hyper-functioning circuits will eventually come to dominate their neighbors, leading to hyper-sensitivity to incoming stimuli, over-specialization in tasks and a hyper-preference syndrome. We make the case that this theory of enhanced brain function in autism explains many of the varied past results and resolves conflicting findings and views and makes some testable experimental predictions.

Figure and table guidelines

CC-BY license

All figures, tables, and images will be published under a Creative Commons CC-BY license, and permission must be obtained for use of copyrighted material from other sources (including re-published/adapted/modified/partial figures and images from the internet). It is the responsibility of the authors to acquire the licenses, follow any citation instructions requested by third-party rights holders, and cover any supplementary charges.

For additional information, please see the 'Image manipulation' section of our policies and publication ethics.

Figure requirements and style guidelines

Frontiers requires figures to be submitted individually, in the same order as they are referred to in the manuscript; the figures will then be automatically embedded at the end of the submitted manuscript. Kindly ensure that each figure is mentioned in the text and in numerical order.

For figures with more than one panel, panels should be clearly indicated using labels (A), (B), (C), (D), etc. However, do not embed the part labels over any part of the image, these labels will be replaced during typesetting according to Frontiers' journal style. For graphs, there must be a self-explanatory label (including units) along each axis.

For LaTeX files, figures should be included in the provided PDF. In case of acceptance, our production office might require high-resolution files of the figures included in the manuscript in EPS, JPEG or TIF/TIFF format.

To upload more than one figure at a time, save the figures (labeled in order of appearance in the manuscript) in a zip file and upload them as 'Supplementary Material Presentation.'

Please note that figures not in accordance with the guidelines will cause substantial delay during the production process.

Captions

Captions should be preceded by the appropriate label, for example 'Figure 1.' Figure captions should be placed at the end of the manuscript. Figure panels are referred to by bold capital letters in brackets: (A), (B), (C), (D), etc.

Image size and resolution requirements

Figures should be prepared with the PDF layout in mind. Individual figures should not be longer than one page and with a width that corresponds to 1 column (85 mm) or 2 columns (180 mm).

All images must have a resolution of 300 dpi at final size. Check the resolution of your figure by enlarging it to 150%. If the image appears blurry, jagged, or has a stair-stepped effect, the resolution is too low.

The text should be legible and of high quality. The smallest visible text should be no less than eight points in height when viewed at actual size.

Solid lines should not be broken up. Any lines in the graphic should be no smaller than two points wide.

Please note that saving a figure directly as an image file (JPEG, TIF) can greatly affect the resolution of your image. To avoid this, one option is to export the file as PDF, then convert into TIFF or EPS using a graphics software.

Format and color image mode

The following formats are accepted: TIF/TIFF (.tif/.tiff), JPEG (.jpg), and EPS (.eps) (upon acceptance). Images must be submitted in the color mode RGB.

Chemical structures

Chemical structures should be prepared using ChemDraw or a similar program. If working with ChemDraw please use our ChemDraw template. If working with another program please follow the guidelines below.

Drawing settings: chain angle, 120° bond spacing, 18% width; fixed length, 14.4 pt; bold width, 2.0 pt; line width, 0.6 pt; margin width, 1.6 pt; hash spacing, 2.5 pt. Scale 100% Atom Label settings: font, Arial; size, 8 pt

Assign all chemical compounds a bold, Arabic numeral in the order in which the compounds are presented in the manuscript text.

Table requirements and style guidelines

Tables should be inserted at the end of the manuscript in an editable format. If you use a word processor, build your table in Word. If you use a LaTeX processor, build your table in LaTeX. An empty line should be left before and after the table.

Table captions must be placed immediately before the table. Captions should be preceded by the appropriate label, for example 'Table 1.' Please use only a single paragraph for the caption.

Ensure that each table is mentioned in the text and in numerical order.

Large tables covering several pages cannot be included in the final PDF for formatting reasons. These tables will be published as supplementary material.

Tables which are not according to the above guidelines will cause substantial delay during the production process.

Accessibility

We encourage authors to make the figures and visual elements of their articles accessible for the visually impaired. An effective use of color can help people with low visual acuity, or color blindness, understand all the content of an article.

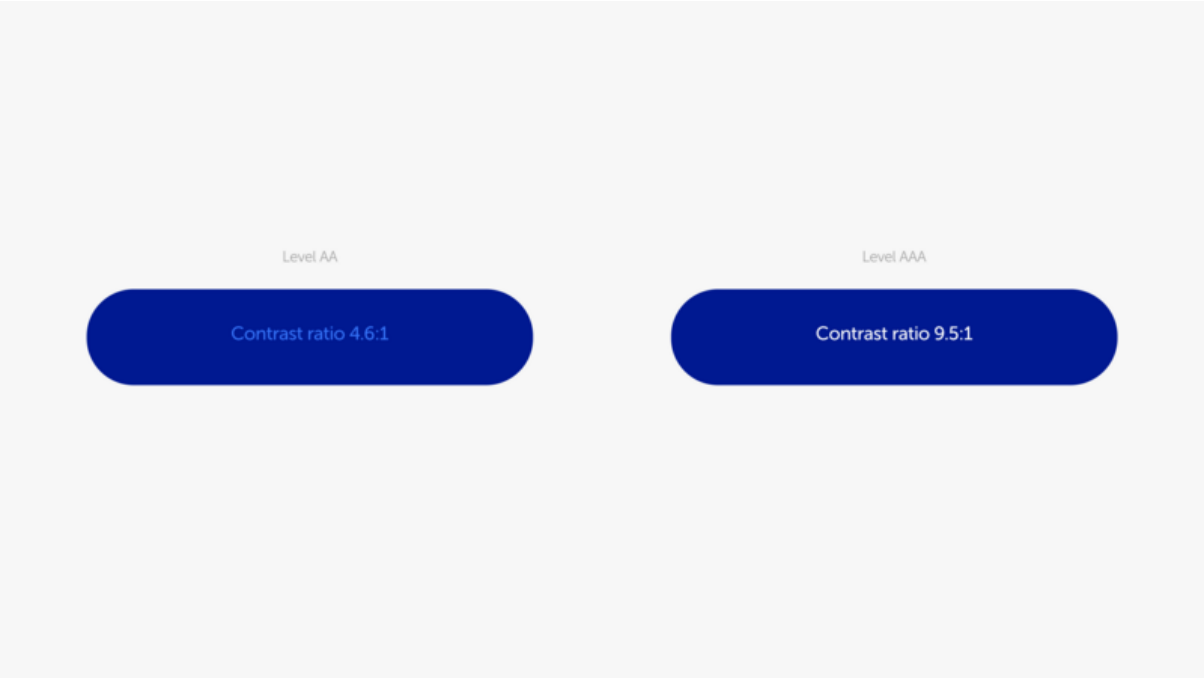
These guidelines are easy to implement and are in accordance with the W3C Web Content Accessibility Guidelines (WCAG 2.1), the standard for web accessibility best practices.

Ensure sufficient contrast between text and its background
People who have low visual acuity or color blindness could find it difficult to read text with low contrast background color. Try using colors that provide maximum contrast.

WC3 recommends the following contrast ratio levels:

Level AA, contrast ratio of at least 4.5:1

Level AAA, contrast ratio of at least 7:1



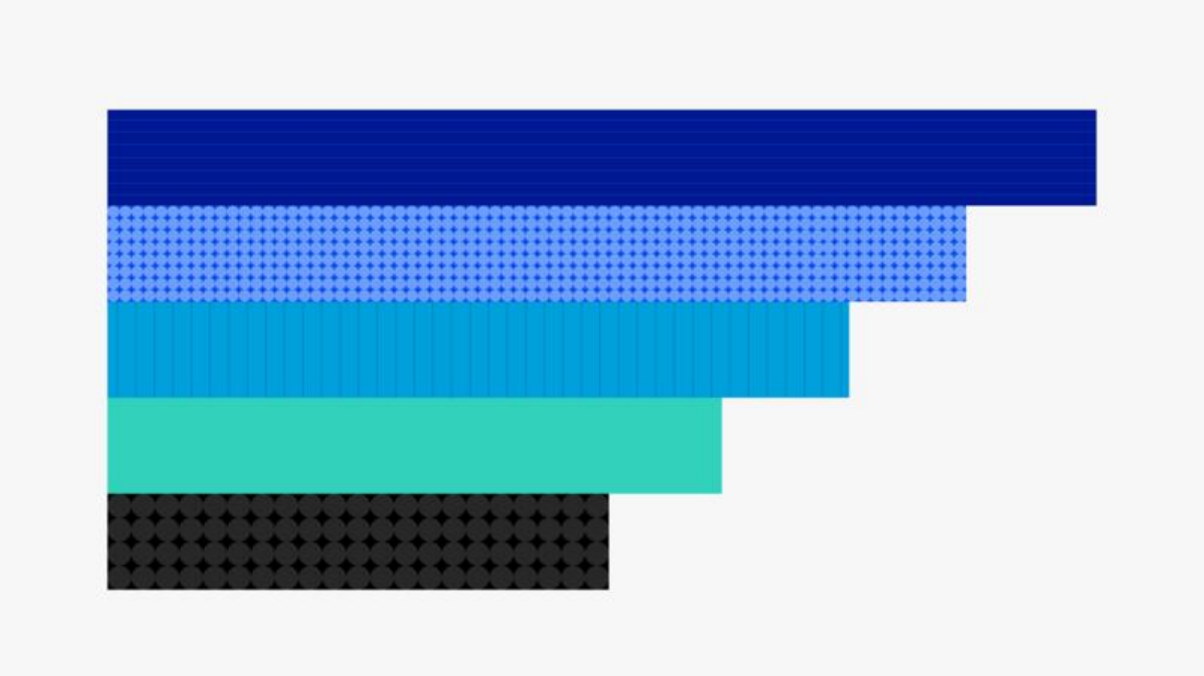
You can verify the contrast ratio of your palette with these online ratio checkers:

WebAIM

Color Safe

Avoid using red or green indicators
More than 99% of color-blind people have a red-green color vision deficiency.

Avoid using only color to communicate information
Elements with complex information like charts and graphs can be hard to read when only color is used to distinguish the data. Try to use other visual aspects to communicate information, such as shape, labels, and size. Incorporating patterns into the shape fills also make differences clearer; for an example please see below:



Supplementary material

Data that are not of primary importance to the text, or which cannot be included in the article because they are too large or the current format does not permit it (such as videos, raw data traces, and PowerPoint presentations), can be uploaded as supplementary material during the submission procedure and will be displayed along with the published article. All supplementary files are deposited to figshare for permanent storage and receive a DOI.

Supplementary material is not typeset, so please ensure that all information is clearly presented without tracked changes/highlighted text/line numbers, and the appropriate caption is included in the file. To avoid discrepancies between the published article and the supplementary material, please do not add the title, author list, affiliations or correspondence in the supplementary files.

The supplementary material can be uploaded as:

data sheet (Word, Excel, CSV, CDX, FASTA, PDF or Zip files)

presentation (PowerPoint, PDF or Zip files)

image (CDX, EPS, JPEG, PDF, PNG or TIF/TIFF),

table (Word, Excel, CSV or PDF)

audio (MP3, WAV or WMA)

video (AVI, DIVX, FLV, MOV, MP4, MPEG, MPG or WMV).

Technical requirements for supplementary images:

300 DPIs

RGB color mode.

For supplementary material templates (LaTeX and Word), see our supplementary material templates.

References

Frontiers' journals use one of two reference styles, either Harvard (author-date) or Vancouver (numbered). Please check our help center to find the correct style for the journal to which you are submitting.

All citations in the text, figures, or tables must be in the reference list and vice-versa

The names of the first six authors followed by et al. and the DOI (when available) should be provided

Given names of authors should be abbreviated to initials (e.g., Smith, J., Lewis, C.S., etc.)

The reference list should only include articles that are published or accepted

Unpublished data, submitted manuscripts, or personal communications should be cited within the text only, for article types that allow such inclusions

For accepted but unpublished works use 'in press' instead of page numbers

Data sets that have been deposited to an online repository should be included in the reference list. Include the version and unique identifier when available

Personal communications should be documented by a letter of permission

Website URLs should be included as footnotes

Any inclusion of verbatim text must be contained in quotation marks and clearly reference the original source

Preprints can be cited as long as a DOI or archive URL is available, and the citation clearly mentions that the contribution is a preprint. If a peer-reviewed journal publication for the same preprint exists, the official journal publication is the preferred source. See the preprints section for each reference style below for more information.

Harvard reference style (author-date)

Many Frontiers journals use the Harvard referencing system; to find the correct reference style and resources for the journal you are submitting to, please visit our help center. Reference examples are found below, for more examples of citing other documents and general questions regarding the Harvard reference style, please refer to the Chicago Manual of Style.

In-text citations

For works by a single author, include the surname, followed by the year

For works by two authors, include both surnames, followed by the year

For works by more than two authors, include only the surname of the first author followed by et al., followed by the year

For humanities and social sciences articles, include the page numbers.

Reference list examples

Article in a print journal
Sondheimer, N., and Lindquist, S. (2000). Rnq1: an epigenetic modifier of protein function in yeast. Mol. Cell. 5, 163-172.

Article in an online journal
Tahimic, C.G.T., Wang, Y., Bikle, D.D. (2013). Anabolic effects of IGF-1 signaling on the skeleton. Front. Endocrinol. 4:6. doi: 10.3389/fendo.2013.00006

Article or chapter in a book
Sorenson, P. W., and Caprio, J. C. (1998). "Chemoreception," in The Physiology of Fishes, ed. D. H. Evans (Boca Raton, FL: CRC Press), 375-405.

Book
Cowan, W. M., Jessell, T. M., and Zipursky, S. L. (1997). Molecular and Cellular Approaches to Neural Development. New York: Oxford University Press.

Abstract
Hendricks, J., Applebaum, R., and Kunkel, S. (2010). A world apart? Bridging the gap between theory and applied social gerontology. Gerontologist 50, 284-293. Abstract retrieved from Abstracts in Social Gerontology database. (Accession No. 50360869)

Website
World Health Organization. (2018). E. coli. https://www.who.int/news-room/fact-sheets/detail/e-coli [Accessed March 15, 2018].

Patent
Marshall, S. P. (2000). Method and apparatus for eye tracking and monitoring pupil dilation to evaluate cognitive activity. U.S. Patent No 6,090,051. Washington, DC: U.S. Patent and Trademark Office.

Data
Perdiguero P, Venturas M, Cervera MT, Gil L, Collada C. Data from: Massive sequencing of Ulms minor's transcriptome provides new molecular tools for a genus under the constant threat of Dutch elm disease. Dryad Digital Repository. (2015) http://dx.doi.org/10.5061/dryad.ps837

Theses and dissertations
Smith, J. (2008) Post-structuralist discourse relative to phenomological pursuits in the deconstructivist arena. [dissertation/master's thesis]. [Chicago (IL)]: University of Chicago

Preprint
Smith, J. (2008). Title of the document. Preprint repository name [Preprint]. Available at: https://persistent-url (Accessed March 15, 2018).

Vancouver reference style (numbered)

Many Frontiers journals use the numbered referencing system; to find the correct reference style and resources for the journal you are submitting to, please visit our help center.

Reference examples are found below, for more examples of citing other documents and general questions regarding the Vancouver reference style, please refer to Citing Medicine.

In-text citations

Please apply the Vancouver system for in-text citations

In-text citations should be numbered consecutively in order of appearance in the text – identified by Arabic numerals in the parenthesis (use square brackets for physics and mathematics articles).

Reference list examples

Article in a print journal
Sondheimer N, Lindquist S. Rnq1: an epigenetic modifier of protein function in yeast. Mol Cell (2000) 5:163-72.

Article in an online journal
Tahimic CGT, Wang Y, Bikle DD. Anabolic effects of IGF-1 signaling on the skeleton. Front Endocrinol (2013) 4:6. doi: 10.3389/fendo.2013.00006

Article or chapter in a book
Sorenson PW, Caprio JC. "Chemoreception". In: Evans DH, editor. The Physiology of Fishes. Boca Raton, FL: CRC Press (1998). p. 375-405.

Book
Cowan WM, Jessell TM, Zipursky SL. Molecular and Cellular Approaches to Neural Development. New York: Oxford University Press (1997). 345 p.

Abstract
Christensen S, Oppacher F. An analysis of Koza's computational effort statistic for genetic programming. In: Foster JA, editor. Genetic Programming. EuroGP 2002: Proceedings of the 5th European Conference on Genetic Programming; 2002 Apr 3–5; Kinsdale, Ireland. Berlin: Springer (2002). p. 182–91.

Website
World Health Organization. E. coli (2018). https://www.who.int/news-room/fact-sheets/detail/e-coli [Accessed March 15, 2018].

Patent
Pagedas AC, inventor; Ancel Surgical R&D Inc., assignee. Flexible Endoscopic Grasping and Cutting Device and Positioning Tool Assembly. United States patent US 20020103498 (2002).

Data
Perdiguero P, Venturas M, Cervera MT, Gil L, Collada C. Data from: Massive sequencing of Ulms minor's transcriptome provides new molecular tools for a genus under the constant threat of Dutch elm disease. Dryad Digital Repository. (2015) http://dx.doi.org/10.5061/dryad.ps837

Theses and dissertations

Smith, J. (2008) Post-structuralist discourse relative to phenomological pursuits in the deconstructivist arena. [dissertation/master's thesis]. [Chicago (IL)]: University of Chicago

Preprint
Smith, J. Title of the document. Preprint repository name [Preprint] (2008). Available at: https://persistent-url (Accessed March 15, 2018).