


Factors influencing access to safely managed sanitation in sub-Saharan Africa: a systematic review protocol

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ABSTRACT

Introduction

Several interventions have been implemented to improve access for all to safely managed sanitation in sub-Saharan Africa (SSA) since the beginning of the Sustainable Development Goals in September 2015. However, consolidated evidence on how such interventions worked or not worked remains limited. The proposed systematic review aims to synthesis evidence on how, why and under which circumstances the implementation of such sanitation interventions in SSA succeeded or failed so as to draw lessons for any future similar interventions.

Methodology

A systematic review protocol was designed and registered in PROSPERO - registration number CRD42023468109. Literature searches will be conducted in multiple electronic databases (from 2015 to 2023), including PubMed, Embase, CINAHL, Scopus, African Journal Online and Google scholar. Gray literature from ProQuest and Theses Global (PQTD) will also be searched. Other databases to be searched will be from IRIS- (WHO Digital Publications), United Nation Children Emergency Fund (UNICEF) and World Bank. Keyword searches will be used to identify articles. Peer-reviewed full text articles written in English and documenting how, why and in which contexts sanitation interventions improve access to safely managed sanitation will be considered eligible for inclusion. Two reviewers will independently screen eligible titles, abstracts and full articles with the third reviewer to help resolve any disputes. Assessment risk of bias in included studies will be appraised using the appropriate Critical Appraisal Skills Programme (CASP) checklist for systematic review and disputes will be resolved through discussion and consensus. The narrative and thematic synthesis of findings will be conducted.

Discussion

Understanding how and why certain sanitation interventions contribute to safely managed sanitation in SSA could guide program implementers on how to design interventions that contribute to the attainment of Sustainable Development Goal number 6.2 of universal access for all to adequate and equitable sanitation. The review will further compliment the limited studies that focus only on sanitation in SSA.

Keywords: sanitation; sub-Saharan Africa; intervention; safely managed; universal access

Ethics disclosure

Ethical approval is not required as this is a study using secondary data which has already been published. The results will be published in a scientific journal. We intend to contribute to the expansion of knowledge regarding factors influencing access to safely managed sanitation in sub-Saharan Africa. The systematic review which will start in November 2023 is expected to be concluded by January 2024

Introduction

In 2022, only twenty four percent (24%) of the 1,166,766 population in sub-Saharan Africa had access to safely managed sanitation (1). This is against the backdrop of the Sustainable Development Goals (SDGs) launched in September 2015 that committed to “adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations”(2). Evidence has shown that lack of safely managed sanitation is among the leading cause of mortality and morbidity especially among children under five years old (3-5). Furthermore, lack of safely managed sanitation leads to economic losses as a result of productive man hours spent tending to the sick especially for women, premature death and treatment costs (6).

The World Health Organization (WHO) defines safely managed sanitation as using an improved sanitation facility that is not shared with other households and where excreta are safely disposed of in situ or treated off site (7). The Joint Monitoring Programme (JMP) further defines “improved sanitation facilities as those that are likely to ensure hygienic separation of human excreta from human contact”(8 p172))

Several sanitation interventions have been implemented in SSA to try and improve access to safely managed sanitation. Some of these interventions have included Community-led Total Sanitation (CLTS) and Participatory Hygiene and Sanitation Transformation (PHAST) which aimed at empowering the communities and households to take the lead in improving their sanitation status (9,10). Similarly, there are interventions aimed at tackling the sanitation challenges from city level by focusing on the entire sanitation service chain (from containment, emptying/transportation, treatment and disposal/reuse of human waste). One of such interventions is the City-Wide Inclusive

Sanitation (CWIS) which focus on sustainable, efficiency and effectiveness in the management of on-site sanitation and Faecal Sludge Management (OSS/FSM) services especially in non-sewered urban and peri-urban areas (11–15). However, most of the sanitation interventions in SSA have been centered on abating diseases in case of an emergency like cholera and are characterized with duplication of efforts with unclear long-term sustainability plans thus leading to perpetuating of inequalities in accessing safely managed sanitation services in urban, peri-urban and rural areas (16–18).

Most studies including monitoring systems on sanitation have been combined with water/or hygiene making it difficult to isolate sanitation enablers and barriers (19–21). Similarly, other studies have focused on some selected countries in SSA with most of them representing limited study outcomes (22–24). On the other hand, some studies have highlighted the need for involvement of stakeholders and placed emphasis on the need for gender mainstreaming in the provision and accessing sanitation services (18,25–27).

Conversely, during the data search, a similar protocol which was registered in PROSPERO on 28/02/2019 (RecordID=119988) was found. This study which is yet to be conducted is entitled ‘What factors drive the use of improved sanitation facilities and services along NSS and FSM value chains in urban areas of developing countries? A systematic review and meta-analysis’. The mentioned study differs from our proposed study in that 1) it is going to look at ‘food safety measures’ 2) it has excluded studies related to connected sanitation systems. 3) it is also going to look at studies from the year 2000 through to 2019.

Therefore, the foregoing has necessitated the undertaking of this systematic review so as to explore and consolidate evidence on the factors that have influenced access to safely managed sanitation in SSA since the introduction of the SDGs between 2015 and 2023. This period is critical to understanding efforts made by SSA countries in their quest to attaining universal access for all to safely managed sanitation. The period will further highlight what interventions have worked and not worked and why. The study will provide valuable insight into the rate of progress towards achieving SDG 6.2 and offer recommendations on how to accelerate the attainment of this goal by 2030.

Research question

What factors have influenced access to safely managed sanitation in Sub-Saharan Africa?

Objective

To explore factors that have influenced access to safely managed sanitation in Sub-Saharan Africa

Methodology

Study design

The study will utilize the Preferred Reporting Items for Systematic Review and Meta-Analysis Protocols (PRISMA-P) framework, adhering to a pre-established methodology for study inclusion

and exclusion, information sourcing, search strategy and search criteria (28). The study protocol was registered in PROSPERO, an international prospective of systematic reviews with registration number CRD42023468109 on October 10, 2023.

Eligibility criteria

Inclusion criteria:

Types of studies

The study will include full-text peer-reviewed articles written in English between 2015 and 2023. The period depicts the time the SDG (Goal 6.2) has been under implementation. The articles of interest will be those that highlight the various sanitation interventions undertaken in SSA in an effort to promote safely managed sanitation and what factors have influenced the choice of such interventions. Such factors could be sanitation technology options, cost, socio-cultural practices, gender and financing arrangements coupled with available legal and policy frameworks. Since the study will look at various sanitation interventions that trigger the uptake of safely managed sanitation – qualitative, quantitative and mixed-method studies conducted in SSA in urban, peri-urban, rural and community levels will be considered. The inclusion criteria will be guided by the Population, Intervention, Comparison and Outcome (PICO) framework (28) as outlined below.

Study Participants/Population

We will include studies where the target population are people residing in the geographical region of SSA comprising of forty-six (46) countries. These will be people of all ages, both males and females, including persons with disabilities residing in urban, peri-urban or rural areas of SSA.

Types of interventions

The study will include sanitation interventions that “are aimed at introducing, improving, or expanding coverage or use of facilities or systems for human excreta disposal and management. More specifically, sanitation interventions may include steps to reduce open defecation by constructing latrines or toilets, encouraging behaviour change to increase latrine or toilet use, as well as the upgrading of facilities to achieve a higher level of service. They may also include improvements to safely remove, convey, and treat faecal sludge, such as pit emptying and sewerage.” (29 p10).

Type of Outcomes

- Utilization of sanitation facilities
- Reduced open defecation
- Reduced morbidity and mortality rates

Exclusion criteria

This review will exclude 1) studies conducted outside of SSA countries 2) studies that do not report on how, where and/or why the interventions produced the outcomes, 3) all non-primary studies such as systematic reviews, and 4) studies not conducted in English because there are limited skills to interpret such studies.

Data sources and search strategy for relevant studies

Databases to be searched will be PubMed, Embase, CINAHL, Scopus, African Journal Online and Google scholar. Gray literature from ProQuest and Theses Global (PQTD) will also be searched. Other databases to be searched will be from IRIS- (WHO Digital Publications), United Nation Children Emergency Fund (UNICEF) and World Bank. The search will be done in collaboration with the Health Science librarian to optimize the retrieval of all the relevant articles and citations. Search strategies will include variations, MeSH terms, and explored or narrowed versions of the following key search terms sanitation, improved sanitation, toilet facilities, safely managed sanitation and safe disposal of human waste and Sub-Saharan Africa. These keywords will then be used together with their synonyms to conduct extensive searches in the databases with the assistance of Boolean operators AND, OR and NOT. Referenced articles will also be searched to lead to other relevant articles of interest.

Study selection

Citations will be imported into Mendeley citation manager to assist remove duplicates. The PICO study design will be used to screen studies for their eligibility characteristics for inclusion using the eligibility screen form (table 2). Rayyan, a free artificial intelligence (AI) web-based tool will be used to “expedite the initial screening of abstracts and titles using a process of semi-automation while incorporating a high level of usability.”(30). Two reviewers (BC and MW) will independently screen titles and abstracts of identified studies against the eligibility criteria for inclusion. Secondly, BC and MW will further screen full texts of first screened studies for final inclusion in the study. Where uncertainties will arise with regard to eligibility, JMZ, MM and JC will be consulted. Table 1 below shows the eligibility screening form:

Table 1: Eligibility screening form

STUDY CHARACTERISTICS	YES	NO	UNCLEAR
1. STUDY DESIGN			
A) Mixed-method study			
B) Quantitative study			
C) Qualitative study			
D) Systematic review			
2. GEOGRAPHICAL AREA OF STUDY			
A) Is the study from a Sub-Saharan country?			
3. STUDY PARTICIPANTS			
A) Male, female and other vulnerable groups (disabled, elderly, etc.			
B) Did the study specify the target beneficiaries – urban, peri-urban or rural participants			
4. STUDY INTERVENTION			

A) Did the study mention any intervention provided in ensuring safely managed sanitation and end open defecation?			
• On-site sanitation at community and household level interventions - CLTS and PHAST			
• City level interventions - CWIS, FSM, Sewerage systems			
• Legal and Policy reforms interventions -			
• Awareness raising and stakeholder participation that accelerate safely managed sanitation and behaviour change			
5. OUTCOMES			
A) Did the study report any of the following outcomes?			
• Uptake in utilization of sanitation facilities			
• Reduced or stopped open defecation			
• Reduced mortality and morbidity among beneficiaries			
6. DECISION			
A) Include?			
B) Exclude?			
C) Unclear?			
7. COMMENTS /REASONS FOR EXCLUSION			

Assessment risk of bias in included studies

The risk of bias in included studies will be assessed for credibility and rigor independently by two reviewers (BC and MWM), using the appropriate Critical Appraisal Skills Programme (CASP) checklists for systematic review (31). Any disagreements among the reviewers will be resolved through discussion, consensus and where this does not resolve the issue, either CJ, MM or JMZ will review the article(s) again and decide for the team accordingly. The studies will then be assigned overall scores as either 'high' (9-10), 'moderate' (7.5 -9) or 'low' (7.5) (32). The assessment of the quality of the studies will be based on the information contained therein to contribute to answering the study objective/question.

Data extraction

Two reviewers (BC and MWM) will independently extract data from the retrieved eligible studies using an adapted standardized data extraction form by the Cochrane library. Disagreements will be settled through discussions with AS, MM, CJ and JMZ. The data extracted will include the following information from each article: (1) authors and publication year, study setting, and study aim (2) study design, interventions, contexts and outcomes of interest. We will also contact primary study authors for key information when data are ambiguous or missing from the included studies.

Table 2: Data extraction guide

Study title, authors and publication year (country)	Study Aim/Study Design	Key finding(s)	Interventions	Contexts	Outcomes

Data synthesis

Narrative and thematic synthesis will be conducted so as to synthesize data. These are methods that are ideal for synthesizing evidence from a wide range of research questions and study designs with quantitative and qualitative approaches (33). Thematic synthesis will mainly be used for data sets that are too heterogeneous as anticipated for most sanitation related studies. Descriptive statistics will be provided on all included studies, in a way that indicates regional study results (East, West, South and Central Africa) to further enrich the contextualization of the findings.

Discussion

Despite the implementation of various sanitation interventions in SSA, only 24% within the seven years into the SDGs, had access to safely managed sanitation (1). Evidence has shown that poor access to safely managed sanitation leads to high mortality and morbidity rates due to high prevalence of diarrhoeal especially among children under five years old (34,35). Similarly, a study conducted by the World Bank in 2012 in eighteen countries in developing countries in SSA inclusive of Zambia, indicated that poor sanitation resulted into a loss of US\$5.5 billion each year (6). Some of the factors that have affected access to safely managed sanitation are affordability, accessibility, acceptability and quality (36–39). Many interventions have been implemented in an effort to increase the uptake to safely managed sanitation in SSA with some interventions succeeding while others failing. However, there has been limited endeavor to comprehend the factors influencing the success and failure of such interventions, as well as the underlying mechanisms and contextual nuances.

Therefore, identifying context-appropriate features to maximize the effectiveness of safely managed sanitation interventions in sub-Saharan Africa is a prerequisite to successful programs (39–43). Where data permits, this review will also examine contextual factors that increase or hinder access to safely managed sanitation in SSA. Such contextual factors may include, religion and socio-economic factors (cultural beliefs and norms, poverty) and some demographical characteristics of beneficiaries (age, gender, ethnicity, disability) (43,44)

The heterogeneity of interventions and outcomes might make it difficult to compare and synthesize the evidence across studies and to draw generalizable conclusions. However, understanding the mechanisms through which access to safely managed sanitation interventions work could help researchers and program implementers refine and adapt interventions to improve their effectiveness

and guide implementation. By identifying the mechanisms towards safely managed sanitation interventions, this review could guide creation of new models of delivering these interventions to improve access- and sustainability of safely managed sanitation services in SSA. Furthermore, it could guide policy makers on which sanitation interventions could be more effective in light of limited available financial resources experienced by most SSA countries.

The raised alarm by the United Nations in the 2020 report that at the pace the rate Goal 6.2 is being implemented, only 67% of the world population will have access to safely managed sanitation by 2030 (45). By demonstrating what works and how in specific contexts, this systematic review will guide implementation of sanitation interventions that lead to safely managed sanitation services. Furthermore, the study will potentially help close the existing inequalities and accelerate attainment of the SDG number 6.2 that seeks to ensure universal access for all to safely managed sanitation for all by 2030.

Supporting information

Declarations

This protocol is supported through the Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED) scholarship BC received in partnership with the University of Zambia. The sponsors and authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the proposed study.

Conflict of Interest

All authors have no known conflicts of interest.

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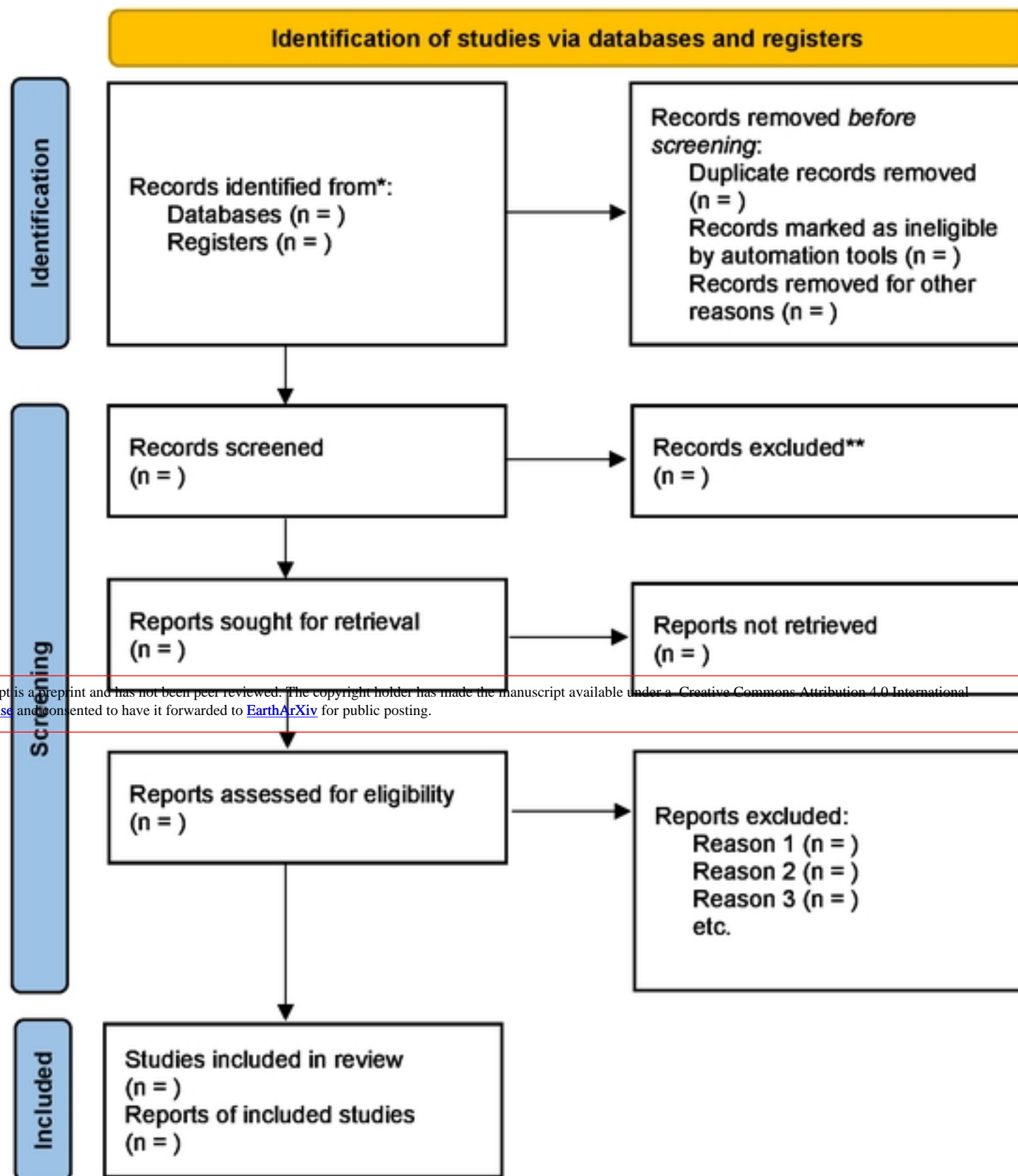
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PRISMA 2020 flow diagram for new systematic reviews which included searches of databases and registers only



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*Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers).

**If automation tools were used, indicate how many records were excluded by a human and how many were excluded by automation tools.

From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71

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