Family Planning Interventions and Infertility in Low- and Middle-Income Countries: A Systematic Review and Meta-Analysis Protocol

Kamil Fuseini

Population Council Ghana

Helen H Habib (✉ helenhhabib@gmail.com)

University of Ghana School of Public Health <https://orcid.org/0000-0001-7767-9312>

Agumasie Semahegn

Haramaya University College of Health Sciences: Haramaya University College of Health and Medical Sciences

Akua Obeng-Dwamena

Population Council Ghana

Leonie Afi Allorsey

Population Council Ghana

Rachel N Anum

Population Council Ghana

Augustine Ankomah

Population Council Ghana

Study protocol

Keywords: Infertility, fertility, sub-fertility, population, family planning, reproductive health

Posted Date: September 8th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-632212/v1>

License: © ⓘ This work is licensed under a Creative Commons Attribution 4.0 International License.

[Read Full License](#)

Abstract

Background: Infertility as a global reproductive health issue is often overlooked, despite accounts of its individual and systemic burden in populations. In LMICs, in particular, the personal and systemic factors that combine to present infertility as a significant health challenge are underinvestigated. Knowledge on the availability and access to infertility mitigating interventions is also inadequate. Furthermore, the challenges that constrain infertility-targeted interventions are often disjointly perceived as an individual problem, with scarce systemic outlook and intervention. This study seeks to explore the availability and accessibility of infertility interventions, their outcomes and challenges, as well as the regulatory and policy framework within which they operate.

Method: This review will follow the PRISMA guidelines for reporting on systematic reviews and meta-analyses. We will conduct searches of relevant MeSH terms in major electronic journal databases and grey literature of relevant organizational websites. Duplicate independent title and abstract reviews will be conducted to firstly eliminate irrelevant studies. This will be followed by full-text screening to select studies that satisfy our inclusion criteria. All selected full-text studies will be assessed for their quality using the Joanna Briggs Institute (JBI) critical appraisal checklist suitable for each methodological design. A thematic analysis of the included studies will be conducted to characterize the socio-cultural construction of infertility from individual and systemic viewpoints, as well as the outcomes and challenges of infertility interventions. Suitable quantitative studies will undergo meta-analysis using a random-effects model in the relevant software. Studies without a quantitative component will undergo only a qualitative synthesis.

Discussion: The qualitative findings will be presented as a framework demonstrating the linkages between the socio-political constructs of infertility, interventions in place to mitigate infertility and the individual and systemic challenges posed to these interventions. We anticipate the use of this framework in guiding future family planning studies targeted at addressing infertility. Findings will be published in a peer-reviewed journal and disseminated among research communities, especially in LMICs.

Trial Registration: This review protocol is registered in PROSPERO with code CRD42019130784.

Plain English Summary

Infertility is a widespread global health issue with extensive consequences for individuals and health systems. It is often overlooked in global health research and programming especially low-to-middle income countries. Infertility is often misconceived as an individual problem and therefore, very little knowledge exists on the health system and societal factors that contribute to the problem and interventions that can remedy it. The aim of this study is to explore the availability and accessibility of infertility interventions, their outcomes and challenges, as well as the regulatory and policy framework within which they operate. This includes the search, extraction and synthesis of relevant studies from major electronic journal and grey literature databases. The results of this study will be relevant in

demonstrating the relationships between the socio-cultural factors of infertility, the available interventions and the challenges posed to these interventions.

Introduction

Infertility is a global reproductive health challenge with significant contributions to morbidity in millions of men and women worldwide ¹. Infertility is defined as the failure to establish a clinical pregnancy after 12 months of regular, unprotected sexual intercourse or due to an impairment of a person's capacity to reproduce as an individual or couple ². Studies have estimated the burden of infertility to affect millions of couples worldwide, with disproportionate prevalence in low-and-middle income countries (LMICs) ³.

A study that estimated the prevalence of infertility from 25 population surveys estimated a prevalence of over 70 million infertile women globally ⁴. A 2012 study that analyzed and modelled reproductive health data from 277 Demographic Health Surveys across 190 countries and territories estimated that between 45.0 million and 52.6 million couples were affected by infertility in 2010 ⁵. The study also discovered that the highest prevalence of infertility was concentrated in developing regions. Despite evidence on the topic indicating infertility to be a reproductive health burden of significant magnitude, it persists as a disproportionately low-priority topic within reproductive health research, programming and policy, especially in LMICs ^{6–8}.

Family Planning (FP) programs, historically, have widely been perceived as a means of regulating fertility, with much less attention focused on the role of FP interventions in addressing infertility ^{9,10}. At the International Conference on Population and Development (ICPD) in Cairo in 1994, one of the targeted FP aims of the ICPD for the next 20 years was “to help couples and individuals meet their reproductive goals in a framework that promotes optimum health, responsibility and family well-being, and respects the dignity of all persons and their right to choose the number, spacing and timing of the birth of their children” ¹¹. This objective highlighted infertility as an FP challenge in the true sense of the term. In light of this objective, among calls to action of participating bodies, governments were encouraged to “...assist couples and individuals to achieve their reproductive goals and give them the full opportunity to exercise the right to have children by choice” ¹¹. Innately, the ICPD's vision included the provision of infertility interventions as a component of FP service delivery. However, the role of FP research, programs and policies in addressing infertility have been largely ignored or underutilized ^{7,8}. This is in part responsible for the paucity of evidence on FP interventions that improve the lives of individuals and couples affected by infertility, especially in low-resourced contexts ¹².

Evidence on the individual and socio-cultural perceptions of infertility is important to understand its true burden and the trends of prevalence. It is also essential to understand the types of infertility interventions available in LMICs, how they are accessed as well as the implementation challenges from individual, population and systemic perspectives. Pragmatically, the review will characterize the linkages between the individual and systemic factors that come into play in the design and implementation of interventions

and how they affect intervention outcomes. It is expected that the study findings can be of benefit to future research, policy development and programming to address infertility in LMICs.

Research Objective And Questions

This systematic review aims to synthesize the evidence on infertility interventions, policies, and regulatory frameworks, as well as their availability and accessibility constraints amongst individuals and couples especially in LMICs. Our research questions are:

1. What are the types of infertility interventions?
2. What are the key challenges in the design and implementation of interventions?
3. How accessible and available are infertility interventions?
4. What are the outcomes of infertility interventions and how are these outcomes measured?
5. What policies or regulation frameworks exist to address infertility?

The estimation of the global burden of infertility is often challenging. This is attributable in part, to global disparities in the definition of infertility, socio-cultural constructions of infertility which may foster underreporting, as well as variances in the tools and methods used in the measurement of infertility ^{3,13}. With respect to interventions, disparities may exist in their definitions and characterization, especially in LMIC contexts where non-clinical methods may be popular among infertile people due to widespread challenges in accessing clinically approved standardized infertility treatments ¹⁴. These non-clinical interventions may include herbal/traditional treatments, religious/spiritual procedures, culturally approved surrogacies or adoptions or any combination of these ¹⁵⁻¹⁸. The availability, desirability and success of interventions are also dependent on several personal and socio-political factors which include but may not be limited to social pressures to biologically bear children, especially in pro-natalist populations ¹⁹, the availability of personal funds to access often-times expensive interventions without incurring catastrophic expenditure ^{20,21}, and the geographical spread of services and facilities within countries ²². In addition to these personal and social factors, understanding of health policy and systems factors that mediate access, treatment, and management options is paramount in investigations to better understand infertility interventions and effectively address their constraints.

In this research, we seek to answer questions on the “what”: what the issue is, what interventions are available to mitigate it, what are the results, and what are the possible challenges with the currently available remedies. We further seek to identify at the systemic and individual levels what is available in terms of services, programmes and policies that are currently in use for mitigating infertility. Finally, we seek to know what the multi-level challenges are with available FP interventions that address infertility, and how they ultimately affect intervention results.

Our findings will be used to develop a framework to assist in program design and implementation especially in LMICs. A synthesis of the types of interventions available in these contexts will also be

conducted. A conceptualization of the challenges; individual, socio-political and health system that face infertility interventions, also forms an integral portion of our proposed review.

This review will help shape future FP and other programs aimed at addressing infertility by underscoring the magnitude of the often-ignored problem of infertility, provide a context and framework for policy development and help identify the individual and socio-political implications of programming challenges.

Review Methods

We will synthesize both quantitative and qualitative research that investigates primary as well as secondary infertility. The quantitative studies are aimed at estimating the burden of infertility since 1960, which marks a period of widespread concern about rapid global population growth and the onset of organised family planning interventions in LMICs. Our review of the included studies will conceptualize the narrative around personal and socio-cultural constructs of infertility, available interventions and their related challenges. We shall also review evidence on the evaluations of these interventions and their outcomes at individual and population levels as well as the related challenges. This review protocol is registered in PROSPERO with code CRD42019130784.

Inclusion criteria

- Primary qualitative and quantitative research studies that examine any type of infertility i.e. primary and secondary among both men and women
- Observational & experimental study designs (cross-sectional, case-control studies, cohort studies, randomized control trials)
- Studies conducted in low and middle-income countries (LMICs)
- Published between January 1960 and December 2020.
- Published in English.

Exclusion criteria

- Studies that do not focus on infertility as a primary research objective.
- Editorials, commentaries, case reports, and brief reports on family planning

Information Sources

We will conduct searches of MeSH terms and combined words in major electronic journal databases that report on FP and infertility issues such as PubMed, Medline, EMBASE, CINHALL, POPLINE, Web of Science, African Medicus, Google Scholar and HINARI. We shall also conduct grey literature searches in relevant organizational websites such as WHO, UNFPA, IPPF, Population Council, and PSI.

Search Strategy

Our search strategy will be implemented across all databases. The search strings are attached as Appendix 1.

Screening

Screening across databases will be conducted with a custom-developed Ms-Excel tool created specifically for the purpose of this review. Two reviewers will conduct title and abstract screening in the first stage. At the next stage, two reviewers will screen full text to identify included studies. A third reviewer will provide inputs to resolve any disagreements and to finalize selection at both levels of screening. The study selection process will be carried out according to the preferred reporting items for systematic review and meta-analysis (PRISMA) flow diagram. The reason for the exclusion the of any study will be described in detail.

Appraisal

All selected full-text studies will be assessed for their quality using the Joanna Briggs Institute (JBI) critical appraisal checklist suitable for each methodological design. All papers will be independently appraised by two reviewers in duplicate. A third reviewer will have the responsibility of resolving any disparities between the two independent appraisals.

Extraction

The extraction of studies will be conducted using a specially developed Ms-Excel extraction template. The template will have sections which will be populated with data including author, year of publication, country, study design and reported prevalence of infertility. Detailed information on any interventions or policies will also be collected including the overseeing body, the target, dosage, and theoretical underpinning. Additionally, we shall draw information on key findings, conclusions, limitations, and recommendations of the studies. Appendix 2 is a representation of the extraction tool. Extraction will be conducted independently by two reviewers.

Analysis

The data will first undergo a narrative synthesis of the included studies. A summary table will be developed to describe the study characteristics of the included articles. A thematic analysis of the studies will then be conducted on the included qualitative studies to characterize the spectrum of infertility interventions, and their accessibility and availability in LMICs. We shall also thematize the key design, implementation and evaluation challenges with respect to these interventions. The documented individual, population-level and health system outcomes of these interventions will also be thematically analyzed. Also included in the analyses will be the existing political and regulatory frameworks within which these interventions are situated and operate. Studies which are deemed suitable for quantitative synthesis will undergo meta-analysis. This will be conducted using a random-effects model in a suitable software application (CMA, RevMan, STATA or R). Studies without a quantitative component and are thus unsuitable for meta-analyses will only undergo qualitative synthesis.

Output And Dissemination

The results of this review will be presented according to the PRISMA guidelines for reporting. Our qualitative findings will be presented as a framework demonstrating the linkages between available infertility interventions, their accessibility to individuals and couples, the challenges with these interventions at individual, population and health system levels as well as the regulatory and policy context of these interventions. We anticipate that this framework will help guide future FP studies targeted at addressing infertility. The findings of this review will be published in a peer-reviewed journal and disseminated among research communities, especially in LMICs.

Discussion

The proposed review may be among the first of its kind to synthesize the linkage between FP infertility interventions, their availability and accessibility, as well as the challenges that face these interventions from the individual, population and systemic viewpoints in LMICs. We seek to understand the individual and systemic factors that come into play in the design and implementation of infertility interventions. Furthermore, we seek to highlight the recorded successes of infertility mitigating interventions. We also seek to identify the gaps and constraints faced by both individuals and health systems in addressing this reproductive health problem in LMIC contexts. It is anticipated by the authors that this review will inform effective research, programming and policy development on infertility especially in LMICs.

Abbreviations

FP	–	Family Planning
ICPD	–	International Conference on Population and Development
JBI	–	Joanna Briggs Institute
LMICs	–	Low-and Middle-Income Countries
MeSH	–	Medical Subject Headings
PRISMA	–	Preferred Reporting Items for Systematic Reviews and Meta-Analyses

Declarations

Ethics approval and consent to participate

This review protocol has been granted exemption by the Institutional Review Board of the Population Council as it does not involve any identifying information and will make use of information already in the public domain.

Consent for publication

Not Applicable

Availability of data and materials

Not Applicable

Competing interests

The authors declare that they have no competing interests.

Funding

There has been no major external funding received for this protocol.

Authors' contributions

KM, HHH and AA conceptualised and drafted this protocol. KM, HHH, AOD, LAA, RNA, and AA supported the development of the protocol and reviewed all draft versions. All the authors read and approved the final version of this manuscript.

Acknowledgements

Not Applicable

References

1. Vander Borcht M, Wyns C. Fertility and infertility: Definition and epidemiology. Vol. 62, Clinical Biochemistry. Elsevier Inc.; 2018. p. 2–10.
2. WHO. Eleventh revision of the International Classification of Diseases Report by the Director-General [Internet]. 2019 [cited 2021 Apr 7]. Available from: <http://www.who.int/classifications/network/meeting2016/ICD->
3. Rutstein S, Iqbal S. Infecundity, Infertility, and Childlessness in Developing Countries [Internet]. 2004 [cited 2021 Apr 7]. Available from: <http://www.measuredhs.com>
4. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment-seeking: Potential need and demand for infertility medical care. Hum Reprod [Internet]. 2007 [cited 2021 Apr 7];22(6):1506–12. Available from: <https://pubmed.ncbi.nlm.nih.gov/17376819/>
5. Mascarenhas MN, Flaxman SR, Boerma T, Vanderpoel S, Stevens GA. National, Regional, and Global Trends in Infertility Prevalence Since 1990: A Systematic Analysis of 277 Health Surveys. PLoS Med. 2012 Dec;9(12).
6. Morshed-Behbahani B, Lamyian M, Joulaei H, Rashidi BH, Montazeri A. Infertility policy analysis: a comparative study of selected lower middle- middle- and high-income countries. Global Health

- [Internet]. 2020 Dec 1 [cited 2021 Apr 7];16(1):1–9. Available from: <https://link.springer.com/articles/10.1186/s12992-020-00617-9>
7. Inhorn MC, Patrizio P. Infertility around the globe: New thinking on gender, reproductive technologies and global movements in the 21st century. *Hum Reprod Update*. 2014 Oct 31;21(4):411–26.
 8. Gipson JD, Bornstein MJ, Hindin MJ. Infertility: A continually neglected component of sexual and reproductive health and rights. *Bull World Health Organ*. 2020 Jul 1;98(7):505–6.
 9. WHO. Infertility [Internet]. WHO Infertility Fact Sheet. 2020 [cited 2021 Apr 7]. Available from: <https://www.who.int/news-room/fact-sheets/detail/infertility>
 10. Slavinsky Atlas R, Martinelli DD. Why infertility services should be provided by family planning agencies. *J Nurse Midwifery*. 1979 Jul 1;24(4):33–5.
 11. UNFPA. International Conference on Population and Development Programme of Action | UNFPA - United Nations Population Fund [Internet]. 2014 [cited 2021 Apr 19]. Available from: <https://www.unfpa.org/publications/international-conference-population-and-development-programme-action>
 12. Friday O, Datta B. What about us? Bringing infertility into reproductive health care [Internet]. 2002 [cited 2021 Apr 7]. Available from: https://knowledgecommons.popcouncil.org/departments_sbsr-pgy
 13. Gurunath S, Pandian Z, Anderson RA, Bhattacharya S. Defining infertility—a systematic review of prevalence studies. *Hum Reprod Update* [Internet]. 2011 Sep 1 [cited 2021 Apr 7];17(5):575–88. Available from: <http://academic.oup.com/humupd/article/17/5/575/756688/Defining-infertility-a-systematic-review-of>
 14. Hess RF, Ross R, Gililand Jr JL. Infertility, Psychological Distress, and Coping Strategies among Women in Mali, West Africa: A Mixed-Methods Study. *Afr J Reprod Heal* [Internet]. 2018/05/20. 2018;22(1):60–72. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/29777643>
 15. Oladokun A, Arulogun O, Oladokun R, Morhason-Bello IO, Bamgboye EA, Adewole IF, et al. Acceptability of child adoption as management option for infertility in Nigeria: evidence from focus group discussions. *Afr J Reprod Health* [Internet]. 2009;13(1):79–91. Available from: <http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=105340778&site=ehost-live>
 16. Donkor ES, Sandall J. Coping strategies of women seeking infertility treatment in Southern Ghana. *Afr J Reprod Health* [Internet]. 2009;13(4):81–93. Available from: <http://search.ebscohost.com/login.aspx?direct=true&db=ccm&AN=105208938&site=ehost-live>
 17. Ofosu-budu D. Ways of reducing the stigma of infertility: Views of infertile women and their herbalists. 2021;25(April):110–9.
 18. Armah D, Wath A Van Der, Yazbek M, Naab F. Holistic management of female infertility: A systematic review. 2021;25(April):150–61.
 19. Inhorn MC, Bharadwaj A. Inhorn-Chapter-Reproductively-Disabled-Lives-Egypt-India. In: *Disability in Local & Global Worlds*. University of California Press; 2007.

20. Nachtigall RD. International disparities in access to infertility services. *Fertil Steril* [Internet]. 2006 [cited 2021 Apr 7];85(4):871–5. Available from: <https://pubmed.ncbi.nlm.nih.gov/16580367/>
21. Kyei JM, Manu A, Kotoh AM, Meherali S, Ankomah A. Challenges experienced by clients undergoing assisted reproductive technology in Ghana: An exploratory descriptive study. *Int J Gynecol Obstet*. 2020;149(3):326–32.
22. Asemota O, Klatsky P. Access to Infertility Care in the Developing World: The Family Promotion Gap. *Semin Reprod Med* [Internet]. 2015 Jan;33(01):17–22. Available from: <http://www.thieme-connect.de/DOI/DOI?10.1055/s-0034-1395274>

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementaryInformation.docx](#)