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Colin Gordy
University of Mississippi

Dylan Barker
University of Mississippi

Marie Barnard
University of Mississippi

Sudeshya Roy
University of Mississippi

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Exploring Global Disparities in Tuberculosis Treatment and Outcomes: A Scoping Review of Gender-Based Perspectives and Implications for Women's Health

Colin Gordy¹, Dylan Barker², Sudeshna Roy¹, PhD, Marie Barnard, PhD²

1. University of Mississippi Department of BioMolecular Sciences
2. University of Mississippi Department of Pharmacy Administration

Introduction

Tuberculosis (TB) is a highly transmissible and prevalent infectious disease caused by *Mycobacterium tuberculosis*. It primarily affects the pulmonary system, with occasional dissemination to other parts of the body. TB has historically been a leading cause of morbidity and mortality across the world, with the bulk of cases and deaths being observed in low- to middle-income countries. While preventative TB measures like the Bacillus Calmette-Guérin (BCG) vaccine and anti-TB treatment regimens have existed for decades, worldwide TB control efforts continue to face numerous obstacles. These hurdles may involve, among others, the emergence of drug-resistant strains and the ongoing HIV epidemic, both of which further heighten TB transmission and progression.

TB is non-discriminatory and can infect people of all ages, genders, and regions. Recorded epidemiological data have consistently suggested that men experience much higher incidence, morbidity, and mortality from TB disease compared to women, on average. This discrepancy is possibly attributable to a variety of factors, such as sociocultural determinants, biological/behavioral differences, and unequal access to medical care. Additionally, women may be more likely to face significant barriers in accessing TB services due to social stigma, gender discrimination, and differing societal expectations to abide by certain gender roles, resulting in adverse effects on their diagnosis, treatment, and outcome.

This scoping review aims to explore such gender-specific disparities and highlight the unique disadvantages that women suffer in the context of TB. By mapping existing literature on women's experience with TB, this review will then seek to uncover the underlying factors giving rise to these inequalities and to identify gaps in existing knowledge around the topic. Its goal is to serve as an informative tool for the basis for future research and policymaking so that more effective outcomes in TB prevention and treatment can be achieved for women globally. Addressing the problems that women face is essential for establishing more equitable anti-TB measures.

Review question

This review seeks to delineate what is known about the biosocial, economic, and healthcare-related factors leading to the disparities experienced by women in tuberculosis (TB) prevention, treatment, and outcomes on a global scale.

Keywords

Tuberculosis, Women, Women's Health, Socioeconomic Factors, Healthcare Disparities, Sex, Sex Factors, Treatment, Outcomes

Eligibility criteria

Participants

Studies focusing on women who have reached maturity, including adolescents if applicable, on a global scale will be included. Studies that focus on men, children, or mixed-gender populations without separate analysis for women will be excluded. Women who are pregnant and have a TB diagnosis will be included.

Concept

Studies that focus on knowledge, attitudes, beliefs, behaviors, and disparities in prevention, treatment, and outcomes related to TB as they pertain to women will be included.

Context

Studies conducted in any setting after the year 1990, including hospitals, at home treatment (e.g., Directly Observed Therapy-Short Term (DOTST)), and community treatment centers, will be included. Type of healthcare setting, including style of institution (e.g., public/private, at home, etc.) and geographic distribution of studies will be mapped.

Outcomes

Outcomes of the studies and the types of instruments utilized to assess any outcomes will be mapped descriptively but will not be analyzed.

Types of Sources

This scoping review will consider a comprehensive range of study designs to explore the biosocial, economic, and healthcare-related factors leading to disparities in TB prevention, treatment, and outcomes experienced by women. Both experimental and quasi-experimental study designs will be included, such as randomized controlled trials, non-randomized controlled trials, before-and-after studies, and interrupted time-series studies. In addition, analytical observational studies, including prospective and retrospective cohort studies, case-control studies, and analytical cross-sectional studies, will be considered for inclusion. Descriptive observational study designs, such as cross-sectional studies, will also be included, but case series and individual case reports, will not. Qualitative studies focusing on the experiences and perspectives of women, using methodologies such as phenomenology, grounded theory, ethnography, barriers and facilitators, qualitative description, action research, and feminist research, will be considered. Additionally, text and opinion papers that

provide expert insights into the gender-specific challenges of TB will be included in this scoping review.

Methods

This scoping review will be conducted in accordance with the JBI methodology for scoping reviews.²

Search strategy

The search strategy will aim to locate published and peer-reviewed studies from a variety of databases. An initial limited search of PubMed MEDLINE was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles, and the index terms used to describe the articles will be used to develop a full search strategy for PubMed, CINAHL, and Embase. The search strategy, including all identified keywords and index terms, will be adapted for each included database and/or information source. Only studies published in English will be included. Any studies not published in English will be excluded.

Study/Source of Evidence selection

Following the search, all identified citations will be collated and uploaded into Zotero and duplicates removed. Following a pilot test, titles and abstracts will then be screened by two or more independent reviewers for assessment against the inclusion criteria for the review. Potentially relevant sources will be retrieved in full. The full text of selected citations will be assessed in detail against the inclusion criteria by two or more independent reviewers. Reasons for exclusion of sources of evidence at full text that do not meet the inclusion criteria will be recorded and reported in the scoping review. Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion, or with an additional reviewer/s. The results of the search and the study inclusion process will be reported in full in the final scoping review and presented in a Preferred Reporting Items for Systematic Reviews and Meta-analyses extension for scoping review (PRISMA-ScR) flow diagram.³

Data Extraction

Data will be extracted from papers included in the scoping review by two or more independent reviewers using a data extraction tool developed by the study research team. The data extracted will include specific details about the characteristics of the women in the reported studies, the geographical setting and location of treatment, the study methods (e.g., study design, data collection methods and instruments), and the descriptive and/or outcome data related to knowledge, attitudes, beliefs, behaviors, and treatment related to TB and women's health. The draft extraction form will be piloted by the reviewers, with at least three papers being extracted independently by each reviewer and the data compared. While conducting the first three data abstractions, the reviewers will make notes about any needed updates to the extraction form. These will be discussed with the comparison of the extracted data. The extraction form will be updated as needed and the rest of the articles will then be extracted. Any modifications will be detailed in the scoping review.

Data Analysis and Presentation

Data will be reported in tabular or graphical format, where appropriate. Study populations and settings will be mapped in detail and will include a graphical representation of the study focus (e.g., women, pregnant women, adolescents, etc.) as well as a narrative summary of the characteristics of the study aims. The type of student design and methods of assessment will be descriptively mapped as well. Dissemination of the findings is planned via academic conferences and publication in a peer-reviewed journal.

Funding

No external funding will be utilized to conduct this review.

Conflicts of interest

None of the authors have any conflicts of interest to report.

References

1. Global tuberculosis report 2023. Geneva: World Health Organization; 2023. Licence: CC BY-NC-SA 3.0 IGO.
2. Peters MDJ, Marnie C, Tricco AC, et al. Updated methodological guidance for the conduct of scoping reviews. *JBI Evid Synth.* 2020;18(10):2119-2126. doi:10.11124/JBIES-20-00167
3. Tricco AC, Lillie E, Zarin W, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169(7):467. doi:10.7326/M18-0850

Appendices

Appendix I: Search strategy

Search strategy for PubMed:

Search number	Query
9	#6 AND #7 AND #8
8	(#1 AND #2 AND #3 AND #4) AND ("adult"[Filter])
7	(#1 AND #2 AND #3 AND #4) AND ("female"[Filter])
6	(#1 AND #2 AND #3 AND #4) AND ("english"[Filter] OR "english and humans"[Filter])
5	#1 AND #2 AND #3 AND #4
4	"Tuberculosis/diagnosis"[Mesh] OR "Tuberculosis/drug therapy"[Mesh] OR "Tuberculosis/epidemiology"[Mesh] OR "Tuberculosis/pathology"[Mesh] OR "Tuberculosis/prevention and control"[Mesh] OR "Tuberculosis/rehabilitation"[Mesh] OR "Tuberculosis/therapy"[Mesh] OR

	"Tuberculosis/transmission"[Mesh] OR tuberculosis therapeutic*[tiab] OR tuberculosis treatment*[tiab] OR tuberculosis outcome*[tiab] OR tuberculosis treatment compliance[tiab] OR tuberculosis treatment adherence[tiab] OR tuberculosis treatment in women[tiab]
3	"Sex Factors"[Mesh] OR "Sex Differentiation"[Mesh] OR "Sex Chromosomes"[Mesh] OR "Sex Characteristics"[Mesh] OR "Gender Role"[Mesh] OR "Sex"[Mesh] OR sex ineq*[tiab] OR gender ineq*[tiab] OR gender disparit*[tiab] OR gender gap*[tiab]
2	"Women"[Mesh] OR "Women's Health Services"[Mesh] OR "Pregnancy Complications, Infectious/epidemiology"[Mesh] OR "Pregnancy Complications, Infectious/microbiology"[Mesh] OR "Pregnancy Complications, Infectious/prevention and control"[Mesh] OR "Health Inequities"[Mesh] OR "Socioeconomic Disparities in Health"[Mesh] OR "Healthcare Disparities"[Mesh] OR "Health Services Accessibility"[Mesh] OR "Socioeconomic Factors"[Mesh] OR female health[tiab] OR female health service*[tiab] OR women* health*[tiab] OR women* health* service*[tiab] OR health* inequit*[tiab] OR disparit*[tiab] OR health* disparit*[tiab]
1	"Tuberculosis"[Mesh] OR "Mycobacterium tuberculosis"[Mesh] OR tuberculosis[tiab] OR TB[tiab]

Search strategy for CINAHL

#	Query	Limiters/Expanders	Last Run Via	Results
S5	S1 AND S2 AND S3 AND S4	Expanders - Apply	Interface - EBSCOhost	123
S4	(MH Tuberculosis/diagnosis+) OR (MH "Tuberculosis/drug therapy+") OR (MH Tuberculosis/epidemiology+) OR (MH Tuberculosis/pathology+) OR (MH "Tuberculosis/prevention and control+") OR (MH Tuberculosis/rehabilitation+) OR (MH Tuberculosis/therapy+) OR (MH Tuberculosis/transmission+) OR (TI "tuberculosis therapeutic" OR AB "tuberculosis therapeutic") OR (TI "tuberculosis treatment" OR AB "tuberculosis treatment") OR (TI "tuberculosis outcome" OR AB "tuberculosis outcome") OR (TI "tuberculosis treatment compliance" OR AB "tuberculosis treatment compliance") OR (TI "tuberculosis treatment adherence" OR AB "tuberculosis treatment adherence") OR (TI "tuberculosis treatment in women" OR AB "tuberculosis treatment in women")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	18,298
S3	(MH "Sex Factors+") OR (MH "Sex Differentiation+") OR (MH "Sex Chromosomes+") OR (MH "Sex Characteristics+") OR (MH "Gender Role+") OR (MH Sex+) OR (TI "sex ineq" OR AB "sex ineq") OR (TI "gender ineq" OR AB "gender ineq") OR (TI "gender disparit" OR AB "gender disparit") OR (TI "gender gap" OR AB "gender gap")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	145,748
S2	(MH Women+) OR (MH "Women's Health Services+") OR (MH "Pregnancy Complications, Infectious/epidemiology+") OR (MH "Pregnancy Complications, Infectious/microbiology+") OR (MH "Pregnancy Complications, Infectious/prevention and control+") OR (MH "Health Inequities+") OR (MH "Socioeconomic Disparities in Health+") OR (MH "Healthcare Disparities+") OR (MH "Health Services Accessibility+") OR (MH "Socioeconomic Factors+") OR (TI "female health" OR AB "female health") OR (TI "female health service" OR AB "female health service") OR (TI "women* health" OR AB "women* health") OR (TI "women* health* service" OR AB "women* health* service") OR (TI "health* inequit" OR AB "health* inequit") OR (TI "disparit" OR AB "disparit") OR (TI "health* disparit" OR AB "health* disparit")	Expanders - Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	601,178
S1	(MH Tuberculosis+) OR (MH "Mycobacterium tuberculosis+") OR (TI tuberculosis OR AB tuberculosis) OR (TI TB OR AB TB)	Expanders - Apply equivalent subjects Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	35,990

Search strategy for Embase

(((("tuberculosis"/exp OR 'mycobacterium tuberculosis'/exp OR 'tuberculosis':ti,ab,kw OR 'tb':ti,ab,kw) AND 'female'/exp OR 'health service'/exp OR 'infectious pregnancy complications'/exp/dm_ep OR ('infectious pregnancy complications'/exp AND 'microbiology'/de) OR 'infectious pregnancy

complications'/exp/dm_pc,dm_dr OR 'health disparity'/exp OR 'health care disparity'/exp OR 'health care access'/exp OR 'socioeconomics'/exp OR 'female health':ti,ab,kw OR 'female health service*':ti,ab,kw OR 'women* health*':ti,ab,kw OR 'women* health* service*':ti,ab,kw OR 'health* inequit*':ti,ab,kw OR 'disparit*':ti,ab,kw OR 'health* disparit*':ti,ab,kw) AND 'sex factor'/exp OR 'sex differentiation'/exp OR 'sex chromosome'/exp OR 'sexual characteristics'/exp OR 'sex role'/exp OR 'sex'/exp OR 'sex ineq*':ti,ab,kw OR 'gender ineq*':ti,ab,kw OR 'gender disparit*':ti,ab,kw OR 'gender gap*':ti,ab,kw) AND 'tuberculosis'/exp/dm_di OR 'tuberculosis'/exp/dm_dt OR 'tuberculosis'/exp/dm_ep OR ('tuberculosis'/exp AND 'pathology'/de) OR 'tuberculosis'/exp/dm_pc,dm_dr OR 'tuberculosis'/exp/dm_rh OR 'tuberculosis'/exp/dm_th OR ('tuberculosis'/exp AND 'disease transmission'/de) OR 'tuberculosis therapeutic*':ti,ab,kw OR 'tuberculosis treatment*':ti,ab,kw OR 'tuberculosis outcome*':ti,ab,kw OR 'tuberculosis treatment compliance':ti,ab,kw OR 'tuberculosis treatment adherence':ti,ab,kw OR 'tuberculosis treatment in women':ti,ab,kw) AND ('tuberculosis'/exp OR 'mycobacterium tuberculosis'/exp OR 'tuberculosis':ti,ab,kw OR 'tb':ti,ab,kw) AND ('female'/exp OR 'health service'/exp OR 'infectious pregnancy complications'/exp/dm_ep OR ('infectious pregnancy complications'/exp AND 'microbiology'/de) OR 'infectious pregnancy complications'/exp/dm_pc,dm_dr OR 'health disparity'/exp OR 'health care disparity'/exp OR 'health care access'/exp OR 'socioeconomics'/exp OR 'female health':ti,ab,kw OR 'female health service*':ti,ab,kw OR 'women* health*':ti,ab,kw OR 'women* health* service*':ti,ab,kw OR 'health* inequit*':ti,ab,kw OR 'disparit*':ti,ab,kw OR 'health* disparit*':ti,ab,kw) AND ('sex factor'/exp OR 'sex differentiation'/exp OR 'sex chromosome'/exp OR 'sexual characteristics'/exp OR 'sex role'/exp OR 'sex'/exp OR 'sex ineq*':ti,ab,kw OR 'gender ineq*':ti,ab,kw OR 'gender disparit*':ti,ab,kw OR 'gender gap*':ti,ab,kw) AND ('tuberculosis'/exp/dm_di OR 'tuberculosis'/exp/dm_dt OR 'tuberculosis'/exp/dm_ep OR ('tuberculosis'/exp AND 'pathology'/de) OR 'tuberculosis'/exp/dm_pc,dm_dr OR 'tuberculosis'/exp/dm_rh OR 'tuberculosis'/exp/dm_th OR ('tuberculosis'/exp AND 'disease transmission'/de) OR 'tuberculosis therapeutic*':ti,ab,kw OR 'tuberculosis treatment*':ti,ab,kw OR 'tuberculosis outcome*':ti,ab,kw OR 'tuberculosis treatment compliance':ti,ab,kw OR 'tuberculosis treatment adherence':ti,ab,kw OR 'tuberculosis treatment in women':ti,ab,kw)