BMJ Open

Gender differences in antibiotic use behaviour and access to antibiotics in low- and middle-income countries: a scoping review protocol

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To cite: Adewusi OJ, Cassidy R, Aboderin A, *et al*. Gender differences in antibiotic use behaviour and access to antibiotics in low- and middle-income countries: a scoping review protocol. *BMJ Open* 2024;**14**:e081279. doi:10.1136/bmjopen-2023-081279

► Prepublication history for this paper is available online. To view these files, please visit the journal online (https://doi.org/10.1136/bmjopen-2023-081279).

Received 23 October 2023
Accepted 30 September 2024

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ABSTRACT

Introduction In low- and middle-income countries (LMICs), the persistent lack of access and high inappropriate use of antibiotics, which are fuelled by gender-related factors, continue to facilitate antimicrobial resistance. This in turn reduces the capacity to treat infectious diseases. However, there is a lack of clarity on the nature and extent of the available evidence on gender influence on access to antibiotics and antibiotic use behaviour. This proposed study will systematically review the available literature to map out the scope of evidence on gender differences and, importantly, the related factors influencing antibiotic use and access to antibiotics in LMICs.

Methods and analysis This scoping review will be conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for scoping reviews. Major databases (MEDLINE, PsycINFO and CINAHL) will be searched via the EBCOhost and Web of Science platforms for peer-reviewed articles. Title and abstract screening, as well as full paper review, will be conducted by a single reviewer, with 20% of identified citations reviewed independently by two other reviewers. A predefined excel spreadsheet will be used for data extraction and analysis. Findings will be presented thematically in a narrative summary and tables.

Ethics and dissemination Obtaining ethics approval is not required for this study. The findings will contribute to understanding gender health inequalities and areas for further research on strategies to incorporate gender considerations in antimicrobial stewardship efforts in LMICs. The study findings will be disseminated through presentations in seminars, scientific conferences and publications in peer-reviewed journals.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This scoping review will identify research from a range of medical, sociological and anthropological databases.
⇒ The review will be carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for scoping review.
⇒ Studies conducted on gender differences in antibiotic use and access to antibiotics in low- and middle-income countries across all the continents will be identified.
⇒ All empirical studies (both quantitative and qualitative studies) will be identified and included in this review.
⇒ The review will be limited to publications in English language and antibiotic use in humans.

INTRODUCTION

The rates of antimicrobial resistance (AMR) are increasing worldwide especially in low- and middle-income countries (LMICs),[1] resulting in the use of broad-spectrum antibiotics, including those considered as last resort for the treatment of bacterial infections.[2] This leaves clinicians with limited therapeutic options for the treatment of infections, and potentially a future inability to treat infections. Apart from the clinical implications, AMR will significantly increase healthcare costs and poverty.[3] The World Bank predicted a 100 trillion USD global production loss by 2050 if there are no AMR policy interventions.[4]

Notably, AMR is fuelled largely by modifiable human behaviour, primarily inappropriate or irrational antibiotic use.[1] As evidenced by the growing literature, behaviour change in antibiotic use is complex and non-linear.[1] This is reflected in the dynamics around self-medication,[5] non-adherence to medical prescription[6] and use of antibiotics for viral infections.[7] The complexities in antibiotic use behaviour are fuelled by factors such as the lived experience of illness, social perception of antibiotics, access and cost of antibiotics, and societal expectation of disease treatment.[8] Previous studies also showed that inappropriate antibiotic use behaviour in LMICs is associated with income, level of education, perception of illness and antibiotics and sex.[5 6 9]

Despite the increasing use of antibiotics, there are reported inequity gaps in access to this medicine. The lack of, and delayed access to, antimicrobials was reportedly responsible for more deaths than AMR.[10] Mostly in LMICs, inadequate access to antibiotics to treat pneumonia among under-5 children was responsible for a significant number of deaths, and about 75% of mortality among under-5 children due to community-acquired pneumonia could be averted by providing adequate and timely access to antibiotics.[10]

The Centre for Disease Dynamics, Economics and Policy reported in 2019 that LMICs had limited access to antibiotics compared with their high-income country counterparts. This finding was attributed to patients' financial incapability, limited resource allocations to health by central governments and poor local and international infrastructure to support distribution of drugs.[11] The report revealed that dying from treatable microbial infections due to lack of access to adequate antibiotics indirectly fuels AMR. As a result of bacterial resistance to first-line antibiotics, more expensive higher lines of antibiotics are needed to treat infections, however, lack of access to these higher-line antibiotics could result in the use of available ineffective ones, which could subsequently lead to death. Furthermore, spread of such untreatable infection further creates a cycle of ineffective antibiotic use.[11]

Access to essential medicine, including antibiotics, refers to the ability to sufficiently obtain the required medicines.[12] The equitable medicine access framework developed by the WHO highlighted four key blocks namely rational selection and use of essential medicines, affordable prices, sustainable financing and reliable health and supply systems. Although the last two blocks in the framework (sustainable financing and reliable health and supply systems) rely primarily on the functionality of a country's health system, drug consumers or end users have pivotal roles to play in the first two blocks (rational selection and affordable prices).[12]

The contributions of gender to health are well documented, playing crucial direct and indirect dynamic roles in disease perceptions, prevention practices, health-seeking behaviour and treatment, and access to healthcare.[13 14] The pattern of gender health inequalities varies according to the context.[15]

Women often lack control of economic resources, may be unable to independently make health decisions and hence, are unable to access needed healthcare.[16] For instance, with 26% poverty incidence and 17% access to healthcare services among women-headed households compared with 24% poverty incidence and 41% access to healthcare services among male-headed households in Nigeria,[17 18] the likelihood of inappropriate antibiotics use behaviour is higher for women. Similarly, the experience of being labelled promiscuous and 'wayward' by health workers when suffering from sexually transmitted diseases and urinary tract infections could encourage women to self-medicate with antibiotics.[19]

On the other hand, masculinity and perception of male roles adversely affect men's health and behaviour.[20] Adopting unhealthy lifestyles, dismissing their health needs and delaying seeking healthcare are often used to sustain and reinforce social inequality and societal structures among men.[15] A qualitative study from 32 communities in Kenya and Uganda revealed that men's busy schedules and perception of clinics as 'female spaces' often result in poor healthcare seeking.[21] Studies from the LMICs reported that being an adult male was associated with the use of antibiotics.[22] Studies are increasingly reporting the association between males and self-medication with antibiotics.[23]

However, beyond the reported associations between sex and antibiotic use, it is less clear from the literature, what evidence exists on the gender dimension of antibiotic use behaviour, the contexts, the reasons and the factors influencing antibiotic and access to antibiotics between males and females, hence, the need for this scoping review. This review will provide information on the gender determinants including the sociocultural and economic factors influencing antibiotic use and access. This study will provide insight into what available evidence can explain the relationship between gender and antibiotic use as well as access to antibiotics.

Despite the reportedly high prevalence of inappropriate use of antibiotics across different categories of the population in the LMICs, most of these countries lack effective implementation of antibiotic use and access to antibiotics policies.[24] Although these policies exist and are gender neutral in a few of the countries, identifying underlying determinants of inequalities related to use and access can be useful in effective formulation and implementation of antimicrobial stewardship policies and hence the focus of this review.

Most existing reviews on human antibiotic behaviours have focused on physicians' prescribing behaviour,[25 26] although other reviews on users' behaviour[9 27] had no reference to gender differences thus creating a gap in the knowledge of the gender-related determinants of antibiotic use. Similarly, there is little evidence on how gender influences access to antibiotics, and it is against this backdrop the scoping review will be conducted. The scoping review will examine the range and characteristics of evidence (including factors and reasons for differences, settings and population characteristics) available in the literature as well as close the knowledge gap on the gender differences in antibiotic use behaviour and access to antibiotics in the LMICs.

Main objective

The overarching aim of this review was to systematically identify the nature, themes and knowledge gaps in antibiotic use behaviour and access to antibiotics with reference to gender in LMICs.

Review questions

1. What evidence on gender differences in antibiotic use and access to antibiotics exist in the LMICs?

2. What evidence on gendered factors influencing antibiotic use and access to antibiotics exist in the LMICs?

3. What are the key gaps in the existing evidence on gender differences in antibiotic use and access to antibiotics in the LMICs?

METHODS AND ANALYSIS

Protocol and registration

The study protocol was registered with the Open Science Framework with registration digital object identifier: https://doi.org/10.17605/OSF.IO/N5W8E.

Search strategy

This review will be conducted to follow the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines for scoping review (PRISMA-ScR).[28] The Academic Search Complete, Anthropology Plus, APA PsycInfo, CINAHL Plus, MEDLINE, OpenDissertations and SocINDEX databases will be searched via the EBCOhost platform. Similarly, the Web of Science platform will be searched for potentially relevant studies. The snowball technique (searching for relevant articles from the reference list of studies included in the review) will be adopted for additional publications. Authors of relevant papers will be contacted to suggest any non-readily available papers that might be relevant to the review questions. No publication date restriction will be applied to the search as a high number of articles is not anticipated. Studies reporting male and female differences in the level of access to antibiotics with or without describing the influencing factors as well as studies reporting male and female differences in the antibiotics use with or without reporting the influencing factors will be included in the study. In addition, studies focusing on males and females or studies carried out among either of the genders will be included in the review. Relevant studies for all ages would be included in the review to allow for age stratification where appropriate.

Search terms

In this study, 'access' refers to rational selection and use of essential medicines (what informs choice of antibiotics), and affordable prices (affordability and availability of antibiotics). These two blocks were selected because they relate more to the consumers than other blocks.[12] Therefore, this study considers factors influencing antibiotic choice, financial and economic capability to purchase, as well as availability of needed antibiotics. The population, concepts and context framework for scoping review described by Peters *et al*[29] as shown in table 1 was used to identify relevant keywords and search terms.

Keywords to be used for the search will include 'antibiotic use', 'antimicrobial use', 'self-medication', 'access*', 'afford*, 'gender' and 'low- and middle-income countries'. Box 1 indicates the full list of the search terms that will be used.

Table 1 Guiding Population, Concepts, Context framework for the study questions

Criteria	Determinants
Population	Male and females
Concepts	Gender, antibiotic access, antibiotic use, influencing factors
Context	Low- and middle-income countries

Inclusion and exclusion criteria

The search will be limited to literature with the following criteria:

- Peer-reviewed articles and publications in English language.
- Studies report antibiotic use among males and/or females.
- Studies report antibiotic access among males and/or females.
- Studies conducted in LMICs as defined by the World Bank.[30]
- All empirical study designs.

Studies with the following criteria will be excluded:

- Studies published as conference abstracts reviews, editorials, literature reviews, commentaries or letters to the editor on antimicrobial use.
- Studies report antibiotic use in animals.
- Studies describe antibiotic prescribing behaviour and factors.
- Studies generally report antibiotic use without reference to males or females.
- Studies conducted in high-income countries.
- Studies on HIV, malaria, tuberculosis and other antimicrobials other than antibiotics.

Data extraction/variables of interest

Data extraction will be carried out from all eligible articles using a predefined Excel sheet. The following variables will be extracted from the reviewed studies; title,

Box 1 List of search terms

Keywords

female OR male OR men OR women OR gender OR 'gender role' OR 'gender difference' OR 'male vs female' OR 'men vs women' OR sex OR culture

'antibiotic* use' OR 'antibiotic* consumption' OR 'antibiotic* usage' OR 'antibiotic* utilization' OR 'anti-bacterial agent use' OR 'antimicrobial use' OR overuse OR 'medicine use' OR prudent OR 'drug misuse' OR 'self medication' OR 'medicine misuse' OR 'therapeutic agent use' OR 'antibiotic user behaviour' OR 'antibiotic* consumer behavio*' OR 'antibiotic* adherence' OR 'over the counter use' OR 'antibiotic* access*' OR 'antibiotic* availab*' OR 'drug access*' OR 'drug availab*'

factor OR determinant OR 'influencing factor OR' driver OR causes OR reason OR motivat*

sub-Sahara* OR 'developing countries' OR 'low and middle income countries' OR 'low-income country' OR 'middle-income country' OR 'low-and middle-income countries' OR LMIC

author, year of publication, study focus, target population and characteristics, country of study, study setting, study design, sample size, antibiotics used (where available), antibiotic access, antibiotic practices and behaviour, reasons and factors influencing antibiotics access and use.

The title and abstract screening of identified articles will be carried out by the first author (OJA). A sub-sample of 20% of abstracts will be independently reviewed by two other authors (RC and SH). Each article will be categorised into: 'certainly include', 'possibly include' and 'certainly exclude'. Full texts for all studies in the 'certainly include' and 'possibly include' categories will be retrieved for assessment against the eligibility criteria by OJA. A total of 20% sample of review-included articles will be reviewed by RC and SH. Disagreements at any point of the screening would be discussed until a consensus is reached among the study team.

Data charting and results presentation

The extracted data will be organised in an Excel spreadsheet and descriptive analysis will be carried out to characterise the studies. Extracted variables will be analysed thematically in a deductive approach with primary consideration for gender. Analysis using other secondary variables such as age, socioeconomic status and rural/urban residency would be carried out as appropriate from the extracted data. The review findings will be presented in tables and charts where appropriate. The study findings will be summarised in narratives that synthesise the results across the data variables, themes and knowledge gaps with possible implications for further studies.

Ethical consideration

This study will review data and other studies already in the public domain, therefore ethical review is not required. This scoping review will map out evidence of the gender differences in access and antibiotic use behaviour in LMICs. The dissemination plan for the findings of this review includes seminar presentations at the University and local public health institutions, conference presentations and publication in peer-reviewed journals. Data generated from this review will be submitted as supplementary materials alongside the main publication.

Contributors OJA conceptualised the study design and developed the methods. RC, AOA, SB and SH provided inputs to the methods and search strategy and reviewed the draft of the article. All authors approved the final version of the article.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Provenance and peer review Not commissioned; externally peer-reviewed.

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REFERENCES

1 World Health Organization. Worldwide country situation analysis: response to antimicrobial resistance. World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland; 2015. Available: http://www.who.int/drugresistance/documents/situationanalysis/en/
2 Abubakar U. Antibiotic use among hospitalized patients in northern Nigeria: a multicenter point-prevalence survey. *BMC Infect Dis* 2020;20:86.
3 O'Neill J. Tackling drug-resistant infections globally: final report and recommendations. 2016. Available: https://amr-review.org/sites/default/files/160525_Final
4 The World Bank. By 2050, drug-resistant infections could cause global economic damage on par with 2008 financial crisis. 2016. Available: https://www.worldbank.org/en/news/press-release/2016/09/18/by-2050-drug-resistant-infections-could-cause-global-economic-damage-on-par-with-2008-financial-crisis
5 Esan DT, Fasoro AA, Odesanya OE, *et al*. Assessment of Self-Medication Practices and Its Associated Factors among Undergraduates of a Private University in Nigeria. *J Environ Public Health* 2018;2018:5439079.
6 Kehinde OO, Ogunnowo BE. The pattern of antibiotic use in an urban slum in Lagos State, Nigeria. *W A J Pharm* 2013;24:49–57.
7 Salihu Dadari HI. Antibiotics use, knowledge and practices on antibiotic resistance among breastfeeding mothers in Kaduna state (Nigeria). *J Infect Public Health* 2020;13:2072–9.
8 Davis MD, Lohm D, Flowers P, *et al*. Antibiotic assemblages and their implications for the prevention of antimicrobial resistance. *Soc Sci Med* 2022;315:115550.
9 Torres NF, Chibi B, Middleton LE, *et al*. Evidence of factors influencing self-medication with antibiotics in low and middle-income countries: a systematic scoping review. *Pub Health (Fairfax)* 2019;168:92–101.
10 Laxminarayan R, Matsoso P, Pant S, *et al*. *Access to Effective Antimicrobials: A Worldwide Challenge*. . The Lancet. Lancet Publishing Group, 2016:387. 168–75.
11 Frost I, Craig J, Joshi J, *et al*. Access barriers to antibiotics. washington D.C. 2019. Available: https://onehealthtrust.org/wp-content/uploads/2019/04/access-barriers-to-antibiotics.pdf
12 World Health Organization. Equitable access to essential medicines: a framework for collective action. 2004. Available: https://apps.who.int/iris/handle/10665/68571
13 Ukwaja KN, Alobu I, Nweke CO, *et al*. Healthcare-seeking behavior, treatment delays and its determinants among pulmonary tuberculosis patients in rural Nigeria: a cross-sectional study. *BMC Health Serv Res* 2013;13:1–9.
14 Azuh D, Fayomi O, Ajayi, Lady. Socio-Cultural Factors of Gender Roles in Women's Healthcare Utilization in Southwest Nigeria. *JSS* 2015;03:105–17.
15 Courtenay WH. Constructions of masculinity and their influence on men's well-being: a theory of gender and health. *Social Science & Medicine* 2000;50:1385–401.
16 Barasa V. WaArusha agro-pastoralist experiences with risk of febrile illness: an ethnographic study of social drivers of zoonoses and rural health-seeking behaviours in Monduli District, Northern Tanzania. University of Sussex; 2019.
17 Akerele D, Momoh S, Adewuyi SA, *et al*. Socioeconomic determinants of poverty among urban households in South-West Nigeria. *Int J Soc Econ* 2012;39:168–81.
18 Omonona BT, Obisesan AA, Aromolaran OA. Health-care access and utilization among rural households in Nigeria. *J Dev Agric Econ* 2015;7:195–203.
19 Braveman P. What are health disparities and health equity? We need to be clear. *Public Health Rep* 2014;129 Suppl 2:5–8.
20 Salgado DM, Knowlton AL, Johnson BL. Men's health-risk and protective behaviors: The effects of masculinity and masculine norms. *Psychol Men Mascul* 2019;20:266–75.
21 Camlin CS, Ssemmondo E, Chamie G, *et al*. Men 'missing' from population-based HIV testing: insights from qualitative research. *AIDS Care* 2016;28 Suppl 3:67–73.
22 Elong Ekambi GA, Okalla Ebongue C, Penda IC, *et al*. Knowledge, practices and attitudes on antibiotics use in Cameroon: Self-

medication and prescription survey among children, adolescents and adults in private pharmacies. *PLoS One* 2019;14:e0212875.
23 Yeika EV, Ingelbeen B, Kemah B, *et al*. Comparative assessment of the prevalence, practices and factors associated with self-medication with antibiotics in Africa. *Tropical Med Int Health* 2021;26:862–81.
24 Fuller WL, Aboderin AO, Yahaya A, *et al*. Gaps in the implementation of national core elements for sustainable antimicrobial use in the WHO-African region. *Front Antibiot* 2022;1:1047565.
25 Teixeira Rodrigues A, Roque F, Falcão A, *et al*. Understanding physician antibiotic prescribing behaviour: a systematic review of qualitative studies. *Int J Antimicrob Agents* 2013;41:203–12.
26 Schröder W, Sommer H, Gladstone BP, *et al*. Gender differences in antibiotic prescribing in the community: a systematic review and meta-analysis. *J Antimicrob Chemother* 2016;71:1800–6.
27 Zanichelli V, Tebano G, Gyssens IC, *et al*. Patient-related determinants of antibiotic use: a systematic review. *Clin Microbiol Infect* 2019;25:48–53.
28 Tricco AC, Lillie E, Zarin W, *et al*. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med* 2018;169:467–73.
29 Peters MDJ, Godfrey C, McInerney P, *et al*. Chapter 11: scoping reviews. In: *JBI Manual for Evidence Synthesis*. JBI, 2020. Available: https://edisciplinas.usp.br/pluginfile.php/7315963/mod_resource/content/1/manual_capitulo_revisao_escopo_JBIMES_2021April.pdf
30 Hamadeh N, van R, Metreau E, *et al*. New world bank country classifications by income level: 2022-2023. 2022. Available: https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups