

Can Behaviour Change Interventions Improve the Rational Use of Antibiotics in Low-and Middle-Income Countries?



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Introduction

Antibiotic resistance (ABR) hinders effective prevention and treatment of infections that can result in more serious illness and consequently, more expensive and lengthy treatments.^{1,2} It places a strain on the healthcare system, and on families and communities due to high direct and indirect costs of care.³ Inappropriate use of antibiotics is recognized as a major driver of ABR, and is of particular concern in low- and middle-income countries (LMICs) where prescribing guidelines may not exist or are not adhered to, and healthy systems are fragile.⁴⁻⁶ Interventions to alter behaviour around the prescription and use of antibiotics have been put forward as one solution to alleviate the threat of ABR and its impact on the spread of infectious diseases.

Evidence of the impact of such interventions, particularly from LMICs has not been critically assessed.

We conducted a literature review to establish what is known about the effectiveness and cost-effectiveness of behavioural interventions designed to improve the prescription and use of antibiotics in LMICs.

Methods

We searched two databases (Web of Science, and PubMed) based on a strategy developed in consultation with an essential medicines and health systems researcher (Table 1). Additional studies were identified using the same search strategy in Google Scholar. We included studies that:

- Described a behaviour change intervention i.e. specifically focused on education; training; modelling; enablement; persuasion; incentivisation; coercion; restriction; and environmental restructuring⁷;
- Used an experimental or quasi-experimental design to estimate effectiveness and/or cost-effectiveness;
- Were implemented in health facility or community settings; and
- Were set in a LMIC.

We excluded studies that were published before 1990, or written in a language other than English, French, Portuguese or Spanish. We also excluded trial protocols, reviews and conference abstracts.

Following systematic screening of titles, abstracts and keywords, and full-text appraisal against the predetermined inclusion and exclusion criteria, data were extracted using a customized extraction form. Studies were categorised by type of behaviour change intervention and experimental design, and a narrative synthesis was conducted.

1. Llor C, Bjerrum L. Antimicrobial resistance: risk associated with antibiotic overuse and initiatives to reduce the problem. *Ther Adv drug Saf.* 2014;5:229-41. doi:10.1177/2042098614554919.

2. Neu HC. The Crisis in Antibiotic Resistance. *Science* (80-). 1992;257:1064-73. doi:10.1126/science.257.5073.1064.

3. Arnold S, Straus S. Interventions to improve antibiotic prescribing practices in ambulatory care (Review). *Cochrane Database Syst Rev.* 2009.

4. Murni IK, Duke T, Kinney S, Daley AJ, Soenarto Y. Reducing hospital-acquired infections and improving the rational use of antibiotics in a developing country: an effectiveness study. *Arch Dis Child.* 2015;100:454-9. doi:10.1136/archdischild-2014-307297.

5. Holloway K. Promoting the rational use of antibiotics. *Reg Heal Forum.* 2011;15:122-30. http://www.searo.who.int/LinkFiles/Regional_Health_Forum_RHF_Vol_15_No_1.pdf.

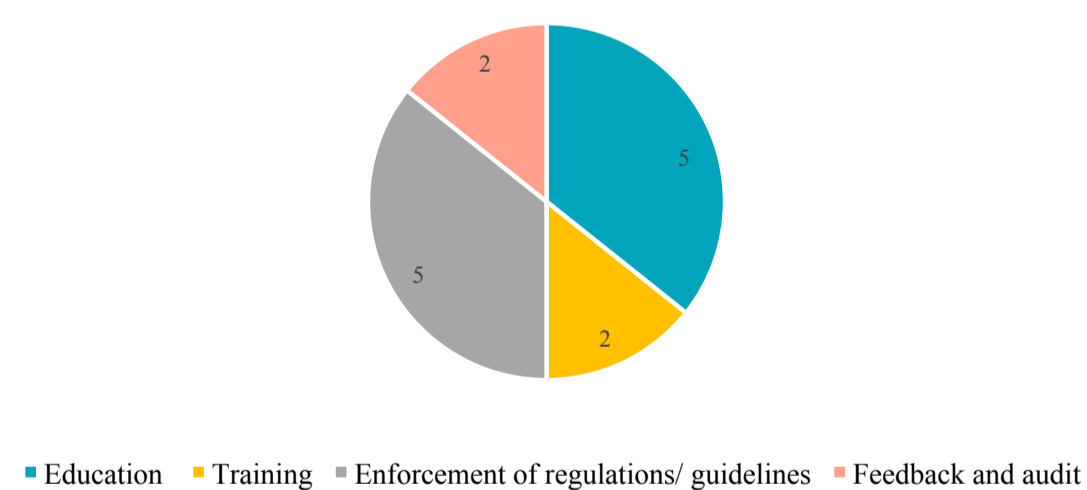
6. Radyowijati A, Haak H. Improving antibiotic use in low-income countries: an overview of evidence on determinants. *Soc Sci Med.* 2003;57:733-44.

7. Michie S, van Stralen MM, West R, Grimshaw J, Shirran L, Thomas R, et al. The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implement Sci.* 2011;6:42. doi:10.1186/1748-5908-6-42.

Results

- We identified 22 studies that met our inclusion criteria.
- One study was set in a low-income country and the remaining 21 in middle-income countries.
- Of these 13 were studies of randomised controlled trials, 5 were interrupted time series analyses, and 4 were quasi-experimental studies.
- Broadly, the interventions implemented focussed on education, training, enforcement of regulations, and feedback and audit.
- 14 of the interventions focussed on a single behavioural component (Fig 1), while 8 were multi-faceted and focussed on a combination of components.
- All but one intervention were aimed at health workers, and only one was aimed at patients or the community. One intervention considered the private sector.
- Studies reported several outcomes including but not limited to:
 - % of patients prescribed or receiving antibiotics with or without prescriptions
 - % of correct prescriptions or adherence to guidelines
 - Mean consumption of antibiotics (and other essential medicines)
- 18 of the interventions indicated success in improving the appropriate prescription and use of antibiotics.
- There was little homogeneity in the outcomes across the studies. As a result, it was not possible to compare between interventions.
- Three studies reported that provider costs per patients fell due to the intervention.

Figure 1. Behavioural component of single faceted interventions



Discussion

This review highlights the need for further evidence from LMICs to identify cost-effective behaviour change strategies to improve the prescription and use of antibiotics, especially in the private sector, and those targeted at patients or communities. This gap in the existing evidence base might inhibit policy decisions on how available resources can be allocated to tackle best ABR.