



Research paper

Antibiotic prescribing in primary healthcare: Dominant factors and trade-offs in decision-making

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KEYWORDS

Anti-bacterial agents;
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Abstract *Background:* This study aims to establish dominant factors influencing general practitioner (GP) decision-making on antibiotic prescribing in the Australian primary healthcare sector. Two research questions were posed: What influences antibiotic prescribing from the perspective of GPs? How do GPs trade-off on factors influencing antibiotic prescribing?

Methods: An exploratory sequential mixed methods design was used, comprising semi-structured interviews followed by a discrete choice experiment (DCE). Ten GPs practising in Brisbane and Greater Brisbane, Queensland were interviewed in September/October 2015. Interview data were used to develop the DCE, which was conducted online from July–October 2016. Twenty-three GPs participated in the DCE.

Results: Three main themes influencing antibiotic prescribing emerged from the semi-structured interviews: prescribing challenges, delayed antibiotic prescriptions, and patient expectations. From the DCE, "Duration of symptoms" and "Patient expectations" exerted the most influence on antibiotic prescribing. Taken together, these results suggest that key challenges to prudent antibiotic prescribing are: patient expectations, an important barrier which is surmountable; prescribing practices of medical colleagues, cultural memes and professional etiquette; and uncertainty of diagnosis coupled with patient expectations for antibiotics exert prescribing pressure on GPs.

Conclusion: Patient expectation for antibiotics is the dominant modifiable factor influencing GP antibiotic prescribing behaviours. Key challenges to prudent antibiotic prescribing can be overcome through upskilling GPs to manage patient expectations efficaciously, and through

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two new emphases for public health campaigns—consumers have the power to reduce the use of antibiotics and the GP as a wise advocate for the patient.

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Highlights

- First study using DCE to quantify factors influencing GP antibiotic prescribing.
 - Patient expectations, prescribing practices of colleagues, and diagnostic uncertainty exerted prescribing pressure on GPs.
 - Patient expectation is the dominant modifiable factor influencing antibiotic prescribing.
 - GPs may benefit from upskilling to manage patient expectations efficaciously.
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Introduction

Antibiotics are a mainstay of treatment for infection. However, every dose of antibiotic prescribed and used increases the likelihood of antimicrobial resistance (AMR). Hence, it is important to ensure that antibiotics are used appropriately. The greatest proportion of antibiotics for human use is prescribed in the primary healthcare sector [1] where use is strongly correlated to AMR rates [2,3], highlighting this sector as an important area for research and action.

Australia is contributing to the global problem of AMR with antibiotic consumption above the OECD average [4]. In the Australian primary healthcare sector, 30 million antibiotic prescriptions were dispensed in 2014 alone [1], some of which were unnecessarily prescribed. For example, 60% percent out of the 24% of people prescribed antimicrobials with an indication for the prescription documented, received antibiotics for colds and other upper respiratory tract infections [5].

Designing effective healthcare interventions to reduce the inappropriate use of antibiotics means identifying and addressing the barriers to appropriate antibiotic use pertinent to the individuals involved. Some of the barriers to prudent prescribing of antibiotics by general practitioners (GPs) are known [6–13]: patients demanding antibiotics, the perception that patients expect antibiotics, prescribing antibiotics to save time due to the perception that it takes longer to explain why antibiotics are not needed, concerns that the patient may not return for follow up, uncertainty in the diagnosis where antibiotics may be warranted, concerns about possible complications, preservation of the doctor–patient relationship, and knowledge and attitudes to AMR.

These studies have predominantly been conducted on GPs practising in Europe and the USA, with different governance, funding structures and infrastructure to that of Australia which may impact clinical practice. Research involving Australian GPs on antibiotic prescribing, previously scarce, is growing [14–18]. Further exploration of factors which are most important in influencing GP decision-making in antibiotic prescribing can inform strategies to promote more prudent use of antibiotics.

In alignment with the WHO Global Action Plan [19], Australia now has a national AMR strategy focussed on a One

Health approach being implemented across human health (e.g. hospital, nursing home, primary healthcare) and animal health [20]. Thus, it is imperative to have current research pertinent to Australia's primary healthcare sector informing the ongoing implementation of its national strategy.

Our aim in this study was to establish the dominant factors influencing GP decision-making in antibiotic prescribing in the Australian primary healthcare sector using mixed methods. Two research questions (RQs) were posed: RQ1: What influences antibiotic prescribing from the perspective of GPs? RQ2: How do GPs trade-off on factors influencing antibiotic prescribing?

Methods

The research paradigm underpinning the study was pragmatism, understood as a problem-driven approach [21]. We used an exploratory sequential mixed methods study design [22,23]. A qualitative component comprising semi-structured interviews was conducted first to answer RQ1 and to inform the development of the quantitative research instrument, the discrete choice experiment (DCE). The DCE addressed RQ2. The qualitative and quantitative components were of equal importance. Recruitment for each of these components was done separately.

The mixing of methods occurred at two points: (a) findings from the semi-structured interviews were used to frame the DCE, and to develop attributes and levels; and (b) findings from both the semi-structured interviews and the DCE were examined to address the research aim.

Method 1: Semi-structured interviews

An interview guide was developed based on a literature review and piloted with two practicing GPs. Data from pilot interviews were not included in the analysis. Convenience and snowball sampling were used in the recruitment of participants via e-newsletters of the two largest Primary Health Networks (PHNs) in Queensland [24] i.e. Brisbane North and Brisbane South PHNs, via recruitment emails to professional networks, and Twitter®. Eligible participants were practising GPs or Registrars (trainee GPs) within a 1-h drive of the Brisbane Central Business District. Participants

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