

Antibiotic use in the community: what factors influence primary care physicians to prescribe antibiotics in Delhi, India?

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Background. It is necessary to understand physician's prescribing behaviour in order to develop interventions that will effectively improve the use of antibiotics.

Objective. To explore the factors that influence primary care physicians to prescribe antibiotics and to investigate possible interventions.

Methods. Focus group discussions (FGDs) were used to explore the perspectives of primary care physicians in the public and private sectors from five municipal wards (residential localities) of Delhi from where data on antibiotic use and resistance were collected. FGDs ($n = 3$ with 36 prescribers) were analysed through grounded theory.

Results. Three broad themes identified were as follows: behavioural characteristics of doctors and patients; laxity in regulation of prescribing and dispensing antibiotics and intervention strategies to decrease misuse of, and resistance to, antibiotics. Important factors identified for antibiotic prescriptions by doctors were diagnostic uncertainty, perceived demand and expectation from the patients, practice sustainability and financial considerations, influence from medical representatives and inadequate knowledge. For public sector doctors, besides the above, overstocked and near-expiry drugs and lack of time were the factors that promoted antibiotic overuse. Doctors also identified certain patient behaviour characteristics and laxity in regulation for prescribing and dispensing of antibiotics as aggravating the problem of antibiotic misuse. Interventions like Continuing Medical Educations for doctors, awareness raising of patients, shared decision making and stricter rules and regulations were suggested to promote rational use of antibiotics in the community.

Conclusion. Exploration of doctors' antibiotic use practices and possible interventions will be helpful in carrying out interventions to promote appropriate use of antibiotics in the community.

Keywords. Antibiotics, India, prescribing behaviour, primary care, qualitative research.

Background

To support the rational use of drugs, it is important to collect information on patterns of drug prescriptions and on factors influencing prescribing decisions.¹ The latter is crucial particularly in the case of antibiotic prescribing since inappropriate prescriptions or overuse of antibiotics can contribute to the emergence of antibiotic-resistant bacteria.^{2,3} Antibiotic resistance is a major public health problem worldwide, and international efforts are needed to counteract its emergence. A pilot study conducted in New Delhi, India, for establishing a methodology for surveillance of antimicrobial

use and resistance in resource-constrained settings showed high levels of antibiotic use and resistance in the community.^{4,5} In the second phase, a qualitative study was conducted to ascertain doctors' behaviour relating to antibiotic use and the factors influencing prescribing patterns among primary care physicians.

Various qualitative studies have looked at the prescribing behaviour of GPs in the Western world.^{6,7} Important factors identified as drivers of inappropriate antibiotic prescribing include patient pressure,⁸ desire to preserve the doctor–patient relationship, the doctor's personal characteristics,⁹ uncertainty about which patients will benefit from antibiotics, the daily pressures

of clinical general practice,¹⁰ the patient's presenting complaints and findings on physical examination.¹¹ However, studies done in developing countries have primarily focused on the nature, extent and magnitude of the problem alone^{12–14} rather than on the perceptions and attitudes of prescribers. Changing physician practice requires a multitude of interventions that are used appropriately according to the problem present in the area.¹⁵ Hence, a qualitative study was conducted for public and private sector primary care physicians in the form of focus group discussions (FGDs) to find out the various factors involved in antibiotic prescribing and to explore suitable interventions to promote rational use of antibiotics.

Methods

This study used qualitative methods to explore the perceptions, attitudes and behaviour of the doctors. It was conducted in Delhi, India, involving primary care physicians from both private and public sectors working in the same five municipal wards (residential localities) from which antibiotic use and resistance data were collected in 2004 and later in 2008–09. For public sector data collection, zonal in-charges were contacted and for the private sector, office bearers of doctors' associations were contacted for permission and cooperation. Owing to the heavy patient load in both the public and private sectors in the study area, doctors were invited in groups for FGDs as it was the most appropriate research method for our study. Public sector doctors were invited from 10 public health facilities from which data on antibiotic drug use were collected. For private sector, 60 doctors who were practicing in the survey area and were members of doctors' association were approached to take part in the FGDs. All 10 doctors who were approached from public sector facilities participated but only 26 of 60 doctors invited from private sector facilities participated in the FGDs. No financial incentive was offered but a small amount (INR 250) was given as conveyance reimbursement. Informed consent was obtained from all participants of the study. A total of 36 doctors (8 females and 28 males) participated in three FGDs conducted between May and September 2008 with AK and CW as facilitators and a social scientist helping in conducting the FGDs. One group composed exclusively of private sector doctors ($n = 18$) who ran their own private clinics, one group exclusively of public sector doctors ($n = 8$) and the third group contained doctors from both public (two) and private (eight) facilities. The FGDs were conducted with the help of a topic guide and a theoretical sampling procedure was adopted to enrich the content. The results from a completed antibiotic use and resistance study were given at the beginning of FGD. Facilitators focused the discussion on

the motivations and behaviours that lead to antibiotic misuse. After the discussion regarding antibiotic prescribing behaviours, prescribers were asked to suggest suitable interventions to decrease misuse of antibiotics and antibiotic resistance. All FGDs were videotaped, transcribed and translated where required. There was a continuous analysis of FGDs throughout the study from first to the last FGD. The data were subjected to grounded theory that is inductive and iterative. In the first FGD, discrete themes were identified, which were then used in subsequent FGDs and tested for reality. Transcripts were closely examined to identify themes and categories. Codes were applied to the broad themes that emerged from the subthemes already identified. Agreement on themes, subthemes and coding was sought. The method of 'constant comparison' was central to the process generating various themes and codes.

The term 'doctor' in the study is used for a qualified and licensed MBBS physician.

Results

Three broad themes identified were as follows: characteristics behaviour of doctor and patient, laxity in regulation for prescribing and dispensing antibiotics and intervention strategies that were further divided into subthemes.

Characteristics behaviour of doctor and patient

The FGDs revealed many prescribing characteristics responsible for behaviour and motivation to antibiotic misuse in the community. The characteristics identified are mainly due to doctor- and patient-related factors. For certain factors of doctors and patients, health care system is also responsible as mentioned below. The behavioural characteristics can broadly be classified into two themes: doctor-related factors and patient-related factors that led to misuse and overuse of antibiotics.

Doctor-related factors. Diagnostic uncertainty. Many doctors said that it is difficult to diagnose at the early stages whether an infection is viral or bacterial, especially in cases of upper respiratory tract infections and diarrhoea. To deal with the uncertainty about whether or not the infection is bacterial, they prescribe antibiotics. Even in cases where patients report fever for a day or two, it was difficult to ascertain the cause. Moreover, medical tests were not recommended to remove the ambiguity as most patients did not want to take a test for a day's fever or could not afford to take these tests due to lack of time or money. As a result, antibiotics are prescribed where they are not required. Generally, in public primary health care facilities, microbiology lab facilities are not available and most of the patients who visit these facilities cannot afford

the tests from private labs. So doctors relied mainly on their clinical acumen.

Doctors' perceived demand and expectation. Doctors from both private and public sectors said that some patients demand capsules and 'strong' medicines. Some patients who had previously been prescribed antibiotics asked to be given these drugs again. Educated patients also named antibiotics that they wanted. Doctors often succumb to patients' demand or expectations for antibiotic prescription.

Many doctors said that the patient expects them to write a prescription for antibiotics when they have spent money on consulting a doctor or waited for considerable time in a public facility. Patients are not satisfied if they get just paracetamol or oral rehydration solution packets (ORS) for fever and diarrhoea, which they could have taken on their own; doctors feel patients want them to prescribe something that they have not taken and that is why doctors prescribe antibiotics.

Practice sustainability and financial considerations. Doctors in private practice did not want to lose any patients. They feared that if they employed a wait-and-watch policy or prescribed only ORS for diarrhoea or paracetamol for fever, the patient would go to some other doctor. Therefore, they prescribed antibiotics that satisfy the patient so that the doctor retains the patient. This was voiced by one of the private doctors. He (GP6) said: 'You have to use your clinical acumen. You feel if I don't give antibiotics and patient goes to another physician or to chemist who prescribes antibiotic and he gets cured. You lose a patient ...'.

Doctors from the private sector revealed that many in their profession prescribe those brands of antibiotics that provide them more profit or prescribe antibiotics even when they are not required to increase their profits. This is probably the reason for high consumption of newer and expensive brands of antibiotics.

Lack of time due to overcrowding. Doctors in the public sector said that they do not have enough time for each patient who comes to them to study a patient's case history, do a proper physical examination or educate them. This point is clearly reflected in the following statement of a public sector doctor (GP 2): 'Frankly speaking we have to move patients fast and we can't really argue so much. We have only two minutes per patient ...'. The public sector doctor points out that due to lack of time, they cannot educate a patient that his condition does not require an antibiotic as it will require an elaborate discussion and probably an argument. Therefore, to save time, doctors simply prescribe antibiotics without looking at the rationality of prescribing it.

Consideration about susceptibility. Many doctors mentioned, even though they were sure that the condition does not warrant antibiotic therapy, they did not want to take a chance. As a doctor (GP 16) in private sector expressed: 'Most of us are giving it in case fever occurs, then what . . . They will blame us if there is an infection . . . So we are prescribing everybody four days antibiotic course'. They felt that under unhygienic conditions, patients are susceptible to infection, so antibiotics are prescribed as a preventative measure.

GPs mentioned that patients coming from poorer localities are most likely to have a bacterial infection as they come from environment that has 'no proper sanitation and people have unhygienic habits' (GP 14). Therefore, they should be prescribed antibiotics as quickly as possible, lest their condition worsen.

Oversupply of drugs and near-expiry drugs. Government-run primary health care (PHC), commonly called dispensaries in India, get their medicine supply from Central Store and medicines are provided free to patients who visit these facilities. Medicine supply is sometimes erratic; there can be no supply of some medicines for few months and oversupply later on. Doctors from government facilities reported that if medicines are received in bulk in Central Store, dispensaries also receive more of those medicines (including antibiotics) than are required. Sometimes, these drugs are nearing their expiry dates. To use the entire stock before it expires, doctors in dispensaries (PHCs) prescribe these drugs even though they may be antibiotics and not required by the patient.

Influence from medical representatives. Newer antibiotics were used on the recommendations of medical representatives who present the doctors with skewed studies in favour of the antibiotic they want to market. As one doctor (GP11) elaborated: 'The company representative gives only the good points of the products. He forces doctors to write the latest antibiotics'.

Patient-related factors. Doctors said that they alone are not to be blamed for inappropriate use of antibiotics. They identified certain behaviours of patients that also lead to misuse of antibiotics and thus increasing antibiotic resistance.

Improper dosage. Most of the doctors said that patients do not take the proper dosage. Once they feel better, they stop medication before the required period. Another source of improper dosage was self-medication, when patients buy antibiotics over-the-counter. Patients buy only as many antibiotic tablets as they can afford or feel will give them relief. As a doctor (GP19) said: 'You ask the patient to take a drug for 5 days. He gets relief in 1 day and stops taking it'.

Lack of follow-up. Doctors observed that patients do not come for follow-up. Doctors from both the sectors said that they do ask a patient to come for follow-up but very few patients come back for a second visit. Doctors in the private sector said that this could be due to expensive consultation fees, whereas doctors in the public sector said that this could be due to long waiting hours in government facilities. Doctors from both the sectors observed that usually the patient is either cured or they repeat the medicines prescribed by the doctor without coming for a second consultation.

Doctors' shopping. Patients want an instant cure so they try a doctor's medicine for a day or two; if this does not work, they go to some other doctor instead of returning to see the same doctor.

Another habit doctors from both the sectors pointed out was that many patients come to them after having undergone multiple cycles of drugs through self-medication, on a chemist's advice or from unqualified 'self-styled' doctors (quacks). One of the GP (GP 21) said: 'I think most of the time you get the patients who already had been to 'n' numbers of people actually. You become like a secondary or tertiary care doctor'.

Self-medication. Many doctors in private practice observed that patients 'get prescription from a reputed physician. They keep that same prescription, whenever the symptoms return they use that prescription' (GP14). In India, prescriptions are not kept by the pharmacists but patients retain their prescriptions after purchasing medicines from retail pharmacists or after the pharmacists handed over the 'free' medicines in public sector. It is a common practice that patients reuse their old prescriptions for similar complaints or symptoms. In repeating prescriptions too they do not take full dosage or for required duration. As one doctor (GP11) elaborated: 'They go on repeating the prescription. They don't want to waste 100-200 rupees on prescription. Anything happens in the family they use that prescription. Show it to the chemist and take medicines'. As the medical expenses are borne out-of-pocket, many patients save the prescription for future use and buy only that amount of antibiotics that they can afford.

Laxity in regulation for prescribing and dispensing

Most of the doctors said that they were not the only prescribers or dispensers. They said that if other prescribers who are not legally qualified to prescribe were stopped or regulated, then three-fourths of the problem of misuse of antibiotics would be solved.

Prescribing and dispensing by 'quacks'. Most of the doctors said that 'quacks' (not MBBS) have taken over their profession. They dispense loose drugs

without proper dosage or duration. They follow a legally trained doctor's prescriptions without knowing the proper diagnosis. Poor patients go to them as their medical fees are less than those of qualified doctors, and the patient does not have to wait for long hours.

Prescribing and dispensing by chemists. Most of the doctors said that chemists dispense on old prescriptions, selling prescription drugs over-the-counter and prescribing antibiotics without proper knowledge. As a result, misuse of antibiotics takes place and this leads to antibiotic resistance.

Prescribing and dispensing by other professionals. Many doctors from private sector said that professionals from homeopathy, ayurveda and so on prescribed allopathic medicines that are mostly antibiotics.

This leads to improper use of antibiotics in the hands of professionals who are not legally entitled to prescribe.

Interventions to stop misuse of antibiotics.

The FGDs pinpointed several areas that doctors considered to have potential for reducing antibiotic misuse.

Education. Continuing medical educations (CMEs) and training for doctors. Doctors from both the sectors felt that proper (rational) use of antibiotics should become an important point of discussion during CMEs. Doctors agreed that their awareness about the extent of antimicrobial resistance is limited.

Educating the patient. As one of the doctors emphasized (GP16): 'You will have to explain to them (patients) that in viral fever antibiotics are not going to make a difference. The idea of quick results should go out'.

One of the doctors (GP17) suggested that since there is a medical officer in every school, they can be motivated to teach children and their parents about appropriate use of antibiotics.

Other suggestions were using advertisements in newspapers, television and through pamphlets to make people understand the importance of proper use of antibiotics and the disadvantages of not adhering to proper use.

Issuing guidelines for proper use of antibiotics. All the community hospitals and doctors should be supplied with guidelines for appropriate use of antibiotics. These should be prepared in consultation with microbiologists and laboratory data for the particular community or area (GP31).

Stricter rules and regulations. Doctors suggested that there should be strict checks on over-the-counter sale

of prescription drugs and prescribing by practitioners, pharmacists and other prescribers not qualified to prescribe allopathic medicine. Many doctors said that routine checks should be done on retail pharmacies to stop dispensing without prescription, on honouring old prescriptions by pharmacists.

Shared decision making. Wherever it is possible to discuss with the patient the futility of taking antibiotics in a viral infection, it should be done. Insecurities and expectations of patient should be discussed so that the doctor does not have to prescribe under pressure from either due to patient's demand or expectations. However, a doctor (GP 30) said it can be done only with 'selective patients' who are educated and are aware of antibiotic resistance.

Discussion

This is one of the first studies from developing countries to conduct an in-depth exploration of primary care doctors' views on their antibiotic prescribing, resistance and interventions for decrease in antibiotic misuse and resistance. Findings from this study revealed that primary care doctors prescribe antibiotic mainly in the following contexts: (i) diagnostic uncertainty, (ii) perceived demand or expectations from patient, (iii) to retain patients and gain financially, (iv) under the influence of medical representatives and (v) under the misguided impression that the poorer section of society needs antibiotics due to unhygienic living conditions. Factors that led public sector doctors of PHCs to prescribe antibiotics were (i) diagnostic uncertainty due to the absence of a lab facility, (ii) patient expectations to get 'capsules', (iii) lack of time to interact with patients and (iv) over-supplied and near-expiry antibiotics. Doctors also stressed that due to laxity in rules and regulations for antibiotic prescribing and dispensing, chemists, patients and 'quacks' misuse antibiotics.

Many doctors felt that prescribing the latest antibiotics not only removed their insecurity but the patients also were satisfied that their visit had been useful as they were being prescribed expensive and new antibiotics, with an obvious expectation of better efficacy. This is what Kunin *et al.*¹⁶ have called 'drugs of fear' that characterize the compelling need of physicians to use the latest and best antibiotics to solve a problem and to meet patient's expectations. A qualitative study conducted in UK has shown that many times GPs prescribe antibiotics to their patients as they believe it is their duty to do the best for them and are concerned about more serious problems rather than the theoretical complications of antimicrobial resistance.¹⁷ Family Physicians in the USA have also argued their antibiotic prescribing decision as balancing act.⁸ These findings are in agreement with our findings and suggest

that prescribers in different settings respond and behave in a comparable way to complex challenges.

Organizational lacunae are found predominantly in developing countries¹⁸ and doctors in our study, particularly those from the public sector, identified this as a major problem contributing to the irrational use of antibiotics. Mismanagement in drug distribution and bureaucratic snags in drug procurement procedures result in delayed supply leading to stock-outs followed by oversupply of drugs and sometimes supply of near-expiry drugs. This leads to overprescription of antibiotics as doctors try to finish off the stock before expiry.

Many other studies have found that perceived patient's expectations for antibiotics as a major reason that doctors prescribe them inappropriately.^{8,19} However, our study doctors were not clear whether the patient was expecting antibiotics or whether any other substitute that will give them quick relief would suffice. A study conducted in Nepal²⁰ has shown that patients' demands did not influence prescribing behaviour and patients were happy to accept advice from prescribers, even if that meant taking fewer drugs.

Doctors also pointed out that once they have written a prescription for a particular symptom, the same prescription is used for self-medication to save money and time required for repeated consultations. This behaviour of repeating the prescription, purchasing antibiotics without a prescription and purchasing fewer units than prescribed is also reported by Lansang *et al.*²¹ from Manila. On the contrary, dispensing a full course of antibiotics and fixed-size packs in the developed world has also shown that patients keep the unused antibiotics and use the leftover antibiotics at a later time.²²

Another factor that influences which antibiotic is prescribed and overuse of antibiotics in the private sector was found to be medical representatives' pressure. Influence of pharmaceutical companies on doctors is very well recognized and proceedings of legal cases provide insight into the extent of influence this industry can impose on doctors and other stakeholders.^{23,24} This has been revealed by Søndergaard *et al.*²⁵ in their study, which shows that pharmaceutical representative's visits markedly influence doctor's drug preference towards the marketed drug.

Various intervention strategies were suggested by primary care doctors in the FGDs—the primary one being education of both prescribers and patients. Participants from both the sectors said that CMEs for doctors should have a special focus on the rational use of antibiotics and antibiotic resistance. This suggestion is in line with the UK Antimicrobial Resistance Strategy and Action Plan (Department of Health).²⁶ Effective interventions like academic detailing for doctors and guidelines supported by microbiological data on the presence of antibiotic resistance

have been found to decrease inappropriate antibiotic practice.²⁷ However, it has been found that the fact that there is high antibiotic resistance in an area may influence GPs to prescribe newer and broad-spectrum antibiotics.¹⁷ Therefore, additional guidelines should be created to help doctors use data on local resistance patterns in their clinical decisions.

Elsewhere, it has been found that frequent repetition of messages, brief written materials on specific topics for prescribers and patients and promotion in the mass media are the most effective strategies to reduce prescribing.²⁸ These suggestions can be easily implemented in the Indian scenario and the present study discussions revealed that most doctors were eager to participate in such exercises and stressed that patients should also be included in such programmes.

This study had some inherent limitations, e.g. it was undertaken in West Delhi and doctors from five municipal wards participated and thus may not be representative of general practice as a whole. Common themes did emerge from three FGDs and thematic saturation was satisfactorily achieved; yet caution should be taken in generalizing the findings. In one of the FGDs, both public and private sector doctors participated, and it is possible that a few doctors did not reveal their true behaviour in such a mixed population. Nonetheless, this study is probably the first in-depth qualitative study in India trying to explore the motivation and reasons for misuse and overuse of antibiotics and understanding of antibiotic resistance by primary care doctors. The findings have important implications as one of the main strengths of this study was the participation of both public and private sector doctors. It was encouraging to note that doctors were concerned about the antibiotic resistance and overuse of antibiotics and were willing to participate in programmes aimed at creating awareness and promotion of rational antibiotic use.

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Ethical approval: Ethical approval for the entire study including surveillance of antibiotic use and qualitative study was obtained from WHO Ethics Review Committee. Approval was also obtained from the V. P. Chest Institute and Sir Ganga Ram Hospital, New

Delhi, for the study. Informed consent was obtained from all participants of the study.

Conflict of interest: None.

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