



Factors influencing antibiotic prescribing in China: An exploratory analysis

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ABSTRACT

Objectives: China has very high rates of antibiotic resistance and a health care system that provides strong incentives for over-prescribing. This paper describes the findings of a qualitative study in a province of southern China that seeks to assess knowledge, attitudes, and practices in relation to the use of antibiotics.

Methods: Semi-structured interviews with patients and health workers at provincial, county, township, and village level. Interviews used four probes (common cold, cough, mild diarrhoea and tiredness) where antibiotics were not indicated, supplemented by questions on knowledge, attitudes, and practices. These data were supplemented by two focus groups, with medical students and pharmacists, and discussions with participants at a national conference on antibiotic use.

Results: Coughs and diarrhoea are almost universally treated with antibiotics, while the cold is normally treated with antivirals instead or as well. Many physicians are aware that the cold is usually self-limiting but believe that they can speed recovery and that they are responding to patient expectations. Most physicians and many patients are aware of the phenomenon of antibiotic resistance, although it is often seen as a property acquired by the patient and not the micro-organism. Physicians face financial incentives to prescribe, with profit splitting with pharmaceutical suppliers. Sales profits form a major part of a hospital's income. National guidance on use of antibiotics is fragmentary and incomplete.

Conclusion: The misuse of antibiotics poses considerable risks. Effective action will require a multi-faceted strategy including education, based on an understanding of existing beliefs, the replacement of perverse incentives with those promoting best practice, and investment in improved surveillance. Much of this will require action at national level.

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1. Introduction

Rates of antibiotic resistance in China are growing rapidly from already high levels [1–4]. At least part of the explanation lies in changes in the health system over the past two decades. The health system that China established in the 1950s was a remarkable improvement on what had existed previously. Medical training and hospital construction increased greatly, while effective campaigns

were conducted against endemic diseases such as schistosomiasis and malaria. Primary health care provision in rural areas was boosted by the introduction of “barefoot doctors”. These changes made it possible for 90% of the population to access at least basic care [5] and contributed to China's marked improvement in life expectancy in the three decades following the Communist takeover, from 35 years in 1949 to 68 years in 1981 [6]. Nevertheless, by 1981, healthcare accounted for only 3% of a comparatively low GDP [7].

During the reforms instituted by Deng Xiaoping in the early 1980s, the health system deteriorated, suffering from low salaries and a lack of investment [8]. The introduc-

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tion of “market socialism” in all aspects of public life led to further reductions in resources. A new system, introduced in the early 1990s [9], limited state financing to about 25–30% of total costs [10], covering only the basic costs of salaries and facilities. Staff were to supplement their income from bonus schemes, funded from sales profits on drugs, tests and services [9] with staff fined for missing sales quotas [11]. Medical insurance covered those employed in state enterprises, but with a decreasing proportion of the population in such employment, by 2005 only 25% of people living in urban areas [12] and 10% of rural Chinese had any cover [7]. Costs of insurance schemes escalated, as prices rose to cover profit-loading by providers, and over-prescription escalated claims [13], so cost-sharing and claims ceilings were introduced to limit expenditure [9].

Studies carried out in the late 1990s provided evidence that fee-for-service provision, provider bonuses, and medical insurance all encouraged prescription of more items, more expensive medications, and newer antibiotics [5,14–16]. The result was that per capita consumption of medicines increased almost fourfold between 1979 and 1992 [8]. By the mid-1990s, more than half of hospital spending was on pharmaceuticals [5,7,10,17], with one survey in 1990 finding that each visit to a physician led to the prescription, on average, of 2.3 drugs [18] while another, among villages in western China found that about half of all prescriptions were for antibiotics [19]. Liu and Mills reported over-prescribing (expressed as cost of drugs) of 38% for pneumonia and 34% for appendicitis in six public hospitals in the period 1987–1997 [20], while Meng et al. [21], in a 2000 study in 109 village clinics in Shandong province, found over-treatment (again by cost) of 60%. A study reported in 2005, from Beijing found over-use of broad-spectrum antibiotics, especially the most expensive [22]. Interviews and focus groups attributed this to the policy of requiring hospitals to support themselves from profits, gaps in the knowledge of junior staff coupled with a tendency to rely on information from pharmaceutical companies, and concern about possible litigation.

A key issue is the prescription of antibiotics when they are not indicated. A study in Wuhan found that bacteriology samples were rarely taken before antibiotics were prescribed [23]. In these circumstances, it is unsurprising that a 2006 study concluded that the problem was due, primarily, to “the over-the-counter purchase and community use of fluoroquinolones in the People’s Republic of China” [24].

While the scale and nature of the problem are apparent, there is rather less research on how the system shapes decisions made by patients and physicians in their everyday encounters. This information will be essential if effective policies are to be put in place. In this paper, we report a qualitative investigation of the determinants of prescribing for common conditions in one province of southern China.

2. Methods

The research was set in Guizhou, a landlocked province in southern China, bordered by Sichuan to the north, Yunnan to the west, Guangxi to the south and Hunan to the east.

Much of the province is mountainous, with forestry and coal mining dominating the economy. Almost 40% of the population are from China’s minority ethnic groups. This study was part of a larger one looking at the entire range of iatrogenic factors that might play a role in transmission of blood-borne viruses. The other elements will be described elsewhere [25].

The approach was based on grounded theory, whereby themes emerge from initial analyses which are then explored in an iterative manner through purposive sampling of relevant key informants and triangulation with other sources of data [26].

The main source of data was a series of semi-structured interviews conducted in rural and urban Guizhou with a purposive sample of healthcare staff, patients, and other key informants, including civil representatives, at provincial, county, and village facilities. Three villages were selected, in consultation with the provincial staff of the Chinese Centres for Disease Control (CDC), with the goal of including ones with different levels of economic development.

Patients were identified by convenience sampling from those present in the health facility on the selected days. The health workers interviewed were, at village level, doctors, and at township, county and provincial level, the hospital director, surgeon/ obstetrician, and officials in charge of safety and procurement. Additional key informants included village leaders, family planning officials, and state and independent pharmacists.

The interview framework was structured around four different minor tracer complaints, common cold, cough, mild diarrhoea and tiredness, chosen as ailments that would rarely merit any medical intervention if rational treatment principles were followed. Follow up questions pursued points raised by interviewees about influences on prescription choices.

The interviews were all carried out by LR, in the presence of a local research assistant who was fluent in the local dialect. Immediately after each interviews, both checked transcripts together to resolve any ambiguities. The transcripts were then read and analysed by both authors to identify emerging themes. These themes were then explored in more detail with key informants with knowledge of the Chinese health system and in two focus groups. One comprised university students, addressing the impact of pharmaceutical advertising, and the other comprised pharmacists in the Guizhou provincial hospital, to explore procedural and legal constraints on prescribing. In both cases a list of relevant topics was derived from the interviews and participants were presented with corresponding scenarios. LR led the focus groups, which were then transcribed by a research assistant. Less formal individual and group interviews were conducted with clinicians and researchers at the December 2005 Second National Conference on Rational Use of Antibiotics in Beijing. This was designed to provide some idea of whether the findings obtained were exceptional in China or whether they could, with caution, be generalised.

Ethical approval was granted by the relevant committees of the Chinese Ministry of Health and the London School of Hygiene and Tropical Medicine.

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