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Training good prescribers: what are the best methods?

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Skills required for good prescribing

The diversity of skills required for safe and appropriate prescribing creates a major challenge for those involved in designing training programmes for good prescribers. It is relatively simple to equip a prescriber with the right aptitude for tackling single, one-off drug prescriptions in younger patients, but rational prescribing for an elderly patient with a multitude of chronic illnesses can involve a difficult journey through the minefield of polypharmacy and individual patient susceptibility factors. (See accompanying article on rational prescribing.)

The gap in the skills of current prescribers is illustrated by evidence of poor prescribing, whether from errors, under- or overprescribing, or inappropriate or irrational prescribing.[1] Many factors underpin poor prescribing at individual, environmental and organisational levels. Problems of particular importance are the lack of specific training for prescribers, accompanied by limited awareness of errors and a perception among some that the task is of low importance.[2–4] It is clear that writing a safe and appropriate prescription is not simply about textbook knowledge of clinical pharmacology but requires some measure of judgement and ability to tackle a complex practical task.

What steps can be taken to address the current limitations in training prescribers? First, there needs to be appraisal of the evidence for the role of educational interventions and the extent to which they improve prescribing.[5] With this in mind, a systematic literature review has recently been conducted of educational interventions designed to improve prescribing skills in medical students and junior doctors.

The current evidence

An extensive literature search was carried out covering eight databases and 3,175 articles.[6] This revealed that a wide range of interventions aimed at changing doctors' prescribing practices had been studied. Many consisted of interventions to alter the prescribing trends of general practitioners according to national guidelines or cost-effectiveness analyses. These were excluded, together with studies of student evaluation of curricula and those assessing students' theoretical knowledge without considering prescribing skills. Eleven controlled trials reported the effects of educational interventions on prescribing tasks in junior doctors and medical students.

General prescribing

The aim of eight of these studies was to cover general prescribing principles, demonstrating practical applications through the use of problem-solving clinical scenarios. The World Health Organization (WHO) Guide to Good Prescribing was the most frequently studied.[7–12] (See later for full discussion of this guide.)

The WHO Guide to Good Prescribing

This training scheme requires students to develop a 'rational prescribing' process, systematically considering the efficacy, safety, suitability and costs of available drugs for a particular condition (Table 1). The theoretical aspects are followed by case scenarios, which the students work through, selecting a drug and prescribing it with appropriate follow-up and monitoring.

Compared with controls, the WHO Guide to Good Prescribing yielded positive results across a wide range of medical schools internationally and students of different seniorities. There was evidence of a 'retention effect' on repeat testing using similar scenarios several months after the intervention. Students were able to demonstrate that they remained conversant with the processes of rational prescribing.[7,8] The skills were not restricted to the specific scenarios covered in the training programme so there was also evidence of a 'transfer effect': the ability to apply the skills to other illnesses. Compared with controls, the students were also better at applying correct prescribing principles, even when faced with case scenarios covering different disease topics.[7,8]

The main limitations of the trials were, first, that assessments were based primarily on written case scenarios rather than testing of practical skills using objective structured clinical examination (OSCE) stations and, secondly, that only a few disease topics were assessed.

Tutorials

Two of the studies evaluated the effects of tutorials covering general prescribing skills, coupled with specific extra tutorials focusing on 'difficult' topics, such as prescription of antibiotics and anticoagulants. An Australian study showed

Table 1. The WHO Guide to Good Prescribing.

Choose a p-drug	• Define the diagnosis • Specify the therapeutic objective • Make an inventory of effective groups of drugs • Choose an effective group according to criteria (efficacy, safety, suitability, cost) • Choose a p-drug (including standard dosage, frequency and duration)
Apply the p-drug to the individual patient using a six-step problem-solving routine	• Define the patient's problem • Specify the therapeutic objective • Verify the suitability of the 'p-drug' • Choose a treatment for this individual patient • Write a prescription • Inform and instruct the patient
Monitor and/or stop the treatment	

significantly improved scores in those who undertook the intervention compared with controls in a written paper comprising four clinical scenarios.[13] In contrast, a UK study showed that five additional tutorials led by pharmacists produced significant improvements in five of seven OSCE stations covering prescribing skills that had been taught.[14]

The weakness of these two trials stems from lack of randomisation or matching of groups – the intervention students and controls could have had different baseline skills and attitudes.

Narrow focused interventions directed at specific aspects of prescribing

Accurate dose calculation and drug administration are critical in particular circumstances such as paediatrics and emergency medicine. Students randomised to an innovative electronic interactive tutorial were better at administering lidocaine and adrenaline in an OSCE,[15] while a single 30-min tutorial on dose calculation for 20 postgraduate paediatrics residents produced improvements in written scores.[16] However, rates of dosing errors in children under the care of the residents receiving the intervention were not studied. These findings must be interpreted with caution, owing to the lack of randomisation and comparability between control and intervention arms.

Medication errors

Medication errors are common,[17] but evidence on the efficacy of student teaching interventions to reduce them is sadly lacking,[18] perhaps because students are allowed to prescribe only after qualification. There was only one, small controlled study of 24 postgraduate paediatric residents in Canada who received a short tutorial and a written knowledge test, followed by recording of prescribing errors in the paediatric emergency department. No difference was found in error rates between study and control groups.[19] Again, lack of randomisation was a major weakness; it was also possible that good prescribers chose not to attend the tutorial.

The WHO Guide to Good Prescribing

The WHO Guide to Good Prescribing takes the student through a structured problem-solving, six-step process in choosing and prescribing a suitable drug for an individual patient (Table 1). There are 41 patient scenarios covering a wide range of presentations, such as a patient with insomnia, a boy with pneumonia or a girl with watery diarrhoea. In one example, a man presents with crushing central chest pain on exertion and the trainee prescriber is asked to choose an appropriate drug for the patient. The trainee should, after reaching a diagnosis of angina pectoris, draw up a table of potentially relevant drugs (in this instance, nitrates, beta-blockers and calcium channel blockers) and proceed to compare each agent using the criteria of safety, efficacy, suitability and cost. After appraising the evidence, the trainee should make a decision and select the most appropriate agent from the list – the so-called 'p-drug' (in this case, sublingual glyceryl trinitrate 1 mg, as required, for the treatment of an acute attack of angina).

The 'p-drug'

In the WHO Guide to Good Prescribing, 'p' stands for personal (although it could equally be 'preferred'), implying that a prescriber has a personal formulary of drugs selected on a rational basis. When

Key Points

- **Safe and appropriate prescribing is a complex and challenging task**
- **A wide variety of educational interventions for prescribing skills have been tested in medical students, but few have looked at practical outcomes such as prescribing errors**
- **In the absence of stronger evidence, the WHO Guide to Good Prescribing would serve as a sound basis for the design of a training programme**
- **Interventions aimed at rational prescribing and problem solving skills can benefit even those students in the preclinical or early clinical phases of their study**

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faced with future patients with angina, the prescriber then considers whether their standard p-drug for this indication is appropriate for the individual patient and what alterations might be needed to the standard dose, frequency or route of administration.

Improvement of prescribing skills

Teaching this method of rational drug selection has improved prescribing skills in simulated scenarios across medical schools in different countries. The inculcation of the techniques for rational prescribing and problem solving may be of benefit even to students still in the preclinical or early clinical phases of their medical education.

Recommendations

In the absence of strong evidence to support the use of other interventions, the WHO model would serve as a good foundation for the design of a targeted prescribing curriculum. We believe that trainees should have hands-on tutorials that guide them through a few of the scenarios given in the WHO Guide to Good Prescribing (or similar cases) using actual prescribing charts to demonstrate their competence. This can be followed-up with self-direct learning based on the WHO Guide to Good Prescribing, during which the students are asked to tackle therapeutic problems and prescribe appropriately for different illnesses. There is also some evidence demonstrating the usefulness of tutorials directed at specific problem areas such as dosage calculation, drug administration, medication errors and the use of problem drugs (eg antibiotics and anticoagulants).

Prescribing is a complex task that needs to be addressed through a dedicated training programme. Student teaching should be based on sound educational principles of adult learning. Safe and appropriate prescribing is a practical skill that should be taught and assessed using techniques based on models like the WHO Guide to Good Prescribing. This method of drug selection is a good model for helping students to develop rational prescribing and problem-solving processes that can serve them lifelong. Further work to develop a curriculum for teaching prescribing and providing example materials for teaching and assessment is needed.

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