Editorial

Strengthening prescribing skills – a priority area for medical education

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Prescriptions are frequently written for patients by doctors and, in certain nations, other medical professionals. Even though prescribing is a routine task, the majority of recently trained physicians do not feel sufficiently prepared for it [1]. Merely a small percentage of medical students think that their education has sufficiently equipped them to write prescriptions. Nonetheless, medical students are thought to have gained the information and abilities necessary to prescribe safely and efficiently by the time they graduate from medical school [2].

Prescribing remains an area of concern globally. A study found shortcomings in the governance of prescribing globally. Over 50% of the doctors surveyed mentioned there were no restriction on prescribing for themselves and their families and they could even prescribe controlled medicines without restrictions [3]. In over 50% of the countries an individual could obtain an antibiotic without a prescription. In England, there was an estimated 50 million prescribing errors and over 52% of these had the potential to cause moderate or severe harm [4]. A systematic review found a wide variation in the prevalence of prescribing errors with high-risk medicines (HRMs) ranging from $0{\cdot}24$ to $89{\cdot}6$ errors per 100 orders of HRMs [5]. Variations in the research methodology used in different studies may be partly responsible. A study found physicians were 8.2 times more likely to commit errors during high than normal-low workload shifts and those on their third or second successive shift (compared to a first or single shift) were more likely to err [6]. Lack of experience in prescribing a specific medication was also associated with a higher error rate.

Prescribing skills in Nepal: Like in other countries, studies in Nepal have revealed deficiencies in the prescribing skills of

students and interns. In Bharatpur, Nepal problems were noted especially in the drug related components of prescriptions written by preclinical students [7]. A study among interns of Birat Medical College found most prescriptions could be rated as good or fair [8]. The authors mentioned that there were several components missing in the students' prescriptions. A prescription has physician and patient related information (patient details, patient address, physician details and clinic or hospital details) and information on the medicines prescribed (name of the medicine, dosage form, dose, frequency, duration and route). An educational intervention significantly reduced the prescribing errors of second year medical students [9]. Several parameters including the drug details improved. At the BP Koirala Institute of Health Sciences most medical officers and postgraduate residents thought their undergraduate pharmacology training taught them to prescribe safely [10]. Many used the internet as their information source on medicines. Another study among preclinical students noted deficiencies in the different components of prescriptions and the authors recommended regular training and assessment of these skills [11].

Problem-based learning: One crucial strategy to enhance prescribing is problem-based learning in pharmacology, which is based on standard treatment guidelines and national essential drug lists [12]. To give students a six-step roadmap to rational prescribing, the World Health Organization (WHO) released the guide to Good Prescribing and the companion Teacher's Guide to Good Prescribing [13, 14]. A recent article mentions the Guide to good prescribing is still relevant but may need to be updated considering recent developments

including the internet and modern educational methods [13]. The increasing use of artificial intelligence (AI) can significantly improve prescribing as explored later in the editorial. The process of personal (P) drug selection is based on objective criteria, and these are drugs that the students/physicians will use most commonly in their practice. P-drug selection has been used during pharmacology training in a medical school in Lalitpur, Nepal [15].

Teaching and assessing prescribing skills: Prescribing skills has received substantial attention and emphasis in the United Kingdom (UK). An online platform called the Prescribing Safety Assessment (PSA) was developed by the British Pharmacological Society and the Medical Schools Council [16]. Students can practice their prescribing on a broad range of clinical problems and receive timely feedback. A variety of educational interventions have been used to teach prescribing to medical students. A recent systematic review concluded that additional prescription writing education helped develop prescribing skills despite the heterogeneity of the methods employed [17]. In addition to stressing the value of small group instruction and the Guide to Good Prescribing, a quick evaluation also pointed out the dearth of new developments in prescribing education and the lack of long-term monitoring of the growth of prescribing skills [18]. Twelve suggestions have been made to help medical students become better prescribers [19]. These include starting prescribing education as early as possible in the curriculum, increasing the number of practice prescriptions written by students, creating dedicated time for prescribing education, learning prescribing in context, focusing on high-risk medicine, providing feedback, involving multidisciplinary teams in

teaching prescribing, using a wide range of teaching and learning methods and assessing prescribing skills.

Prescribing education in Nepal: In Nepal, pharmacology and medicines are taught during the first two years of the basic sciences and there is little teaching of therapeutics and application of knowledge during the clinical years. Clinical pharmacologists and pharmacists are not often involved in teaching clinical students. The emphasis on prescription writing may be more on the format of the prescription and less on rational drug selection. This may have to be re-examined and greater integration between the basic and the clinical sciences is required. Prescribing must be taught and assessed during the clinical years and postgraduate training. A variety of teaching-learning methods can be used, and it should be taught in the clinical workplace. Prescribing can integrate knowledge, skills and attitudes from a variety of areas. Knowledge of genetic make-up of the population, socioeconomic status, support systems, diet, complementary and alternative medicines that the patient may be consuming, their belief systems, chronic use of enzyme inducers like alcohol and nicotine, other medicines being prescribed together all require attention while writing a prescription. Nepal may need to develop knowledge of pharmacogenetics and the genetic profile of the population. Prescribing skills should be assessed and various methods including an objective structured clinical exam (OSCE) can be used. Prescribing skills should be assessed before internship and can be assessed during the national licensing examination for registration. There has been more emphasis on diagnostic skills, but prescribing is a complex and important process deserving much greater attention and resources [20].

AI and prescribing: Recently, prescribing has been supported by artificial intelligence (AI). Machine learning algorithms reduced antibiotic prescriptions and assisted in identifying unsuitable ones, according to a recent comprehensive evaluation [21]. Prescribers, however, had little input on the models' dependability and user-friendliness and were not heavily involved in their development. A potential advancement, intelligent prescription systems (IPS) can assist with medicine selection, dosage, and use monitoring based on the needs of each patient [22]. Patient specific factors can be integrated with evidence-based guidelines, clinical decision support systems and real time patient data. Medicines can be tailored to patient characteristics; their dose and route can be optimized and possible drug-drug interactions predicted. AI driven Clinical Decision Support Systems (CDSS) could potentially decrease polypharmacy and reduce medication-related harm especially in older adults [23]. A limitation however is that these systems may not have been trained on patient datasets from Nepal and other developing nations. Hence their performance in the Nepalese context may be need careful examination. The cost of these systems may also need to be considered. Medical students and faculty in Nepal could play an important role in training these AI systems in the Nepalese context. They should be introduced early in the curriculum to these systems to improve prescribing as part of a wider introduction of AI in medicine. Rational prescribing can improve the use of medicines, reduce cost, decrease adverse drug reactions and improve patient safety.

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