Editorial

iKARE: an innovative framework to reduce prescribing errors

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Introduction to prescribing errors

Medicinal treatment is the most common medical intervention and a critical component of modern healthcare. The Royal Pharmaceutical Society of Great Britain outlines that prescribing is a "technically difficult, and morally complex, problem".[1] Prescribing medication has the potential to alter the management of a patient's condition drastically. Prescribing is a complex task that requires the interpretation of evidence from clinical trials considering individual patient factors. However, it can be associated with errors at numerous stages, including prescribing, dispensing, administering and monitoring.

A medication error is defined as "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is controlled by the health care professional, patient, or consumer. Such events may relate to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labelling, packaging, nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use".[2] Prescribing errors account for a significant proportion of all medication errors and are an essential cause of patient harm. The term' prescribing error' incorporates irrational prescribing, inappropriate prescribing, under-prescribing, overprescribing and errors in writing a prescription.

In England, a recent study report has prompted immediate actions to address the significant problem of medication errors. The study revealed a staggering 237 million errors annually, with a quarter of them resulting in harm to patients. It is estimated that these errors contribute to approximately 700 deaths each year and may also play a role in an additional 1,700 to 22,300 deaths. The study highlighted common mistakes leading to patient harm, such as administering incorrect medications, dispensing incorrect doses, and delays in medication administration.[3] These findings emphasise the urgent need for interventions to mitigate medication errors and improve patient safety in England.

The hazards of irrational prescribing have been proven to be causes of morbidity, mortality, institutionalisation and increased cost of treatment. Emergency admissions due to adverse drug reactions are thought to cost £2 billion per year.[4] Irrational analgesia prescribing can lead to drug dependence, and overuse of injections can increase the possibility of a patient developing hepatitis B, HIV/AIDS and abscesses.[5,6]

The EQUIP study is the largest hospital-based UK study investigating the prevalence and causes of prescribing errors across twenty English hospitals and eight Scottish hospitals, respectively. Foundation-year doctors write approximately two-thirds of hospital prescrip-

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- iKARE, stands for Knowledge, Attitude, Resources, and Environment.
- iKARE is a distinctive and innovative approach to educating prescribers about safer prescribing practices.

tions and have a significantly higher prescribing error rate than consultant-grade doctors.[7,8] The economic impact varies from £60 for inhaler medication to £6 million in litigation claims for anaesthetic errors.[9]

In acknowledgement of the significance of medication safety, the World Health Organization (WHO) has launched its third patient safety challenge globally. This initiative aims to enhance medication safety by reinforcing existing systems that aim to reduce preventable harm. As part of this effort, the WHO has put vital recommendations, including promoting safer prescribing within postgraduate medical education, providing consistent and supportive feedback to junior doctors, and collecting incident reports to facilitate quality improvement initiatives and training. Furthermore, the WHO emphasises the importance of cultivating safer working environments that minimise the likelihood of these errors.[10]

The prevalence and causes of prescribing errors: the PRescribing Outcomes for Trainee Doctors Engaged in Clinical Training (PROTECT) study investigated prescribing errors amongst foundation doctors (i.e. junior doctors in their first or second year of postgraduate training) in the UK. Higher error rates were associated with teaching hospitals, surgical or mixed wards, wards with high patient turnover, wards with more prescribed medicines and the months of June and December.[7]

Prescribing in psychiatry

Prescribing plays a critical role in managing mental health disorders, as medications are often the primary treatment modality.[11] However, prescribing practices in psychiatry can be complex and challenging due to several factors.

One of the complexities arises from combination regimens, where multiple medications are prescribed simultaneously to target different symptoms or aspects of a mental health condition. This approach requires careful consideration of drug interactions, potential side effects, and optimal dosing to ensure effectiveness while minimising adverse effects.[12]

Another challenge in psychiatric prescribing is the utilisation of high-dose antipsychotics, particularly for individuals with severe or treatment-resistant conditions. Careful monitoring is essential to mitigate the potential risks and adverse reactions associated with higher doses, such as extrapyramidal symptoms or metabolic complications. Polypharmacy, the concurrent use of multiple medications, is also prevalent in psychiatric practice and increases the risk of drug-drug interactions.[13]

A recent meta-analysis highlighted the significance of the prescribing and monitoring stages in psychiatric treatment, as they were identified as the leading cause of preventable harm. This emphasises the importance of implementing rigorous protocols, ongoing evaluation, and close monitoring of medication regimens to enhance patient safety and minimise adverse outcomes.[12]

It is noteworthy that primary care plays a crucial role in managing mental health, as approximately 90% of adults with mental illness receive treatment in primary care settings.[13] Primary care physicians are often at the forefront of prescribing medications for mental health disorders. Therefore, they need to be well-informed about the complexities of psy-

chiatric prescribing and collaborate with mental health specialists when necessary to ensure optimal treatment outcomes.

Causes of prescribing errors

Nick Barber, Professor of the Practice of Pharmacy, defined good prescription should accomplish the following objectives (1) to maximise effectiveness, (2) to minimise risks, (3) to minimise costs, (4) to respect the patient's choices.[14,15] The causes of prescribing errors are complex and multifactorial.[10] These encompass complex and high-pressure work environments where junior doctors operate on the wards with frequent patient turnover and increasing demands. Challenges arise when accessing prescribing support or relevant clinical information out of hours. Staffing issues, such as altered shift patterns leading to unfamiliarity with processes or patients, can also play a role. Individual factors involve a lack of knowledge or experience, low self-awareness, perceiving prescribing tasks as routine or low priority, feeling fatigued, hungry, stressed, or unwell, experiencing low morale or mental health issues, and encountering difficulties when transitioning to becoming a foundation year doctor. Team dynamics contribute to prescribing errors through hierarchical structures that discourage junior doctors from seeking senior guidance, miscommunication within the team, uncertainty surrounding prescribing responsibility, over-reliance on presumed safety-netting mechanisms (e.g., nurses or pharmacists identifying and correcting errors), and a lack of a blame-free culture. Systematic obstacles include:

- Limited access to hospital protocols or guides,
- Lack of standardisation in drug charts or e-prescribing systems,
- Communication challenges between primary and secondary care due to varying interfaces, and
- Inadequate feedback mechanisms.

Lastly, prescribing errors can be task-specific, encompassing situations such as prescribing outside routine practice, managing polypharmacy or complex prescribing, encountering language and communication barriers, or unfamiliarity with the individual patient.

This was also mirrored in the PROTECT study, which displayed that error causation was related to the work environment, team factors, pressure from other staff, workload and interruptions.[7]

The General Medical Council states in their "Good Practice in Prescribing and managing medicines and Devices" guideline: "You are responsible for the prescriptions that you sign. You must only prescribe drugs when you have adequate knowledge of your patient's health. You must be satisfied that the drugs serve your patient's need".[16]

An introduction to iKARE

To mitigate prescribing errors amongst junior doctors, the Royal College of Physicians released a report emphasising the importance of enhancing prescribing training in a practical and interactive manner. It calls for increased support from hospital trusts to establish safer working environments for junior doctors to prescribe. Additionally, it recommends collaborative efforts between postgraduate medical education lead and medication safety officers to integrate safe prescribing topics into medical education. [10]

The iKARE program has been developed with the aim of preventing errors from happening in the first place and fostering a proactive culture that promotes ongoing learning and self-reflection. This course is specifically designed for junior doctors and non-medical prescribers, equipping them with enhanced knowledge and comprehension of prescribing practices and furnishing them with a framework for ensuring safer prescribing.

The development of the iKARE course was informed by the perspectives of a cohort of junior doctors through an initial focus group. iKARE, which stands for Knowledge, Attitude, Resources, and Environment, follows a PDSA (Plan-Do-Study-Act) cycle to facilitate achieving specific goals. This cycle involves several

stages:

1. Providing staff with the necessary information to implement the desired change
2. Leading by example to foster a shift in attitude
3. Providing resources to support the desired change
4. Creating the appropriate environment and systems to facilitate and sustain the intended transformation

The iKARE program consists of a series of four one-hour interactive workshops that are available to all prescribers across the trust. These workshops are integrated into the weekly teaching program and are delivered on a rolling basis, with new prescribers joining every six months. The first complete course took place from August 2018 to February 2019. The course is structured into four main sessions: 1) Principles and the iKARE model, 2) Holistic approach to medication management, 3) Case scenarios, and 4) Quiz session.

iKARE program

The iKARE sessions delve into ten key considerations when it comes to prescribing. Firstly, it emphasises the importance of establishing an accurate diagnosis and evaluating whether the prescribed medication is likely to provide benefits to the patient. Attendees are encouraged to gather the most thorough drug history by conducting patient interviews and consulting at least one additional source of information, which includes over-the-counter and alternative medicines. Secondly, prescribers are urged to explore prior adverse drug reactions and allergies. Thirdly, the session focuses on factors that may impact treatment's potential benefits and harms, such as age, pregnancy, and impaired organ function. The fourth aspect highlights the significance of concordance, which involves working in partnership with the patient, managing their expectations, and ensuring their understanding of the prescribed medication.

Prescribers are advised to adopt a patient-centred approach, selecting safe and cost-effective medications within the scope of drug licensing indications and weighing the advantages and disadvantages based on evidence-based practices. Maintaining a patient-centred approach facilitates the identification of the most appropriate formulation, dose, frequency, route of administration, and duration of treatment for the patient. The sixth consideration emphasises adherence to national guidelines and local formularies when applicable, and prescribers should be knowledgeable about accessing them. The clarity in prescribing is crucial, and prescribers should strive to produce unambiguous, legally compliant prescriptions using the correct documentation while monitoring the beneficial and adverse effects of medications. The ninth step emphasises effective communication and documentation, including providing reasons for prescribing decisions. Lastly, the tenth aspect underscores the importance of staying up to date, seeking advice and support when needed, escalating appropriately, and double-checking complex prescriptions.

Feedback

Feedback is vital for the continuous evolution of iKARE. To facilitate this, structured feedback in the form of surveys is utilised by iKARE facilitators to monitor program progress, strategise improvements for future sessions, and encourage self-reflection among participants. The feedback received thus far has been overwhelmingly positive. In February 2021, a total of 21 attendees provided their feedback, which revealed significant improvements in their prescribing knowledge of General Medical Council (GMC) guidance after participating in the program. Before attending the sessions, over two-thirds of prescribers had a limited or no understanding of the distinction between prescribing and medication errors. However, following the program, 95% of participants agreed that their knowledge in this area had improved. Additionally, 61% of attendees rated the prescribing error sessions as "excellent."

The feedback collected has offered valuable insights into the perspective of prescribers.

Among the participants, 60% correctly identified that foundation doctors are more prone to making prescribing errors. Additionally, the most commonly perceived causes of prescribing errors were busy environments and a high turnover of patients.

In a subsequent feedback cycle involving thirteen participants, the content of the program was consistently rated as "very good" or "excellent". Furthermore, 62% of prescribers found the presentation style to be "excellent". Attendees gained valuable knowledge on accessing patient information leaflets through the trust website and other sources of prescribing information. They also learned how to avoid the cognitive disconnection between a prescription and the clinical assessment process. The iKARE course fostered a culture of careful consideration, emphasising the importance of even seemingly mundane or routine prescriptions.

Following the completion of all four sessions, every audience member expressed a positive change in their prescribing knowledge. They unanimously recommended that the prescribing course become a regular offering for junior doctors. In general, the prescribers who participated in the course appreciated being introduced to the iKARE model. Most attendees did not offer suggestions for future course improvements, indicating their satisfaction with the program.

The Senior Leadership Team (SLT) of Pennine Care NHS Foundation Trust recognised the importance of enhancing compliance with Core and Essential Skills (CEST) among medical staff. As of spring 2021, the compliance rates with CEST were below 75%, with medical staff exhibiting the lowest compliance rate within the organisation. In order to initiate change, the SLT acknowledged the necessity of adopting a clear model to engage staff members. The recently introduced iKARE model was deemed suitable for articulating this approach to change.

The effectiveness of iKARE has emphasised the significance of advancing additional initiatives aimed at ensuring safer prescribing practices. In recognition of this importance, iKARE was nominated and finalist for the innovation award in Pennine Care NHS Foundation trust.

CONCLUSION

Prescribing errors have significant ramifications for both patients and healthcare systems, making it imperative to address this issue proactively. In this context, iKARE emerges as a distinctive and innovative approach to educating prescribers about the importance of safer prescribing practices. By equipping prescribers with the necessary knowledge and skills, iKARE is a valuable tool in reducing prescribing errors.

One noteworthy aspect of iKARE is its tailored approach towards doctors and non-medical prescribers. Recognising that junior doctors & independent prescribers play a pivotal role in prescribing medications, the program focuses on cultivating good prescribing habits from the early stages of their prescribing practice. This targeted approach not only enhances patient safety but also contributes to the professional development and competency of prescribers. By incorporating iKARE into medical education and practice, we can foster a culture of safer prescribing and improve patient outcomes.

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Abbreviations list: Acquired immunodeficiency syndrome (**AIDS**), Core and Essential Skills (**CEST**), General Medical Council (**GMC**), Human immunodeficiency virus (**HIV**), Knowledge, Attitude, Resources, and Environment (**iKARE**), National Health Service (**NHS**), Plan-Do-Study-Act (**PDSA**), PRescribing Outcomes for Trainee Doctors Engaged in Clinical Training (**PROTECT**), Senior Leadership Team (**SLT**), United Kingdom (**UK**), World Health Organization (**WHO**).

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