Medicines Evidence Commentary

commentary on important new evidence from Medicines Awareness Weekly

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Medicines optimisation: effect of a combined education, informatics and financial incentive intervention on high-risk prescribing in general practice

A cluster-randomised study found that a 48-week combined education, informatics and financial incentive intervention reduced high-risk prescribing of antiplatelets and non-steroidal anti-inflammatory drugs (NSAIDs) in 33 Scottish primary care general practices. The study was not designed to identify which aspect of the intervention was the most effective. Statistically significant reductions were also observed for certain related emergency hospital admissions. These findings support the NICE guideline on medicines optimisation which recommends that health professionals consider a number of different interventions to minimise medicines-related patient safety incidents.

Overview and current advice

The NICE guideline on medicines optimisation describes medicines-related patient safety incidents as unintended or unexpected incidents that are specifically related to medicines use, which could have or did lead to patient harm. These include potentially avoidable medicines-related hospital admissions and re-admissions, medication errors, near misses and potentially avoidable adverse events.

A report commissioned by the Department of Health, Exploring the costs of unsafe care in the NHS, found that 5% to 8% of unplanned hospital admissions are due to medication issues. A study by Howard et al. 2007 found that over half of all avoidable drug-related hospital admissions are caused by 4 classes of medicines: antithrombotics, anticoagulants, NSAIDs and diuretics1.

A previous study, the pharmacist-led information technology intervention for medication errors (PINCER) study, tested computer analysis of GP records using a set of indicators designed to identify common medication errors (Avery et al. 2012)2. This approach, along with pharmacist feedback and support, successfully reduced prescribing errors in UK general practices. The indicators used in the PINCER study are now available for GPs to use as an audit tool in their own practices.

The NICE guideline on medicines optimisation recommends that organisations and health professionals consider applying the PINCER principles to reduce the number of medicines-related patient safety incidents, taking account of existing systems and resource implications. Using a screening tool, for example the STOPP/START tool to identify potential medicines-related patient safety incidents in some groups of people, is also recommended.
The NICE guideline on medicines optimisation supports learning from medicines-related safety incidents and recommends that health and social care organisations and practitioners should ensure that action is taken to reduce further risk when medicines-related patient safety incidents are identified. Health and social care organisations and practitioners should apply and share learning in the organisation and across the local health economy, including feedback on trends or significant events to support continuing professional development. NICE also recommends that health professionals consider carrying out a structured medication review for older people and for adults, children and young people who are taking multiple medicines or who have chronic or long-term conditions, when a clear purpose for the review has been identified.

The NICE pathway on medicines optimisation brings together all related NICE guidance and associated products in a set of interactive topic-based diagrams.

**New evidence**

A cluster-randomised study ([Dreischulte et al. 2016](#)) investigated the effect of a 48-week combined education, informatics and financial incentive intervention on high-risk prescribing of antiplatelets and NSAIDs and related emergency hospital admissions in 33 Scottish primary care general practices. The study used a stepped-wedge design, where all practices received the intervention but were randomised to 1 of 10 start dates between October 2011 and September 2012. Practices were followed up for 48 weeks after the intervention finished.

The education element of the intervention consisted of a 1 hour visit by a pharmacist at the beginning of the intervention, additional written information and 8-weekly newsletters tailored to the progress of the practice. An informatics tool extracted data from the practices’ electronic medical records, highlighted people who needed a review and facilitated reviews by displaying drug histories. Weekly updates on high-risk prescribing rates and progress of reviews were provided by the informatics tool. Practices received an initial fixed payment of £350 and a further £15 per patient reviewed during the intervention period (irrespective of whether prescribing was changed).

The primary outcome measure was a composite of 9 measures of high-risk prescribing of NSAIDs and antiplatelets in people with risk factors for adverse drug events. These included prescribing NSAIDs or antiplatelets without gastroprotection for people at risk of gastrointestinal adverse events, prescribing an NSAID in combination with a renin-angiotensin system antagonist and a diuretic, prescribing an NSAID for a person with chronic kidney disease, and prescribing an NSAID for a person with a history of heart failure. Prescribing indicators were measured every 8 weeks before and after the practice received the intervention. High-risk prescribing was considered to be current if a prescription had been issued in the last 8 weeks.

Secondary outcomes included ongoing (prescribed within the last year) and new (not prescribed within the last year) high-risk prescribing, the rate of each measure of the composite primary outcome individually, and emergency hospital admissions for gastrointestinal bleeding, acute kidney injury or heart failure. The investigators considered both hospital admissions that were preceded by high-risk prescribing, as well as those which were not preceded by high-risk prescribing, for people with risk factors for adverse drug events related to NSAIDs and antiplatelets.

A total of 3.7% (1102/29,537) of people with risk factors for adverse events were prescribed NSAIDs, antiplatelets or both immediately before the intervention. After the intervention this decreased to 2.2% (674/30,187 people; adjusted odds ratio 0.63, 95% confidence interval [CI] 0.57 to 0.68, p<0.001). Rates of ongoing and new high-risk prescribing were also statistically significantly reduced after the intervention compared with immediately before it (1.5% compared with 2.6%, p<0.001 respectively; and 0.7% compared with 1.1%, p<0.001 respectively). There were statistically significant reductions in
each of the individual measures of the composite primary outcome, except for prescribing of NSAIDs to people with a history of heart failure. There was no statistically significant difference between rates of high-risk prescribing at the end of the intervention period compared with 48 weeks after the intervention finished, suggesting that the effect on high-risk prescribing was sustained after the intervention finished.

In people with risk factors for adverse events related to NSAIDs and antiplatelets the rate of emergency hospital admissions (preceded by a high-risk prescription in the previous 8 weeks) statistically significantly decreased during the intervention compared with the pre-intervention period for gastrointestinal ulcer or bleeding (0.4 compared with 4.6 admissions per 10,000 person-years respectively; rate ratio 0.09, 95% CI 0.00 to 0.52, p=0.004) and acute kidney injury (11.1 compared with 34.6 admissions per 10,000 person-years respectively; rate ratio 0.32, 95% CI 0.17 to 0.58, p<0.001). There was no significant difference in emergency hospital admissions for heart failure.

In people with risk factors for adverse events related to NSAIDs and antiplatelets irrespective of preceding high-risk prescribing the rate of emergency hospital admissions was statistically significantly reduced for gastrointestinal ulcer or bleeding (55.7 compared with 37.0 admissions per 10,000 person-years respectively; rate ratio 0.66, 95% CI 0.51 to 0.86, p=0.002) and heart failure (707.7 compared with 513.5 admissions per 10,000 person-years respectively, rate ratio 0.73, 95% CI 0.56 to 0.95, p=0.02). The rate of emergency admissions for acute kidney injury was not statistically significantly different between the pre-intervention period and the intervention period.

The pragmatic study design suggests the results are generalisable to UK practice, but the investigators also highlight a number of study limitations. A total of 66 eligible practices were initially approached to take part in the study but only 34 agreed to participate (1 practice withdrew before the study started). This could indicate that the included practices were more motivated to change prescribing patterns than non-participating practices. In a stepped-wedge design, more clusters are exposed to the intervention towards the end of the study than in its early stages. This implies that the effect of the intervention might be confounded with any underlying temporal trend. A result that initially might seem suggestive of an effect of the intervention may actually be the result of outcomes improving due to an underlying temporal trend. The authors state that the rate of high-risk prescribing was rising slowly during the pre-intervention period and there were no other relevant non-trial interventions during the implementation period. Therefore the authors conclude that underlying temporal trends were unlikely to have affected prescribing outcomes.

Commentary

Commentary provided by NICE

This study found that a combined intervention of education, informatics and financial incentives reduced the rate of high-risk prescribing in a sample of Scottish general practices. Hospital admissions for gastrointestinal bleeding and acute kidney injury in people with risk factors for adverse events associated with antiplatelets and NSAIDs and who had received recent prescriptions for these were also reduced. Total hospital admissions for gastrointestinal bleeding and heart failure in people with risk factors for adverse events associated with NSAIDs and antiplatelets (irrespective of whether they had received prescriptions for these in the last 8 weeks) were also statistically significantly reduced during the intervention compared with before it.

These findings are promising; however the effect on admissions irrespective of recent high-risk prescribing was greater than could be explained by the effect on admissions that were preceded by high-risk prescriptions. Larger studies that are powered to examine the effect on hospital admissions are needed to confirm the findings.
The study showed that the combination of education, informatics and financial incentives were effective at reducing high-risk prescribing, although the study was not designed to identify which aspect of the intervention was the most effective. Feedback on high-risk prescribing was one element that the informatics tool provided, but it also facilitated reviews by highlighting appropriate people and displaying information on drug histories. Providing education and minimising barriers to reviews were also elements of the PINCER study discussed above, which found similar reductions in rates of prescribing to the current study at 6 months.

These findings support the NICE guideline on medicines optimisation which recommends that health professionals consider a number of different interventions to minimise medicines-related patient safety incidents such as applying the principles of the PINCER intervention, using a screening tool to identify potential medicines-related patient safety incidents, and carrying out a structured medication review for some groups of people when a clear purpose for the review has been identified.

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References


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