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'If no-one stops me, I'll make the mistake again': Changing prescribing behaviours through feedback; A Perceptual Control Theory perspective'

Jane Ferguson, BSc MSc PhD *, Chris Keyworth, BSc MSc PhD, Mary P. Tully, FFRPS MRPharmS PhD

Manchester Pharmacy, School, University of Manchester, Oxford Road, Manchester, M13 9PL, United Kingdom

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ABSTRACT

Background: Doctors at all levels make prescribing errors which can prolong patients' hospital stay, increase the risk of death, and place a significant financial burden on the health system. Doctors have previously reported receiving little or no feedback on their prescribing errors. The effectiveness of feedback in modifying future practice varies widely, depending on how feedback is delivered. To date there is little evidence about why and how feedback interventions do or do not work. Behavioural theories can be used to evaluate this process and provide explanatory accounts to inform recommendations for future interventions.

Objective: To explore the experiences of prescribers receiving different methods of feedback about their prescribing errors. Perceptual Control Theory (PCT) was used as a theoretical framework to explain which aspects of feedback were most likely to influence prescribing behaviour.

Methods: A secondary analysis of 31 semi-structured qualitative interviews with junior doctors who had taken part one of three studies in which they received feedback on their prescribing errors. A hybrid approach to analysis involved inductive thematic analysis, and deductive a priori template of codes using PCT as a framework to guide data analysis and interpretation.

Results: Feedback was most useful for learning and most likely to influence future prescribing behaviour when it was timely, and provided a comprehensive, contextualised benchmark to which participants could compare their prescribing behaviours and current level of knowledge. Group discussions and completing directly-observed prescribing event forms were thought most likely to impact future prescribing; email feedback alone was perceived as least effective in changing prescribing behaviour.

Conclusion: Feedback has the potential to change future prescribing behaviour. Behaviour change can only take place if prescribers are made aware of these discrepancies, either via providing appropriate reference values or benchmarks before mistakes are made, or by providing timely and comprehensive feedback after mistakes are made.

1. Introduction

Prescribing of medication is one of the most common interventions that patients receive when admitted to hospital. However, this is not always an error-free process.[1,2] Prescribing errors can result in preventable adverse drug events, prolong hospital stay and increase the risk of death; consequently, this costs the National Health Service (NHS) in the United Kingdom (UK) an estimated £750 million annually.[3] Although doctors at all levels make prescribing errors, evidence from the UK suggests that junior doctors (the term junior doctors refers here to all doctors in their first or second year of training) are responsible for a disproportionate number of errors in comparison to medical consultants, with junior doctors being twice as likely to make a prescribing error compared to senior doctors.[1] Antecedents of prescribing errors are

* Corresponding author. Permanent address: Alliance Manchester Business School, Alliance Manchester Business School, The University of Manchester, Room 4.008a, Crawford House, Booth Street East, Manchester, M15 6PB, United Kingdom.
E-mail addresses: jane.ferguson@manchester.ac.uk (J. Ferguson), christopher.keyworth@manchester.ac.uk (C. Keyworth), Mary.P.Tully@manchester.ac.uk (M.P. Tully).

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multifactorial and complex.[4] Factors contributing to prescribing errors include the busy clinical environment, lack of professional support, individual lack of knowledge and experience, poor medicines reconciliation and gaps in prescribing teaching.[1,4] Consequently, a multifaceted approach to prevention of prescribing errors has been suggested,[4] with interventions aimed at improving knowledge, encouraging reflective practice,[4] and contributing to attitudinal change towards prescribing[2] being particularly relevant.

A common reason given for why errors persist is that doctors report that they are not always aware they have made an error.[4] Consequently, delivering feedback to individual doctors about their prescribing errors has the potential to reduce future prescribing errors.[5,6] Such feedback can be delivered in one of two ways, using a formal system (such as audit and feedback interventions)[7] or in a more informal way, such as routine one-to-one feedback[8] (one of the more common approaches in day-to-day clinical practice).

Audit and feedback interventions have been used in healthcare organisations with the aim of changing the behaviour of health professionals, and improving performance and professional standards (such as ensuring adherence to patient management guidelines or appropriate testing and screening of patients). Such interventions involve measuring an individual's professional practice, comparing their performance to professional standards or targets, and then feeding back the results of the comparison to the individual. Evidence suggests that audit and feedback interventions are effective in changing behaviour.[7,9,10] A Cochrane review of 140 studies of audit and feedback interventions in healthcare found that such interventions were most effective if provided by a supervisor or colleague, given more than once, delivered verbally and in writing, and included a clear action plan.[7] The authors concluded that future studies of audit and feedback should directly compare different ways of providing feedback. However, the effectiveness of audit and feedback interventions varies widely, depending how the feedback is delivered.[7] Providing structured and regular feedback about prescribing errors has been shown to increase appropriate prescribing.[11]

While audit and feedback interventions are structured, and often carried out at regular intervals, this is not the only feedback that is delivered in practice. Routine feedback about prescribing errors is delivered in an ad hoc manner, as errors are identified.[4,8] In NHS hospitals, for example, this generally involves pharmacists detecting inappropriate prescribing or prescribing errors as part of their normal duties, then either correcting minor issues or telling a prescriber of the need to amend a prescription. Often, prescribing errors are corrected by those doctors on duty when they are identified, and pharmacists have no duty to pass on the information to the original prescriber (who may have been on night duty when the error occurred, for example). Consequently, prescribers are often unaware of their errors, thus losing a valuable learning opportunity to modify future practice. Furthermore, doctors report being unaware that they have made a mistake; thus, they are unaware of a need to change their behaviour.[4,8]

Junior doctors have described their support relating to feedback about prescribing as inadequate[4] and routine feedback and supervision as being absent or lacking,[12] and irregular and insufficient.[13] Furthermore, this lack of support in the early stages of clinical practice has been identified by junior doctors as being particularly stress-inducing.[14] Previous research has found that routine feedback was universally valued by doctors as an educational and professional development practice.[8] This is particularly important given that a number of studies have found evidence that junior doctors are not as well prepared with the knowledge and skills for prescribing.[4,15,16] This highlights the necessity of routine feedback in order to highlight and address gaps in knowledge relating to prescribing errors and any disparity between perceived and actual performance.[17] Furthermore, previous research in UK hospitals found that doctors and pharmacists agreed that direct and individualised feedback on prescribing errors was both acceptable and necessary for professional development.[13] Opportunities to learn from feedback about their own (and others') mistakes through peer comparison and discussion was particularly desired by doctors in their first year of practice.[4] Given that doctors have reported receiving little or no feedback it is therefore unsurprising that there is a paucity of research on its effectiveness on prescribing errors.[8]

To date there is very little evidence on the mechanism of action of feedback interventions.[10] Theories of behaviour[9] can be used to evaluate how feedback works, and identify likely mechanisms through which change is achieved. Additionally, theory can provide explanatory accounts of effects and be used to generate recommendations for developing and implementing feedback interventions and further understand why some interventions are more (or less) effective than others.[18] However, there is a lack of evidence relating to how theory has been used in the design and evaluation of either audit and feedback or routine feedback research. A Cochrane review of audit and feedback intervention design found there to be little guidance on how to use audit and feedback most efficiently in practice, concluding that audit and feedback "will continue to be an unreliable approach to quality improvement until we learn how and when it works best".[19]

Perceptual Control Theory (PCT) has previously been used to understand the perceptual basis of behaviour,[20] the analysis of complex tasks,[21] and how cognitive behaviour therapy works.[22] PCT offers a theoretical framework for comparing different methods of feedback and understanding how feedback might best be employed to change, in this case, prescribing behaviour. PCT asserts that 'behaviour is the control of perception' and assumes that behaviour is directed by both goals and the aim to control perceptual experience by making experiences align to these goals.[23] The main tenet of PCT is that humans behave in certain ways to accomplish goals. According to the theory, if a gap is perceived between a goal and current experience, then behaviour change will occur to meet that goal via a process called *reorganisation*. For example, a prescriber might perceive a gap in their prescribing knowledge, compare it to a goal for that experience (i.e. appropriate prescribing), and act to change their perception to reach that goal (e.g. seek advice). However, there are often no comparators in practice,[4] and therefore no discrepancies between goals and experience are detectable, meaning that behaviour change is unlikely. PCT assumes that behaviours are purposeful and that behaviours are more likely to change if a reference point or 'standard' is available. If there is discrepancy between what the prescriber wants to achieve and what they are experiencing, then 'control' is a process of reducing this discrepancy. According to PCT, prescribers are controlling a perception, not an action. Consequently, without feedback prescribers will perceive that their prescribing behaviours are appropriate.

Given the potential for feedback to improve prescribing, and the lack of evidence relating to the effectiveness of any of the usual feedback interventions, the aim of this paper is to explore the feedback experiences of prescribers using PCT to compare different methods of delivering feedback and explain which aspects of feedback are theoretically most likely to influence prescribing behaviour.

2. Methods

2.1. Design

A secondary analysis of existing qualitative data[24] was carried

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