Original Article

Applying Health Psychology to Advance the Science of De-Implementation

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Introduction

Healthcare Provider (HCP) behaviours are the actions performed by HCPs when delivering healthcare to patients. These behaviours can include activities related to (1) promoting health and preventing illness, (2) assessing and diagnosing illnesses, (3) providing treatments, (4) providing general management of health conditions (5) carrying out action related to healthcare system management and (6) building therapeutic alliances with patients and carers (Patey et al., 2023). A variety of professions are involved in the delivery of these activities including physicians, nurses, midwives, physiotherapists, and other allied healthcare professionals such as psychologists, pharmacists, and dentists. HCP behaviour have their origins in the academic and practical training HCPs receive and evolve as they develop their professional identities throughout their careers (Francis & Presseau, 2019). However, as new scientific discoveries are made in healthcare, new and innovative diagnostic tools and treatments need to be implemented. For example, when newly developed guidelines or a new annual vaccine is required for the public, these advancements require uptake and implementation (Castillo, Patey, & MacDonald, 2021; Vallis et al., 2021). Conversely, when inefficient and harmful clinical practices need to be removed, defined as low-value care, HCPs to change the way they deliver care to their patients. For example, recommendations exist that preoperative tests, such as chest x-rays and electrocardiographs, should not be routine ordered for patients having low-risk surgical procedures (Kirkham et al., 2015), antibiotics should not be prescribed for individuals with upper respiratory tract infections (Wong et al., 2022), and diagnostic imaging should not be ordered for individuals with acute non-complicated low back pain (Hall et al., 2019).

Implementing evidence-based care is a fundamental challenge facing healthcare. Implementation science is a field of research investigating the best methods and strategies to improve to uptake of evidence-based medicine and change clinical practice, whether delivering high value care through implementation or attemping to remove low-value care through de-implementation. Unfortunately, changing clinical practice is not particularly easy and questions arrise as to whether the approaches to support the initiation of new practice behaviours and stopping of outdated practice behaviours should be at the same. This paper discusses why de-implementation is of interest of late and how the application of health psychology theories, tools and methods can advance the science of de-implementation.

Why is everyone so interested in de-implementation?

The delivery of low-value care that is not required or potentially harmful is a global problem. About 25%–30% of all care has been estimated to be of low-value in countries such as Australia,

Canada, Spain, Brazil and the USA, and this estimate rises to 80% for certain procedures (Brownlee et al., 2017; Squires et al., 2022). The harm associated with low-value care can include both direct and indirect patient harms, unnecessary workload for hard-pressed HCPs, wasted healthcare resource and negative impacts on the climate. The recent COVID-19 pandemic has clearly illustrated that healthcare is a limited resource and continued low-value care greatly reduces the availability of those scarce resources to those patients who need it. Fundamentally, people are not receiving the best possible care. Recent work has started to focus what it means to de-implement.

Over the last decade, some of that work has involved an increasing global recognition of the existence of low-value care and its negative consequences. Organizations like Choosing Wisely promote discussions between physicians and patient about appropriate care (Born, Kool, & Levinson, 2019; Levinson, Born, & Wolfson, 2018; Levinson et al., 2014). There are networks such as Deprescribing.org and the United States Deprescribing Research Network which are organizations interested in reducing unnecessary medication and are concerned about polypharmacy (Farrell, McCarthy, & Thompson, 2015; Steinman & Boyd, 2022). Additionally, organizations like Cochrane Sustainable Healthcare (Johansson et al, 2019) and BMJ's Too Much Medicine (Glasziou et al, 2013; Macdonald & Loder, 2015) promote resource stewardship and appropriateness of healthcare delivery. Whilst awareness and advocacy are critical steps in de-implementing low-value care, it alone will not change clinical practice. We require further investigation into the best strategies for de-implementation.

What is the Value of using a Behaviour Science Approach?

If we consider clinical practice as a set of behaviours – whether using new guidelines, preforming a surgical technique, prescribing medications, or providing support or advice to a patient – then encouraging appropriate practice is about supporting behaviour change. Further, encouraging high value care is about reducing the frequency in which low-value care is preformed whether it is often to not at all for a subgroup of patients, often to not at all for the whole patient population, or from monthly to annually for patients. This framing allows us to use psychology to understand de-implementation because we are just trying to get people to stop doing things they should no longer do. There are thousands of different behaviours performed by different HCPs across many contexts, requiring different implementation approaches. Behavioural sciences can be applied to develop de-implementation strategies to support HCP behaviour change and provide valid, reliable tools to evaluate these strategies (Patey et al., 2023).

If changing clinical practice is about changing behaviour and de-implementation as decreasing behaviour frequency, then do behavioural theories proposed different approaches for decreasing frequency of behaviour (i.e., de-implementation) and increasing frequency of behaviour (i.e., implementation). We know that behavioural theories can help with designing de-implementation interventions (Gillies et al., 2021). To effectively apply theories when designing de-implementation interventions, we need to know which theories are best suited for understanding how to reduce behaviours. Using Critical Interpretative Synthesis, a conceptual review of 66 papers and their theoretical sources reported three key findings (Patey, Hurt, Grimshaw, & Francis, 2018). Firstly, 9 of the 15 behavioural theories

identified do not distinguish between implementation and de-implementation (5 theories were applied to only implementation or de-implementation, not both). Secondly, to decrease the frequency of behaviour using theories that did not distinguish between de-implementation and implementation a strategy of substituting one behaviour with another was applied and the behaviour targeted using theory was the novel substitute behaviour (Patey et al., 2018). Interestingly, there was no theoretical basis provided for using this strategy, nor were methods proposed for selecting appropriate substitute behaviours. The third finding was that Operant Learning Theory makes an explicit distinction between techniques for increasing and decreasing frequency of behaviour. Specifically, a behaviour will occur more frequently (implementation) if it is followed by reinforcement and conversely, behaviour will occur less frequently (de-implementation) if it is followed by punishment. However, it is unclear at this point how best to use Operant Learning Theory strategies for de-implementation because they may not be acceptable in health systems; punishments, such as professional sanctions and disciplinary actions, are often used in severe cases of misconduct.

Whilst the term "de-implementation" is a recent term, commonly used in since 2012 (Eccles et al., 2012; Nieuwlaat et al., 2013), decreasing ineffective or harmful healthcare practices (de-implementation) and strategies to support this have been going on for decades. They are sometimes termed "Quality Improvement initiatives" and "Infectious Disease Control". Researchers have been designing implementation and de-implementation interventions for decades but rarely explicitly distinguished between them. It is unclear what approaches are being used and whether implementation and de-implementation interventions do require different strategies. To investigate what approaches are currently being used and perhaps provide insight into the theoretical perspective applied when designing the interventions, unpacking the 'active ingredients' of the de-implementation interventions is imperative.

The behaviour change technique (BCT) taxonomy (version 1), a tool grounded in the behavioural sciences, is probably the most comprehensive taxonomy of intervention components which consists of 93 techniques (Michie et al., 2013). Each technique has a definition and an example to aid in designing interventions or coding of pre-existing intervention descriptions. Whilst there are a number of taxonomies that permit the identification of intervention components such as the Expert Recommendations of Implementation Strategies (ERIC) (Powell et al., 2015) or the Effective Practice and Organisation of Care (EPOC) (Effective Practice and Organization of Care, 2015) taxonomies, the BCT taxonomy possess a level of granularity and specificity the other taxonomies do not. This granularity permits for an in-depth investigation of the potentially subtle differences in implementation and de-implementation that may be overlooked with other taxonomies (Patey, Grimshaw, & Francis, 2021). A review of intervention descriptions in 181 articles from three systematic reviews in the Cochrane Library were coded using the BCT taxonomy (v1) and found three BCTs identified more frequently in de-implementation than implementation interventions: Monitoring of behaviour by others without feedback, Restructuring social environment, and Behaviour substitution (Patey, Grimshaw, & Francis, 2021). Whilst there are some significant differences between BCTs reported in implementation and de-implementation interventions suggesting that researchers may have implicit theories about different BCTs required for de-implementation and implementation, these findings do not imply that the BCTs identified as targeting implementation or de-implementation are effective, rather simply that they were more frequently used.

What if we just gave Healthcare providers something else to do?

Both the synthesis of behaviour theories and the review of de-implementation interventions identified *Behaviour substitution* as a potential strategy for de-implementation. *Behaviour substitution* is defined in the BCT taxonomy (v1) as "prompt a substitution of the unwanted behaviour with a wanted or neutral behaviour" (Michie et al., 2013). For example, an alternative to order red blood cells (RBC) transfusion for patients with anemia in hospital is to order intravenous iron transfusions (Ionescu et al., 2020). Similarly, another example of behaviour substitution may be when a HCP provides a viral prescription, which is similar in format to a drug prescription, except it explains the symptoms of an upper respiratory tract infection (e.g., common cold) and provides management strategies instead of prescribing antibiotics for sore throat (Lee et al., 2020). Pragmatically, it is a strategy that is likely more acceptable to HCPs as it maintains clinical autonomy and self-regulation and it is better than the ethical and social consequences of using punitive technique. HCPs are typically action oriented people who may be uncomfortable with the option of appearing to do nothing during patient consultations or in response to patient need. But how do we know when best to us it and how do we pick a substitute behaviour?

To address this, recent work discussed why *Behaviour substitution* may be a useful de-implementation strategy, and why it may not be suitable for all circumstances (Patey, Grimshaw, & Francis, 2023). Based on the body of knowledge in behavioural science, and as well as an established framework to identify barriers and enablers to behaviour change, the Theoretical Domains Framework (Michie et al., 2005), a list of principles was proposed when considering and/or selecting a substitute behaviour for a de-implementation intervention. Specifically, the substitute behaviour should 1) have a clinical rationale or strong evidence base for its use (*Knowledge, Memory attention and decision processes, Beliefs about consequences*); 2) serves the clinical objective (patient outcome) and serves the practical objective (e.g., satisfy the patient that they have been taken seriously; offer symptom relief) (*Beliefs about consequences, Social influences, Memory, attention and decision processes*); 3) be easily explainable to patients (*Beliefs about capabilities, Social Influences, Beliefs about consequences*); 4) be no more time-consuming than the undesired behaviour (*Environmental context and resources, Beliefs about consequences*); 5) have good fit with existing skills (*Skills, Beliefs about capabilities*); 6) be no more expensive to perform than the undesired behaviour (*Environmental Context and resources, Beliefs about consequences*). It is proposed that applying these principles should increase the likelihood that Behaviour substitution will be effective in reducing low-value care (Patey, Grimshaw, & Francis, 2023).

Where do we go from here?

In the last six years theories, tools, and methods from Health Psychology have greatly advanced our understanding of de-implementation. Whilst most behavioural theories provide little insight into the distinction between implementation and de-implementation, Operant Learning Theory may be an option. Our next focus should be on how we best deliver strategies from Operant Learning Theory specifically around selecting the dose, or potency, of punishment stimulus required to have an effect and whether there is a linear relationship between potency of the stimulus and behaviour change. For example, what forms of punishments could be applied in health care systems?; How are punishments conceptualised and how could they be titrated to get the desired effect?; Should the same

or differing levels of punishment be applied in circumstances whereby behaviour needs to be eliminated versus behaviour that only needs to decrease in frequency (e.g. would stopping antibiotic prescriptions for sore throats require the same punishment stimulus as reducing the number of imaging requests for low back pain?); Could making test ordering inconvenient, by requiring additional repeated justifications or approvals, be enough of a punishment to reduce unnecessary test ordering? Additionally, with respect the proposed de-implementation strategy, Behaviour substitution, understanding how we know when best to us it and what are the methods for selecting the substitute behaviour requires investigation. While the work presented is just a start in understanding de-implementation and exploratory in nature, there is more opportunity to advance both de-implementation science and Health Psychology to improve to delivery of high value health care.

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