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Article

Using the Consolidated Framework for Implementation Research to Evaluate a New Discharge Medication Prescription Pathway

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Abstract: The effective dissemination and implementation of health service interventions into practice requires a range of strategic and systematic approaches. This paper applies a conceptual implementation framework to the evaluation of a hospital-wide clinical pharmacy initiative, a redesign of the discharge medication prescription pathway. The influencing factors and strategies used to overcome potential negative influences are described and assessed.

Keywords: pharmacists; hospital pharmacy; United Kingdom; discharge prescriptions; prescribing; consolidated framework for implementation research; implementation strategies

Introduction

The effective dissemination and implementation of health service interventions and practice innovations requires a range of strategic and systematic approaches (Haines, Kuruvilla, & Borchert, 2004; Jacobs et al., 2015). Barriers can be found within the practice environment, individual practitioners and even in patients. There may be obstacles at local, national and organisational levels (Grol & Grimshaw, 2003; Haines et al., 2004). There are also factors that facilitate successful implementation and dissemination. Implementation research aims to promote the systematic uptake of evidence-based practices into the normal activities of healthcare organizations (Rubenstein & Pugh, 2006).

The Consolidated Framework for Implementation Research (CIFR), (Damschroder et al., 2009) was developed to consolidate existing research into implementation science. The authors of the framework assessed nineteen implementation models in order to produce a list of overlapping constructs, which together comprise a comprehensive framework for planning the implementation of an intervention. The CFIR is described as a 'metasynthesis' of other planning and evaluative models and is non-directional in that it does not specify or predict causal relationships. The main intent of the CFIR is to guide implementation and promote the development of theories about what works and what doesn't in different contexts. However, it has most often been used to evaluate interventions and practice changes that have already been introduced. Researchers in South Yorkshire tested the CFIR against eleven diverse healthcare innovations. After applying the Framework's domains and associated constructs to the initiatives, the authors concluded that the CFIR was comprehensive and adaptable enough to capture the complexities of implementing change in various settings (Ilott et al., 2013). Damschroder and Lowery (2013) used the CFIR to assess a weight-management program in different facilities by assigning scores to each construct. They found that several constructs in the framework helped distinguish between facilities with low vs high implementation effectiveness. Rather than rigidly applying the CFIR to an intervention, the authors emphasise that users should assess and adapt each construct in the context of their specific initiative.

In the English National Health System (NHS), hospital pharmacy departments are responsible for dispensing medications for patients to take home on discharge. Delays in obtaining discharge

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medication are often cited as causes of patient complaints, staff dissatisfaction and delayed discharge (National Audit Office, 2000, 2002; The Audit Commission, 2001, Care Quality Commission, 2011). Discharging a patient from hospital is a complex process, involving many steps. The supply of medication often occurs during the final stage of discharge and the timing is dependent on several decisions and actions - the decision to discharge, decisions about which medications to prescribe, follow up or monitoring arrangements for medications, writing the discharge prescription, and handing the prescription to pharmacy for dispensing. Additionally, the discharge prescription comprises just one part of the full discharge notification (DN) that is sent to the patient's general practitioner or other primary healthcare provider. The DN also contains clinical information about the patient's stay in hospital. Therefore, traditionally, the discharge prescription is written by the doctor at the same time that he/she writes the clinical information section. The same doctor will have competing demands on his/her time. Completing the DN is therefore often the job that is done last, resulting in the pharmacy department receiving the prescription late. (Care Quality Commission, 2011; National Audit Office, 2000). A slow dispensing process in pharmacy may further compound delays to supplying discharge medication. Because of these complex factors, patients are often waiting for their medication before they can leave the hospital. This has resultant negative impacts on patient throughput, waiting times and patient experience.

In addition to delays caused when discharge prescriptions are not written on time, the quality of discharge prescriptions is known to be poor. Errors and other problems with discharge prescriptions were highlighted in the Department of Health report, 'Building a safer NHS for patients: Improving Medication Safety' (Smith, 2004). The EQUIP study of prescribing errors by junior doctors in hospitals in North-West England detected errors in 6.4% of prescribed discharge medications (items) (Dornan et al., 2009). Franklin and colleagues found that 9% of discharge medications from medical admissions and surgical wards were prescribed in error (Franklin et al., 2011). Seden et al (2013) reported that 34.5% of discharge prescriptions contained at least one prescribing error and in a study of prescribing errors in mental health hospitals, 6.5% of discharge medications were associated with an error (Keers et al., 2014). 68% of discharge prescriptions required correction by pharmacists in a recent large UK multi-centre study (Dodds, 2014).

Reports from the literature show that when pharmacists have written discharge medication orders instead of doctors, improvements in quality and efficiency have been noted (Cattell et al., 2001; Chantelois & Suzuki, 2003; Hobson & Sewell, 2004). However this has only previously been implemented on a small-scale, in individual clinical areas, with pharmacists writing relatively few prescriptions (Hobson & Sewell, 2003).

The aim of this study is to use the Consolidated Framework for Implementation Research to examine the factors involved in the implementation of a hospital-wide redesign of the discharge medication prescription pathway.

Methods

Setting: A 1000-bedded secondary, tertiary and quarternary acute teaching hospital in London. The hospital provides surgical, medical and specialist clinical services to local, national and international patients. Each service has designated wards to which their patients are admitted.

The pharmacy department has about 170 members of staff, and provides clinical and dispensing services to in- and out-patients. Inpatient clinical pharmacy services are provided by specialist clinical pharmacy teams (pharmacists and pharmacy technicians), aligned to the corresponding wards.

Description of redesigned pathway: The redesign of the discharge medication pathway involved expanding the routine clinical roles and responsibilities of pharmacists. In the new pathway, the two tasks described above, producing the discharge prescription and writing the clinical details – were unlinked, and pharmacists were given the responsibility of producing the list of discharge medication orders for dispensing, after consulting with the patient, doctor and nursing staff. Doctors retained responsibility for writing the clinical summary and signing off the final list of discharge medications, after dispensing. The redesigned pathway was implemented across the

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whole hospital, a change which took place over approximately four years, between 2008 and 2012. Success was mainly measured by the proportion of all discharge medication orders that were written by pharmacists. The initial target was 50%, and performance reached 80% in 2013.

Evaluation: The pathway redesign required changes to the organisation of care, collaborations between disciplines and complex changes in clinical practice. In order to assess the characteristics which enabled the successful change, the influencing factors, and the various strategies employed, were tested against the domains and constructs in the Consolidated Framework for the Implementation of Research (CIFR), (Damschroder et al., 2009). The CFIR comprises five domains and 39 constructs listed below in Table 1.

Table 1. Domains and constructs of the CFIR

Domain	Constructs	Sub-constructs
INTERVENTION CHARACTERISTICS	Intervention Source	
	Evidence Strength & Quality	
	Relative advantage	
	Adaptability	
	Trialability	
	Complexity	
	Design Quality and Packaging	
	Cost	
OUTER SETTING	Patient Needs & Resources	
	Cosmopolitanism	
	Peer Pressure	
	External Policy & Incentives	
INNER SETTING	Structural Characteristics	
	Networks & Communications	
	Culture	
	Implementation Climate	Tension for Change Compatibility Relative Priority Organizational Incentives & Rewards Goals and Feedback Learning Climate
	Readiness for Implementation	Leadership Engagement Available Resources Access to knowledge and information
CHARACTERISTICS OF INDIVIDUALS	Knowledge & Beliefs about the Intervention	
	Self-efficacy	
	Individual Stage of Change	
	Individual Identification with Organization	
	Other Personal Attributes	
PROCESS	Planning	
	Engaging	Opinion Leaders Formally appointed internal implementation leaders Champions External Change Agents
	Executing	
	Reflecting & Evaluating	

Results

Intervention Characteristics

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Source: The innovation was internal to the Trust, and not a regional or national imperative. For pharmacy staff, the initial drive was internal to the pharmacy department. This facilitated the engagement of pharmacy staff. However, clinical pharmacists are part of small, specialty-based clinical teams. Some therefore viewed the change as coming from an external source, imposed by someone who was not part of their team. Additionally, once 50% coverage was reached (50% of discharge prescriptions were written by pharmacists), there was pressure from managers to increase to 75%. This target was therefore imposed externally. The strategy to minimise the potentially negative impact of this external pressure was to give teams complete flexibility in how they implemented the practice change. Each was asked to report on just two performance indicators. These were the percentage of discharge prescriptions written by pharmacists (PTTAs) and the proportion of PTTAs which needed to be changed after being written. Aside from those, pharmacy teams were free to use which ever strategies worked best for them to introduce and monitor the initiative. Adaptability is key to preventing individuals from resisting 'poorly-fitting' interventions (Damschroder et al., 2009). Non-pharmacy staff will have largely viewed the change as externally imposed. However, clinical pharmacy staff are regarded as part of the multi-disciplinary ward team, alongside therapists, nurses and doctors, therefore individual pharmacists led implementation on their wards, to minimise the impression of external imposition.

Evidence and relative advantages: In the early stages, the evidence for the initiative was weak. However as coverage increased, anecdotal evidence of the advantages spread throughout the organisation. The goodwill that this generated encouraged staff to continue to maintain momentum. Ward pharmacists also began to see the advantages to themselves of the change. Thus, evidence was generated and disseminated as the service was rolled out.

Complexity, adaptability and trialability: Redesigning a pathway is inevitably complex and difficult (Grol & Grimshaw, 2003). The use of pilot wards and measured rollout enabled shared learning, and tools were developed which each team adapted for their own use.

Cost, quality and packaging: The benefits of the change to affected individuals, including patients, were relatively easy to explain and make palatable. Pharmacists were the most resistant groups of staff, an issue which is discussed further under 'individual characteristics'. Associated costs were minimal as the role change was largely time-neutral and there were no equipment costs.

Inner and Outer Settings

The characteristics of the inner and outer settings had significant impacts on the success of the new pathway.

Patients needs and resources: The importance of understanding and prioritising patients' needs is a stated value within the organisation, also reflected within the pharmacy department. Therefore the increased benefits to patients from the new way of working was a motivating factor.

Peer pressure: There was no peer pressure from external organisations. However, some competition between pharmacy teams was created by incorporating the performance indicators described above onto the service scorecard. Each teams' results were visible to all, and overall performance was discussed at monthly management meetings. When teams were rolling out the new pathway in their areas, weekly figures were reported. This meant increased accountability for the teams, and the ability to provide rapid, positive encouragement. Monthly figures from the scorecard were reported upwards and were available widely throughout the Trust. This gave the project a high profile. The impact of applying indicators depends partly on the degree with which staff support the programme which is being measured and the existing culture. Additionally, measurement alone can have a negative influence, unless accompanied by a supportive environment and discussions about how improvements can be made (Sheldon, 1998). Therefore the figures were used a basis for discussions on how to improve performance, rather than being the focus of the discussion.

Implementation climate: There was great tension for change within the organisation. Delayed discharge is a continuing cause for concern in an acute hospital, and ideas which improve patient flow are always being sought. Therefore there was compatibility with priorities at organisational

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and departmental levels. Individual pharmacists' readiness for change was less assured. Pharmacists took on increased clinical responsibility as a result of the new pathway there was some reluctance which took some time to surmount .

External policy and incentives: Although there was no capacity for extrinsic rewards, the increased respect for, and profile of, the clinical pharmacy service was a significant influence.

Other inner setting facilitators were the stability of leadership within the pharmacy department and the clinical teams, and the established culture, which was reinforced in meetings.

There were negative factors associated with the inner setting which had to be overcome. Ward pharmacists had competing demands on their time, some clinical staff found it difficult to prioritise safe and timely discharges, there was poor discharge planning in some areas and a general lack of clarity from ward and medical teams regarding discharge plans. All pharmacy team members worked towards the goals of promoting good communication on wards, requesting transparency about discharge dates and promoting the concept that discharge planning was not optional. Occasionally, support from senior clinicians (Consultants) was solicited, as they had authority over the junior doctors, to ensure planned discharge dates were communicated to pharmacists.

Characteristics of Individuals

Knowledge and beliefs: One significant obstacle was the ambivalence of individual pharmacists towards their new role. As Greenhalgh et al. (2004) describe, people will develop feelings about innovations, discuss them with others, find meaning in them and challenge them. There was occasional reluctance to take on a task that was regarded as low value and most suitable for inexperienced junior doctors. Alongside careful planning and evaluation, management support is essential to support effective role change (McKenna et al., 2008). Where necessary, support was provided in the form of temporary extra staff to pump-prime the service. Additionally, at initiation of rollout, meetings were held with senior managers and doctors to highlight the value of the service and request their support in taking it forward.

Self-efficacy and individual state of change: The question of whether it is appropriate to take the responsibility of writing discharge prescriptions away from doctors is one which some senior pharmacists are uncertain about, and not all agree with the premise. Hobson and Sewell (2004) also found this, in their survey into the extent of pharmacists writing discharge prescriptions. An important consideration was that the pharmacists had no choice as to whether or not to undertake the new clinical role of writing discharge prescriptions. In their paper exploring the advanced practice roles of community nurses, Aranda and Jones (2008) discuss the need to engage with issues of changing identities and values. This 'identity change' was possibly an underlying factor negatively affecting pharmacists' acceptance of this increase in clinical responsibilities. Research shows that task and professional boundaries are important factors influencing clinicians' attitudes towards role change. These needed to be acknowledged and addressed (Kronus, 1976; Wilson et al., 2002). Strategies to reduce the impact of these individual barriers included – one-to-one meetings with staff to address their concerns, suggesting, leading and supporting small-scale evaluation projects, supporting individual pharmacists to write up and present project results locally and nationally, and visible recognition of successes within the department. Because of the innovative nature of this change, there were no examples or precedents from outside the organisation which could be used to encourage staff. Therefore 'peer opinion leaders' – pharmacists who had successfully rolled out the pathway in their areas - were enlisted to advise their colleagues, motivate and help solve problems. Greenhalgh and colleagues (2004) describe peer opinion leaders as those individuals who exert influence through their credibility and representativeness. These pharmacists were highly appreciated by their non-pharmacy clinical colleagues and their enthusiasm and visibly increased status were helpful in motivating other pharmacists. This is a tactic also suggested by Damschroder and colleagues (2009).

Individual identification with organisation: A positive belief that was continually emphasised was the benefits to patients and the department's core commitment to provide a service aimed at

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maximising the quality of patient care. The identification of all pharmacists with this and other departmental values was key to them accepting their expanded role.

Process

Planning: A considerable amount of planning was involved in the pilot stages of the new pathway and also during rollout. Damschroder et al (2009) describe six considerations. In Table 2, some examples of strategies employed are mapped against these considerations.

Table 2

Factors to consider during the planning stage	Examples of actions
Consideration of stakeholders' needs and perspectives	• External stakeholders' requirements informed all aspects of planning. For example, nurses and doctors were surveyed about their attitudes towards the original and new processes. • Each team needed to monitor their progress, therefore they were given standardised data collection sheets and analysis tools so that they did not have to develop their own. • To alleviate liability concerns expressed by some pharmacists, a Trust-wide policy and procedures document was written and approved.
Tailored strategies for appropriate subgroups	Different implementation tools were developed for different groups of pharmacy staff, nurses and other ward staff such as administrators, doctors and discharge co-ordinators. These included presentations, posters, meetings, group and 1:1 training.
Appropriate style, imagery and metaphors are used for delivering information	Posters, presentations and training materials all emphasised the benefits for patients and staff, tailored to the groups that were being targeted. A flowchart was used to illustrate the new pathway.
Identification and use of appropriate communication channels	Existing meetings such as ward handovers and junior doctors' training sessions were used. On occasion, senior nurse managers were asked to use their authority to ensure ward nurses supported the new pathway.
Rigorous tracking of progress towards goals and milestones	Performance indicators were tracked and discussed (described above).
The use of strategies to simplify execution	Each team rolled out the new process ward-by-ward, ensuring the service was fully embedded before moving on.

Engaging: As well as peer opinion leaders, change champions and expert opinion leaders could be identified. Change champions are individuals who dedicate themselves to supporting, marketing and driving through an implementation (Damschroder et al., 2009). Expert opinion leaders exert influence through their authority and status (Greenhalgh et al., 2004). The clinical pharmacy team leaders and a few of the more junior pharmacists were change champions. The pharmacy lead with overall responsibility for the project (RO) was both a change champion and an expert opinion leader.

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Ilot and colleagues also found that the project instigators had dual change champion and opinion leader roles (Ilott et al., 2013). The departmental head (Director of Pharmacy) was also an expert opinion leader, as he fully supported the new process, but also used his authority to impose an increased target (from 50% to 75% coverage).

Reflecting and Evaluating: Ongoing monitoring and evaluation helped ensure the new pathway was successful. Teams reported weekly figures against the key performance indicators during the rollout phase. Once performance was steady at 65 – 70% coverage, they were 'rewarded' by an increase in the reporting interval to monthly. Some teams conducted audit and evaluation projects pre- and post-rollout. There were also semi-formal assessments of the change management requirements before implementation. In order to maintain success, KPI monitoring has continued. Key messages are reinforced with new staff and the pathway is regularly updated to reflect changing requirements and circumstances.

Two related factors, not described in the CFIR, were identified during implementation of the redesigned pathway. These are the legal and professional considerations when implementing a practice change, especially one which involves role extension. These were not highlighted as barriers by any of the pharmacists undertaking this role change, however it is possible that they were underlying factors.

Discussion

The most significant enabling factors for this particular innovation appeared to be the intervention characteristics (i.e. it resolved an important organisational problem, and the advantages were seen by all affected staff as well as patients), the implementation climate, and certain aspects of the process. Some positive inner setting characteristics were deliberately created, while potential negative influences which had to be addressed were individuals' beliefs and attitudes regarding the role change. The availability and quality of evidence for the change had very little impact until implementation reached a critical mass.

The method used in this study for evaluating a practice change has some limitations. Other studies employing the CFIR have used interviews to elicit the significant factors involved in implementation (Damschroder & Lowery, 2013; Ilott et al., 2013). Using independent researchers to assess the interview data has the advantage of improving objectivity. However, there is still the risk of bias as the interview data is by necessity obtained from personnel who were intimately involved in the change. In this study, the author evaluated work that she had been responsible for leading. The loss of objectivity is a possible weakness.

Conclusion

The CFIR was an effective tool for reviewing the theoretical and pragmatic factors involved in effective implementation of a redesigned pathway. Some of these factors can be found in other models (Greenhalgh et al., 2004; Rycroft-Malone et al., 2002), but the CFIR was developed to combine all in a single comprehensive tool. Researchers in other settings may also find that legal and professional issues are relevant factors. This is a possible gap in the framework and needs further review.

In common with other researchers, CIFR has been used to learn lessons from the successful change to a service pathway. However, the framework was originally designed to support the planning for a new practice, service or intervention, by providing a list of factors to be considered and addressed. We believe the tool is sufficiently comprehensive to add value if used during the pre-implementation stages of pharmacy services.

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