Developing a theory-based taxonomy of methods for implementing change in practice

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Abstract

Title. Developing a theory-based taxonomy of methods for implementing change in practice

Aim. In this paper we present a theory-based taxonomy of the methods used to implement change in practice.

Background. Implementation research is characterized by inconsistent terminology for the methods employed and inattention to differences in the relevance of methods across different disciplines. Studies of the effectiveness of implementation have yielded mixed results. Positive effects shown have been small. The limited success of many efforts to implement change in practice may be due, in part, to the absence of a framework to guide the use of implementation methods.

Method. A provisional taxonomy of implementation methods, derived from theory and existing taxonomies, was used to content analyse a convenience sample of 43 reports of empirical studies of the implementation of one or more research-based practice changes involving nurses that had been published between 1995 and 2005. This taxonomy was revised throughout the course of analysis to capture more completely the information in each report.

Findings. Following the analysis, nine of the 11 methods in the provisional taxonomy were retained, two were removed and five new methods were identified. The final taxonomy includes 14 implementation methods organized into five categories: (a) increasing coordination; (b) raising awareness; (c) persuasion via interpersonal channels; (d) persuasion via reinforcing belief that behaviour will lead to desirable results and (e) increasing behavioural control.

Conclusions. The taxonomy presented here differs from prior taxonomies by focusing on nursing and by providing a clear and mutually exclusive guide to implementation methods. By deriving the initial coding strategy from theory, the taxonomy links the methods to theoretical constructs that may inform the selection of methods across different practice changes and settings.

Keywords: research implementation, research in practice, theory-based taxonomy, theory–practice gap
Introduction

Recent reports have highlighted the continuing gap between what is known to be best practice and the care that patients receive [Institute of Medicine (IOM) 2001, McGlynn et al. 2003, Hussey et al. 2004]. Over the past two decades, policy makers and researchers have sought more effective methods to promote the use of best practice by both clinicians and healthcare organizations. A recent review of this work identified ‘implementation’ as the area in greatest need of more research (Greenhalgh et al. 2004). Also called ‘quality improvement’, implementation refers to the active and planned effort to mainstream a change in practice within an organization (Greenhalgh et al. 2004). As the single largest professional group in health care, nurses are central to efforts to implement change in practice. Effecting change in clinical practice can be difficult because of numerous individual, group and system-level factors. Implementation research is, therefore, critical to developing and testing methods to improve the quality of care.

Yet, implementation research in nursing and other disciplines is still in the early stages of development. A recent review of reports of empirical studies of implementation of change in practice indicates that many of these reports provide minimal description of the methods used to implement change (Greenhalgh et al. 2004). This may be a limitation in reporting or may reflect an actual inattention to implementation methodology in the design of studies. The terms used to describe implementation methods are neither well defined nor consistently applied (Grimshaw et al. 2003, Ellis et al. 2005). The numerous studies testing the effectiveness of efforts to implement change in practice have yielded mixed results, with implementation methods found to be effective in some studies but ineffective in others. Even when positive effects have been realized, they have been small (Grimshaw et al. 2004). The limited success of implementation research may be due, in part, to the absence of a framework to guide the selection and use of implementation methods (Eccles et al. 2005, Shojania & Grimshaw 2005). In fact, the results of a study of implementation projects across 57 settings indicate that formal models or methods were rarely used to guide the change process (Cohen et al. 2005). In this paper, we describe the development and initial testing of a theory-based taxonomy of implementation methods with a specific focus on nursing.

The initial taxonomy

Several taxonomies have been developed to clarify the methods used to implement changes in clinical practice. Early taxonomies focused on methods for changing the performance of individual physicians and included such strategies as audit and feedback, education, and reminder systems (Davis et al. 1995). More recently, both the Agency for Healthcare Research and Quality (AHRQ) and the Cochrane Effective Practice and Organisation of Care Group (EPOC) have developed broader taxonomies that include methods aimed at systems level change (Cochrane EPOC 2002, Shojania et al. 2004). These taxonomies include methods such as changes in medical record systems and case management. Although these taxonomies provide an initial framework, the terms used are not mutually exclusive. Moreover, these taxonomies do not link methods to theory, nor do they attend to potential discipline-specific differences in implementation methods.

In the present study, we linked existing taxonomies with relevant theories to create a system for categorizing implementation methods. Given that existing taxonomies draw primarily from evidence-based medicine, we chose to focus on implementation involving nurses. As the single largest professional group in health care and the leaders of quality improvement teams, nurses play a central role in implementing change in practice. Moreover, a focus on nursing takes into account potentially discipline-specific aspects of the implementation process.

We drew from contingency, diffusion of innovation and behavioural theories as they are central to current implementation research and address the multiple levels at which change in practice occurs, specifically, the level of the organization, interpersonal network and individual (Ferlie & Shortell 2001). Scholars have identified contingency theory as a useful perspective for viewing implementation at the level of the organization (McDonald et al. 2004, Shortell & Kaluzny 2006). Diffusion of innovations and behavioural change theories have been identified as central to addressing implementation at the level of individuals and across interpersonal networks (Walker et al. 2003, McDonald et al. 2004, Eccles et al. 2005).

Contingency theory

Contingency theory addresses the fit between the characteristics of clinical care and the structure used to organize and control that care (Alexander & Mark 1990). According to contingency theory, the best outcomes will result from matching the structure of work to the characteristics of clinical care. A central feature of clinical care is the degree of interdependence, or the extent to which the actions of individuals and/or units are closely interrelated in the process of delivering of care. Contingency theory posits that higher degrees of interdependency in the clinical care process will
require greater investments in coordination to ensure effective performance (Scott 2003). The AHRQ and EPOC taxonomies include several structural arrangements to facilitate coordination, such as case management, care teams, and modifications to the medical record system. Reviews of implementation methods indicate that using teams or case managers to coordinate care can be an effective method for improving care processes and patient outcomes (Norris et al. 2002, Gensichen et al. 2006), as can medical record systems (Shojania et al. 2004).

**Diffusion of innovations theory**

Over the past 40 years, scholars have made extensive use of Rogers’ (2003) diffusion of innovations theory to explore both the passive diffusion and active dissemination of innovations across populations of potential adopters. The theory posits that individuals move through a series of stages when they adopt a new practice, and that different types of communication channels are most effective at different stages. Individuals move through stages as they become aware of a new innovation, are persuaded to adopt it, and then implement the innovation in practice. During the awareness stage, mass media and external change agents can be effective communication channels. Mass media (e.g. electronic and print) can generate broad awareness of a new innovation. External change agents are agencies or individuals that promote change from outside the organization in which the change will be implemented and may include government agencies, academic researchers, and professional and other organizations. During the persuasion and adoption phases, interpersonal communication channels are central and are most effective when the communication is among individuals who are similar to one another. In deciding whether to adopt an innovation, individuals depend mainly on the communicated experience of a peer who has already adopted a new idea.

Both the AHRQ and EPOC taxonomies include education as an implementation method to produce awareness in potential adopters. These taxonomies’ definition of education focuses primarily on mass media communication via workshops, meetings, or distribution of print or electronic materials (Cochrane EPOC 2002, Shojania et al. 2004). The evidence confirms that although mass media channels increase awareness, they have limited influence on adoption and implementation (Grimshaw et al. 2004). The taxonomy developed by EPOC includes two interpersonal communication strategies: opinion leaders and consensus groups. Rogers (2003) introduced the term ‘opinion leader’ to describe individuals who are able to influence the attitudes or behaviours of others. Identifying and using opinion leaders as an implementation method has proven to be difficult and researchers report mixed results regarding the effectiveness of opinion leaders for promoting a practice change (Greenhalgh et al. 2004). The Cochrane EPOC taxonomy term *local consensus process* involves convening a workgroup of representatives from the disciplines that will be implementing the change to develop, adapt, or review the new practice (Cochrane EPOC, p8).

Although not listed in the AHRQ or Cochrane EPOC taxonomies, researchers have explored the effectiveness of external change agents and found that they can increase awareness of an innovation and the effectiveness of implementation (Kelly et al. 2000, Greenhalgh et al. 2004). Yet, when external change agents attempt to lead implementation within an organization, they may encounter distrust of their motives and minimal long-term commitment to the process change (Zapka et al. 2004, Cohen et al. 2005).

**Behavioural change theories**

Although several theories of behaviour change may be pertinent to changing clinical practice, the Theory of Planned Behavior has been referenced most frequently in implementation research (Walker et al. 2003, McDonald et al. 2004, Eccles et al. 2005). The Theory of Planned Behavior posits three determinants of an individual’s intention or motivation to perform a behaviour: attitude towards the behaviour, subjective norms and perceived behavioural control. Attitude refers to whether individuals have a favourable evaluation of a behaviour, specifically, the degree to which they believe the behaviour will result in desirable consequences. In the case of health care, desirable consequences may take the form of observed improvements in patient outcomes or, in the absence of observed patient outcomes, attitudes may be changed through feedback and incentives related to clinicians’ performance of the process change (Charns & Gittell 2006). Subjective norms refer to an individual’s perception of the degree of approval or social pressure to perform the behaviour from important referent individuals or groups; the concept is closely related to Rogers’ use of interpersonal communication channels. The final determinant, perceived behavioural control, refers to an individual’s perception of the ease or difficulty of performing a behaviour (Ajzen 1991).

The Cochrane EPOC and AHRQ taxonomies include methods to change individuals’ attitudes (e.g. audit and feedback, financial incentives) and behavioural control (e.g. reminder systems). Audit and feedback involves monitoring a provider’s performance over a period of time relative to a practice change and then reporting performance back to the
provider. Reviews have found that audit and feedback has a positive but small effect on behaviour change in physicians (Grimshaw et al. 2004). Evidence for its effectiveness with nurses is lacking (Cheater et al. 2006). The evidence on the effectiveness of financial incentives is limited (Rosenthal & Frank 2006). Reminder systems are among the more effective methods for changing provider behaviour and have been found to improve performance by 10–20% (Grimshaw et al. 2004). The EPOC taxonomy also includes environmental change as a method to increase behavioural control.

We developed an initial taxonomy based on these three theoretical traditions linked to the methods listed in the AHRQ and EPOC taxonomies. In order to create a comprehensive and concise taxonomy, we removed redundant items and consolidated several items. In keeping with the definition of implementation as an ‘active and planned effort to mainstream a change in practice within an organization’ (Greenhalgh et al. 2004), the initial taxonomy we created distinguished between efforts to mainstream the practice from the change in practice itself. The taxonomy, therefore, included only methods that directly targeted care providers or the organization of care and excluded methods that targeted patients, for example, AHRQ’s categories of ‘promotion of self-management’ and ‘patient education’. The taxonomy was further refined to ensure that each term was mutually exclusive. ‘Total Quality Management or Continuous Quality Improvement’, a category in the AHRQ taxonomy, is typically comprised of several other components (e.g. data collection and feedback). Likewise, ‘team or personnel changes’ may include creation of a ‘case management’ position, another category in the taxonomy. The taxonomy replaced these terms with single component, mutually exclusive items. Table 1 shows the initial taxonomy of implementation methods.

**Methodology**

We employed a systematic review process to locate reports with which to test the comprehensiveness and utility of the taxonomy we created and shown in Table 1.

**Sample**

The sample for the present study was drawn from a search done for a broader review of the determinants of implementation effectiveness. For the broader review, we searched the literature for reports of empirical studies of the implementation of research-based practice changes involving nursing, that is, studies on change in nursing practice or in interdisciplinary practice that included nurses. Our search was complicated by the very problem we hoped to address with our taxonomy, namely, lack of consistency of terminology in the field (Greenhalgh et al. 2004, Ellis et al. 2005). We

Table 1 Provisional and proposed taxonomy of implementation methods

<table>
<thead>
<tr>
<th>Methods listed by category</th>
<th>Provisional taxonomy</th>
<th>Proposed taxonomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Increase coordination to manage interdependence (Contingency Theory)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centralized care management – case manager, team (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Modified medical record system (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Workgroup oversight</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>Pilot testing</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2. Raise Awareness of the Practice Change (Diffusion of Innovations)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>External change agent</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>3. Persuade via Interpersonal Channels, Norms (Diffusion of Innovations and Theory of Planned Behavior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workgroup develops change (EPOC’s consensus process)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Opinion leader (EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Guidance from manager</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Persuade by Reinforcing Belief that Behavior will Lead to Desirable Results (Theory of Planned Behavior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection &amp; feedback (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Financial incentives (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Performance evaluations</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>5. Increase Behavioral Control (Theory of Planned Behavior)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reminder systems (AHRQ &amp; EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Environmental change (EPOC)</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Designation of a change leader</td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

AHRQ, Agency for Healthcare Research and Quality taxonomy (Shojania et al. 2004); EPOC, Cochrane Effective Practice and Organisation of Care Group taxonomy (Cochrane EPOC 2002).
identified publications by referring to the reference lists of existing reviews of the literature in this area and by searching the Medline database of the National Library of Medicine and the Nursing and Allied Health database (CINAHL). Articles were sought that were published between January 1995 and September 2005. We chose 1995 because of the increased focus on implementation at that time following growing awareness of the limited effectiveness of simply disseminating evidence-based guidelines (Davis et al. 1995, Oxman et al. 1995). The search terms used included ‘quality assurance’, ‘diffusion of innovation’, ‘evidence-based medicine’, ‘nursing practice, evidence based’, ‘research utilization’ and ‘research transfer’. In order to identify articles reporting on the determinants of implementation effectiveness, the search was limited to those with one of the following keywords in either the title or abstract: ‘determinant’, ‘factor’, ‘barrier’, ‘facilitator’, or ‘characteristic’. The search was further limited to English-language publications. The titles and then abstracts of publications were reviewed. The full article was retrieved if it reported on the implementation of one or more research-based changes in practice in a healthcare delivery setting (i.e. hospital, long-term care, ambulatory care, health department, or home care). Articles were included in the review if they met the following additional inclusion criteria. They had to report on an implementation effort that targeted nursing practice or interdisciplinary practice that included nurses, and had to include a description of the methods used to implement the change in practice. Using these criteria, a sample of 43 publications was identified to test the theory-based taxonomy.

Data collection/analysis

A directed content analysis approach was used to extract relevant data from each report (Hsieh & Shannon 2005). Directed content analysis starts with theory or research findings as the basis for the initial codes. The taxonomy of implementation methods shown in Table 1 served as the basis for a provisional coding scheme for the analysis. This scheme was applied to the publications and then the categories were iteratively revised through abstraction to capture the information encountered in the review (Hsieh & Shannon 2005). Table 1 presents the provisional and final taxonomies of implementation methods. The operational definitions for each category are available from the first author (J.L.) upon request. Data were also abstracted pertaining to setting, clinical practice targeted for change, disciplines implementing the change and any theories or models that authors described as guiding the implementation effort.

Validity

Two reviewers (J.L. and M.B.) independently used the coding schema to extract information from the same 15 randomly selected articles, noting any recommendations for revisions. The reviewers met to compare their results, resolve discrepancies and revise the coding schema. The principal reviewer (J.L.) then completed data abstraction for all retrieved articles. A research assistant then tested the reliability of the final coding schema by reviewing seven randomly selected publications and achieved 90% agreement between her coding and that of the principal reviewer.

Findings

Forty-three articles were analysed. Thirty-two of the studies were conducted in the United States, four in Canada, three in Australia, two in the United Kingdom and two in the Netherlands. The majority of the studies (n = 24) were conducted in acute care hospitals, nine in outpatient clinics, seven in long-term care facilities, two in home care and one in an emergency department. The studies addressed the implementation of change related to a broad range of care processes, including skin care (n = 6), incontinence (n = 5), pain management (n = 3), smoking cessation (n = 3), mechanical ventilation (n = 3), and a variety of others, such as urinary catheters, diabetes and asthma (n = 23). Twenty-seven of the studies were directed towards changing interdisciplinary practices of care, and 16 were directed exclusively towards nurses and/or nursing assistants. Although the authors of 14 reports structured their research according to models and frameworks, only four referenced theories as the guiding framework for their studies. Roger’s Theory of the Diffusion of Innovations was cited as a guiding framework in three reports and the Theory of Planned Behavior was cited in one report. Nursing scholars have developed several models to guide the utilization of research findings in practice; the CURN (Horsley et al. 1978), Iowa (Titler et al. 2001), Ottawa (Graham & Logan 2004) and Stetler (Stetler 2001) models were cited in one publication each. PRECEDE-PROCEDE (Green & Kreuter 2005) and a framework developed by Ferlie and Shortell (2001) were each mentioned twice.

As reported in detail below, the categories of implementation methods outlined in the taxonomy fully described the methods reported in studies of implementation in nursing. The specific methods identified in the provisional taxonomy captured most but not all of the methods described in the literature. Several methods not included in the provisional taxonomy were identified and added (Table 1).
Implementation methods to increase coordination

The reports reviewed included frequent use of methods to increase coordination across disciplines and individuals. The authors of seven reports noted centralizing care management (six through use of case managers and one through use of a team), and 11, modification of the medical record system. The reports also included two methods that were not in the provisional taxonomy: workgroup oversight and pilot testing. In 22 reports, authors described a workgroup that oversaw implementation of the new care process. Previous taxonomies have included a workgroup that developed the innovation but not a workgroup serving a coordinating role. In eight reports, authors cited pilot testing the process change, a method not previously identified in implementation taxonomies. Pilot testing has been advocated as a method for managing interdependency (i.e. the close inter-relationship of individuals and units during care delivery). One type of pilot testing that has been gaining prominence is the use of ‘plan-do-study-act’ cycles, involving small, local tests of a process change prior to broad scale implementation. The rationale for this approach is that because it is impossible to predict the effects of change in highly interdependent care processes, small pilots allow implementers to assess the impact of process changes on the system so they can further refine and re-pilot (Berwick 1998).

Implementation methods to raise awareness

Virtually all studies included methods designed to increase potential adopters’ awareness of the new process. Education was the implementation methodology most frequently cited in reports (n = 36). Close to half of the reports (n = 21) offered descriptions of the involvement of external change agents in the implementation process, a method not identified in previous taxonomies. In the majority of cases, the external change agents were academic researchers who initiated the implementation effort as part of an externally funded research project. Other external change agents included health professional organizations, quality improvement collaboratives, an employer coalition, a health plan’s research foundation and government agencies.

Implementation methods to persuade individuals to adopt the practice change via interpersonal channels

The review found that interpersonal networks and communication were often used as a vehicle to foster implementation by influencing the subjective norms of potential adopters. Twenty-one of the publications reported that the change in care processes was either developed or adapted by a workgroup comprised of representatives of the disciplines that would ultimately implement the change. Although several authors used the term opinion leader (e.g. Lekan-Rutledge 2000), none employed that term as it is defined in EPOC’s taxonomy and in the present study’s coding schema. That is, none of the studies involved promotion of the process change by individuals who had been identified by their colleagues as ‘educational influencers’ (Cochrane EPOC 2002, p. 9). In five studies, managers were used to promote a process change, a method not identified in previous taxonomies. In three cases, the manager supervised the clinicians implementing the practice change. For example, in one study of a long-term care facility, the Director of Nursing monitored execution of an incontinence protocol on each shift and provided feedback on performance (Frantz et al. 2003). In the other two studies, the implementation effort was led by unit managers/directors not in a direct supervisory relationship with the nurses implementing the process change.

Implementation methods to persuade individuals to adopt the practice change by reinforcing belief that the behaviour will lead to desirable results

Reports indicate the use of two strategies to influence individuals’ attitudes by reinforcing their expectations that a process change would lead to positive outcomes. Twenty-seven reports featured the use of data collection and feedback. In one study, the process change was included as a specific criterion on employee’s performance evaluations (Xakellis et al. 2001), a method not previously included in taxonomies. None of the studies involved financial incentives.

Implementation methods to increase behavioural control

The studies reviewed included use of both of the methods to increase behavioural control that were identified in the provisional taxonomy. In six of the publications, authors reported use of reminder systems to prompt clinicians to recall the practice change at the time of a clinical encounter. In nine publications, authors reported changes to the work-environment that were designed to facilitate performance of a practice change. Environmental changes included altering the materials or equipment available or the way materials were packaged or dispensed, increasing staffing and installing patient alarm bells. In addition, 11 studies included the use of a designated change leader, a method not included in previous taxonomies. Authors used different terms to refer to change leaders, including ‘outcome managers’ (Burns et al. 1997).
Change leaders differ from change ‘champions’, a term coined by Rogers (2003, p. 414). Like ‘opinion leaders’, ‘champions’ are difficult purposefully to select and engage as they tend to emerge spontaneously during change efforts and effect change through their charisma and commitment. In contrast, ‘change leaders’ are given authority to lead the change effort by a manager or executive. In addition to championing the change effort, they also monitor implementation, provide feedback and guidance to clinicians and workgroups, and address barriers to implementation as they arise.

Discussion

The proposed taxonomy builds on prior taxonomies by explicitly linking implementation methods to theory. Few implementation studies to date have presented an underlying rationale for the selection of implementation methods. By linking methods to theory, the proposed taxonomy offers a step towards building the theoretical basis to guide implementation research.

Previously developed taxonomies were based largely on the work done in evidence-based medicine. The present review focused on studies of implementation that involved nurses. The resulting taxonomy expands upon the methods previously identified to include ones that may be particularly relevant to nursing: workgroup oversight, pilot testing, guidance from a manager, performance evaluation and designation of a change leader. The methods identified in implementation studies involving nurses may differ from those used in studies that target physicians. The more hierarchical nature of interpersonal networks in nursing may allow for a greater role for the manager as a normative force (West et al. 1999). Thus, nursing may benefit from capitalizing on the supervisory role in implementing changes in care. Although interdependency characterizes the work of all healthcare providers, physicians have historically had greater autonomy than most other healthcare professionals. As a result implementation targeting physicians has tended to focus on changing individual behaviour with less attention to fostering coordination among disciplines. Because of the high level of interdependence among healthcare professionals [Institute of Medicine (IOM) 2004], it is not surprising that implementation studies outside of medicine would place a greater emphasis on coordination. Our review repeatedly identified a method to increase coordination that is not included in previous taxonomies, namely, using a workgroup to oversee implementation. In fact, the dominant models of research utilization in nursing all are organized around a workgroup of clinicians that develops and implements the change (Horsley et al. 1978, Steetler 2001, Titler et al. 2001). Implementation efforts involving nurses also manage interdependency by employing pilot tests to evaluate and refine process changes prior to full-scale implementation.

The proposed taxonomy reflects also the growing prominence of external change agents in implementation, a method not included in prior taxonomies. Although academic researchers have long served as external change agents in their partnerships with clinicians, improvement collaboratives and government agencies are becoming more involved in actively promoting change in healthcare organizations.

The methods in the proposed taxonomy are consistent with the extensive descriptive research on barriers to nurses’ utilization of new research in practice. Researchers have found that nurses’ attitudes towards a change influence their uptake of new practices. Nurses are more likely to adopt a practice if they perceive it to lead to positive outcomes and interpersonal networks are the most important source for persuading most nurses of the value of a new practice (Estabrooks 1998, Thompson et al. 2001, McCaughan et al. 2002, Ruston 2002). Nurse managers and clinician workgroups are two methods for using interpersonal connections to communicate a change in practice.

Findings from descriptive studies of research utilization in nursing further suggest that a lack of perceived behaviour control plays a central role in limiting nurses’ implementation of research-based changes to their practice. When surveyed about the barriers encountered in making research-based changes to practice, nurses reported lack of organizational support, insufficient time on the job to implement new ideas and facilities that were inadequate for implementation (Funk et al. 1995, McCaughan et al. 2002, Bryar et al. 2003). This suggests the importance of employing methods to make changes to the work environment and provide reminders to clinicians as they provide care. Designating an individual to lead the change effort is an additional method that can increase the perception of organizational support and address barriers to implementation.

There are several limitations to the proposed taxonomy. Although an effort was made to continue analysing studies until data saturation was achieved, the selected reports may not have been fully representative and methods may have been missed. Further, as noted by Greenhalgh et al. (2004), many implementation studies are ‘impoverished by a lack of process information’ and provide only limited description of the methods used. Many of the methods used in practice may simply not have been reported. Finally, education is a central method in implementation and
What is already known about this topic

- The methods used in implementation studies are not well described or consistently named.
- The taxonomies of implementation methods that have been developed are based primarily on research in evidence-based medicine.
- Although several models of research utilization in nursing are available, none provide a theory-based rationale to guide the use of implementation methods.

What this paper adds

- The limited success of many efforts to implement change in practice may, in part, be due to the absence of a theoretical rationale for matching implementation strategies to differences in the nature and context of the practice change.
- The taxonomy presented offers a new system for categorizing implementation methods, with particular attention to nursing.
- By linking methods to theory, the taxonomy can be used to guide the selection of implementation methods that will best fit the characteristics of the practice change, users’ stage of adoption, and users’ perception of the change and their ability to implement it in their care setting.

Conclusion

Implementation research suffers from a lack of consistent terminology for the methods employed and from inattention to differences in the relevance of methods across different disciplines. Previous taxonomies have been informed primarily by evidence-based medicine. The work of nurses differs from that of physicians and, therefore, may require different methods for implementing change in practice. The limited success of many efforts to implement change in practice may, in part, be due to the absence of a theoretical rationale for matching implementation strategies to differences in the nature and context of the practice change. The taxonomy presented in this paper differs from prior taxonomies by focusing on nursing and by providing an explicit, mutually exclusive and exhaustive approach to describing implementation methods. By deriving the initial coding strategy from theory, the taxonomy links the methods to theoretical constructs that may inform the selection of methods that are most appropriate across differing practice changes and settings.

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