Case Report

Use of the Theoretical Domains Framework to Develop an Intervention to Improve Physical Therapist Management of the Risk of Falls After Discharge

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Background and Purpose. Older adults have an increased risk of falls after discharge from the hospital. Guidelines to manage this risk of falls are well documented but are not commonly implemented. The aim of this case report is to describe the novel approach of using the Theoretical Domains Framework (TDF) to develop an intervention to change the clinical behavior of physical therapists.

Case Description. This project had 4 phases: identifying the evidence-practice gap, identifying barriers and enablers that needed to be addressed, identifying behavior change techniques to overcome the barriers, and determining outcome measures for evaluating behavior change.

Outcomes. The evidence-practice gap was represented by the outcome that few patients who had undergone surgery for hip fracture were recognized as having a risk of falls or had a documented referral to a community agency for follow-up regarding the prevention of falls. Project aims aligned with best practice guidelines were established; 12 of the 14 TDF domains were considered to be relevant to behaviors in the project, and 6 behavior change strategies were implemented. Primary outcome measures included the proportion of patients who had documentation of the risk of falls and were referred for a comprehensive assessment of the risk of falls after discharge from the hospital.

Discussion. A systematic approach involving the TDF was useful for designing a multifaceted intervention to improve physical therapist management of the risk of falls after discharge of patients from an acute care setting in South Australia, Australia. This framework enabled the identification of targeted intervention strategies that were likely to influence health care professional behavior. Early case note audit results indicated that positive changes were being made to reduce the evidence-practice gap.

Immediately after discharge from the hospital, the risk of falls and fall injuries for older adults is high.[1,2] Up to 40% of patients fall at least once in the 6 months immediately after discharge, with 54% of these falls resulting in injury.[2] Cohorts of patients with a high risk of falls include patients with a surgical repair of a hip fracture (53% of patients fall within 6 months)[3] and patients with stroke (50% of patients fall within 6 months).[4] Although there is a growing body of literature focusing on strategies to prevent falls in the hospital[5] as well as extensive literature for community settings,[6] there has not been such a strong focus on reducing the risk of falls during transitions between settings (eg, when patients transfer from the hospital back to the community or to a subsequent facility, such as a rehabilitation facility, other acute care hospital site, or a residential care facility).

Best practice guidelines for the prevention of falls and harm from falls in older people have been developed in Australia,[7] and the National Safety and Quality Health Service Standards in Australia now address the prevention of falls and harm from falls.[8] Both of these place emphasis on implementing prevention strategies to reduce the risk of falls after discharge from the hospital, including recommendations to identify risk early in a patient's admission, to take action to increase the proportion of at-risk patients undergoing a comprehensive assessment of the risk of falls, to refer patients at risk to appropriate services as part of the discharge process, and to educate patients and caregivers about this risk and strategies for the prevention of falls.

A study investigating physical therapist treatment of patients admitted to the hospital after a hip fracture indicated that management of the risk of falls was given little attention.[9] This finding raised concerns about an evidence-practice gap because up to 90% of hip fractures occur as the result of a fall,[10] and there is an increased risk of repeat falls within the first 6 months after surgery for a hip fracture.[3]

The purpose of this case report is to describe a systematic approach for improving the identification and treatment of patients at risk of falls after discharge from an acute care hospital setting in South Australia, Australia.

The Theoretical Domains Framework (TDF) was used to develop interventions aiming to change clinical practice behavior and improve the uptake of evidence into practice.[11,12] The TDF targets behavior change in health care professionals and comprises 14 domains that encompass factors that are likely to influence health care professional behavior change: knowledge; skills; social/professional role and identity; beliefs about capabilities; optimism; beliefs about consequences; reinforcement; intentions; goals; memory, attention, and decision processes; environmental context and resources; social influences; emotion; and behavioral regulation (Tab. 1).[12] These domains also can be mapped to a component within a "behavior change wheel" (BCW) on the basis of the concept that capability, opportunity, and motivation interact to generate behavior.[12,13] From here, the link can be made to relevant behavior change strategies[13] that are most likely to overcome the identified barriers and enhance the enablers of changes in practice. Behavior change strategies that are relevant, feasible, and acceptable in local settings can be chosen, and specific interventions can be devised.

Case Description

A 4-step method described by French et al[14] (Appendix 1) was used to identify barriers and enablers for bridging the evidence-practice gap and to identify behavior change strategies most likely to improve the identification and treatment of patients at risk of falls after discharge from the hospital.

Identifying the Problem (Step 1)

Setting. The setting was the orthopedic ward of a 588-bed acute care teaching hospital in South Australia. This ward admits, on average, 5 to 10 new patients with hip fracture per week. The ward is staffed by 2 full-time-equivalent physical therapists, but inclusive of weekend staff, up to 20 different physical therapists as well as 25 to 30 physical therapist students per year can assess and treat the patients on this ward.

Target groups. The target groups were clinical staff responsible for the assessment and treatment of patients who had undergone surgery for hip fracture: the Southern Community Falls Prevention Team, a team of health care professionals based in the community and responsible for the coordination of services for the prevention of falls in older people who were living in southern metropolitan Adelaide, South Australia, Australia, and had been identified as having a risk of falls; executive managers in the hospital who had an interest in the management of falls and were responsible for resource allocation; and patients who had been admitted with a hip fracture as well as their partners/caregivers (consumers).

Data sources. A mixed-methods approach involving both quantitative and qualitative data collection methods to identify current practice and potential barriers to practice change was used. This approach included focus groups with physical

Table 1.
Fourteen Domains of the Theoretical Domains Framework and 84 Associated Component Constructs[1,2]

Domain (Definition)	Constructs
Knowledge (awareness of the existence of something)	Knowledge (including knowledge of a condition/scientific rationale)
	Procedural knowledge
	Knowledge of task environment
Skills (abilities or proficiencies acquired through practice)	Skills
	Skills development
	Competence
	Ability
	Interpersonal skills
	Practice
	Skills assessment
Social/professional role and identity (coherent set of behaviors and displayed personal qualities of a person in a social or work setting)	Professional identity
	Professional role
	Social identity
	Identity
	Professional boundaries
	Professional confidence
	Group identity
	Leadership
	Organizational commitment
Beliefs about capabilities (acceptance of truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use)	Self-confidence
	Perceived competence
	Self-efficacy
	Perceived behavior control
	Beliefs
	Self-esteem
	Empowerment
	Professional confidence
Optimism (confidence that things will happen for the best or that desired goals will be attained)	Optimism
	Pessimism
	Unrealistic optimism
	Identity
Beliefs about consequences (acceptance of truth, reality, or validity about outcomes of a behavior in a given situation)	Beliefs
	Outcome expectations
	Characteristics of outcome expectations
	Anticipated regret
	Consequences
Reinforcement (increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus)	Rewards (proximal/distal, valued/not valued, probable/improbable)
	Incentives
	Punishment
	Consequences
	Reinforcement
	Contingencies
	Sanctions

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Table 1.
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Domain (Definition)	Constructs
Intentions (conscious decision to perform a behavior or resolve to act in a certain way)	Stability of intentions
	Stages-of-change model
	Transtheoretical model and stages-of-change model
Goals (mental representations of outcomes or end states that a person wants to achieve)	Goals (distal/proximal)
	Goal priority
	Goal/target setting
	Goals (autonomous/controlled)
	Action planning
	Implementation intention
Memory, attention, and decision processes (ability to retain information, focus selectively on aspects of the environment, and choose between 2 or more alternatives)	Memory
	Attention
	Attention control
	Decision making
	Cognitive overload/tiredness
Environmental context and resources (any circumstance of an individual's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior)	Environmental stressors
	Resources/material resources
	Organizational culture/climate
	Salient events/critical incidents
	Interaction of person and environment
	Barriers and facilitators
Social influences (interpersonal processes that can cause people to change their thoughts, feelings, or behaviors)	Social pressure
	Social norms
	Group conformity
	Social comparisons
	Group norms
	Social supports
	Power
	Intergroup conflict
	Alienation
	Group identity
	Modeling
Emotion (complex reaction pattern, involving experiential, behavioral, and physiological elements, through which a person attempts to deal with a personally significant matter or event)	Fear
	Anxiety
	Affect
	Stress
	Depression
	Positive/negative affect
	Burnout
Behavioral regulation (anything aimed at managing or changing objectively observed or measured actions)	Self-monitoring
	Breaking habit
	Action planning

therapists responsible for the assessment and treatment of patients who were admitted to the site and who were at risk of falls after discharge; in-person interviews and regular meetings with key stakeholders; reviews of routinely collected hospital data; audits of case notes and in-person interviews with patients who had undergone surgery for hip fracture; and phone interviews with patients referred to the Southern Community Falls Prevention Team after discharge from the hospital. The information obtained was synthesized to allow mapping of current processes, and feedback from key stakeholders was sought to determine accuracy and rigor. The process map was then compared with best practice guidelines[7] and Standard 10 (relevant to falls) of the National Safety and Quality Health Service Standards.[8]

Assessing the Problem (Step 2)

The TDF (Tab. 1) was applied retrospectively to the barriers and enablers that had been identified in step 1, in which a detailed gap analysis was undertaken. This analysis allowed TDF domains to be linked to each barrier and enabler and all aspects influencing clinical practice behavior to be identified (Tab. 2).

Forming Possible Solutions (Step 3)

A BCW[13] was used to identify potential intervention components that were most likely to overcome the modifiable barriers and enhance the enablers (Tab. 2). Factors such as feasibility, local relevance, and acceptability of the chosen interventions to the site were considered in the selection of behavior change strategies, along with relevant previously examined implementation interventions for acute care hospital settings.

A project governance committee comprising representatives from the physical therapy department at the hospital was established. The members were all directly involved with the proposed practice change, had relevant knowledge regarding the project design, or had a keen interest in promoting practice change. The committee was chaired by the chief investigator (S.T.) and performed tasks such as reviewing and providing feedback on identified barriers and enablers, identifying and testing implementation strategies for dissemination, and adapting education materials. The committee met once per month during the first 18 months of the project.

Outcome

Steps 1 through 3 ran for 11 months from March 2012 until February 2013.

Identifying the Problem (Step 1)

A case note audit[9] revealed that only 10% of patients who had been admitted to the site for surgery for hip fracture were identified as having a risk of falls and that only 8% had a documented referral to a community agency for follow-up regarding the prevention of falls. Key approaches to reducing the risk of falls after discharge from the hospital were not being routinely implemented—in particular, a lack of identification of the risk of falls; a lack of assessment and management of the risk of falls; a lack of a rehabilitation approach that addressed fall risk factors; and a lack of follow-up to review and advance prescribed interventions. Therefore, the initial focus of the project was improving the identification and management of the risk of falls after discharge for patients who had been admitted with a fractured hip.

From subsequent process mapping (including interviews with staff and patients), it became apparent that the scope needed to be expanded to include all patients who were admitted to the site and who were at risk of falls after discharge. Therefore, the interventions needed to be tailored with regard to applicability and feasibility for all wards in the hospital involved in managing the risk of falls after discharge and not just the orthopedic ward. Two key health professional groups were identified as target groups for the practice change. The first group was physical therapists who were responsible for assessing and treating patients with an identified risk of falls, and the second was the Southern Community Falls Prevention Team. Finally, the project needed to focus on improving the communication and process links between acute and primary care settings—that is, improving the transition of care provided to patients at risk of falls after discharge from the site.

Step 1 ensured that project aims were clarified and aligned with both the Australian best practice guidelines for the prevention of falls and harm from falls in older people[7] and the National Safety and Quality Health Service Standards.[8]

Three main issues were identified and became the focus for the project. First, patients who were at risk of falls after discharge from the hospital were not routinely being identified (Appendix 2). There was no defined process to identify patients who were potentially at risk. The fact that the determination of which patients needed follow-up in the community relied on physical therapist discretion may have accounted for a large degree of variability. Second, documentation of high-quality clinical transfer of information relating to patients who were identified as having a risk of falls after discharge from the hospital was not occurring routinely or consistently (Appendix 2). Baseline data collection revealed that the only way in which community agencies could obtain information about patients to

Table 2.
Barriers to Behavior Change, Relevant Theoretical Domains, Components of the COM-B System, Intervention Functions, and Behavior Change Strategies[a]

Step 2: Assessing the Problem	Step 2: Linking to TDF Domains (Tab. 1)	Step 2: Mapping the BCW COM-B System to TDF Domains	Step 2: Linking Components of the COM-B System to Relevant Intervention Functions	Step 3: Forming Possible Solutions (Behavior Change Strategies)
Which barriers and enablers need to be addressed?	Within which theoretical domains do the barriers operate?	Relevant component(s) of the COM-B System	Intervention function(s)	"Healthy Hips Project" interventions developed to overcome the identified barriers (and enhance the identified enablers)
Beliefs about which professional group is responsible for managing the risk of falls after discharge Examples: Hospital staff believe it is the responsibility of community service providers, even though community service providers may not be aware of the patient or have appropriate services available Showing optimism that other groups will take responsibility for this issue after discharge from the hospital	1. Social/professional role and identity 2. Beliefs about consequences 3. Optimism	Reflective motivation (1, 2, and 3 all fall within this component)	Education (increasing knowledge or understanding) Persuasion (using communication to induce positive or negative feelings or stimulate action) Incentives (expectations or rewards) Coercion (creating expectation of punishment or cost)	• Education sessions ○ Guideline recommendations ○ National Safety and Quality Health Service Standards ○ DVD on the role of the "community fall team" ○ Presentation of baseline data highlighting evidence-practice gap • Establish mechanisms of feedback about patient outcomes after referral • Offer incentives ○ Food rewards to attend education sessions and when targets are met ○ Highlight how utilization of the community fall team can reduce workload in tertiary care settings
Low awareness of guideline recommendations or of how to implement the key messages appropriately Examples: Lack of knowledge of community services available to undertake a comprehensive assessment of the risk of falls after discharge Lack of knowledge that a comprehensive assessment of the risk of falls after discharge would be beneficial for patients at risk	Knowledge	Psychological capability	Education Training (imparting skills) Enabling (increasing means/reducing barriers to increase capability beyond education and training)	• Education sessions • Establish and disseminate (including providing training for use of) a clear process pathway for the identification and management of the risk of falls to act as a decision support tool
Lacking skills and confidence in abilities to appropriately identify patients at risk and then put an appropriate action plan in place Example: Lack of skills to consistently identify patients at risk and confidence in how to effectively manage this risk	1. Skills (cognitive and interpersonal) 2. Beliefs about capabilities	1. Psychological capability 2. Reflective motivation	1. Education, training, and enabling 2. Education, persuasion, incentives, and coercion	• Fall risk pathway • Modify existing initial assessment pro forma to include prompts and possible actions • Develop templates outlining examples of transfer that meet standards for high-quality clinical transfer and the needs of the community fall team • Provide feedback on audit results and rewards for achieving targets • Develop and disseminate standardized operating procedures

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Table 2.
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Step 2: Assessing the Problem	Step 2: Linking to TDF Domains (Tab. 1)	Step 2: Mapping the BCW COM-B System to TDF Domains	Step 2: Linking Components of the COM-B System to Relevant Intervention Functions	Step 3: Forming Possible Solutions (Behavior Change Strategies)
Beliefs about the services that will be provided by external agencies if patients are referred to them after discharge Example: Inaccurate beliefs surrounding patient outcomes after referral to the community fall team (previously reinforced by misrepresented data)	1. Knowledge 2. Beliefs about consequences 3. Reinforcement	1. Psychological capability 2. Reflective motivation 3. Automatic motivation	1. Education, training, and enabling 2. Education, persuasion, incentives, and coercion 3. Persuasion, incentives, coercion, and enabling Environmental restructuring (changing the physical or social environmental promoters or barriers) Modeling (providing an example for people to aspire to or imitate)	• Education sessions • Fall risk pathway • Establish mechanisms of feedback of accurate data reflecting patient outcomes after referral to the community fall team • Rewards for achieving targets
Lack of access to computers to complete transfer and difficulty accessing the transfer page before it has been locked by the medical team	Environmental context and resources	Physical opportunity	Environmental restructuring Enabling Restriction (using rules to reduce the opportunity to engage in targeted behaviors)	• Create an alternative option for transfer ○ Development of a paper-based discharge summary • Education sessions ○ Reinforcing need for transfer (how transfer affects patient outcomes) ○ Teaching staff how to access the electronic transfer tool ○ National Safety and Quality Health Service Standards ○ Providing templates on criteria required for transfer ○ Aligning the system of transfer with the new electronic patient medical record system (expected rollout: 2014)
Physical therapist perception of what is considered to be a priority intervention within a time-limited environment	1. Social/professional role and identity 2. Environmental context and resources 3. Social influences	1. Reflective motivation 2. Physical opportunity 3. Social opportunity	1. Education, persuasion, incentives, and coercion 2. Environmental restructuring, enabling, and restriction 3. Restriction, environmental restructuring, and enabling	• Recruit opinion leaders to reinforce importance of guideline recommendations • Establish governance systems/lines of reporting to foster an ongoing interest in meeting targets • Provide feedback of data relating to targets with the support of management
Junior staff and new staff members model their behavior on senior or more experienced clinical staff members (who do not always follow care guidelines)	Social influences	Social opportunity	Restriction, environmental restructuring, and enabling	• Develop standardized operating procedures and include these in the staff orientation manual • Education sessions • Audit and feedback • Modify initial assessment pro forma
Lack of feedback to physical therapists when appropriate actions have been taken Example: Not receiving any information about patient outcomes after identification, referral, and transfer of information from tertiary care settings	Reinforcement	Automatic motivation	Persuasion, incentives, coercion, enabling, environmental restructuring, and modeling	• Audit and feedback to staff about patient outcomes after discharge from acute care settings • Establish a feedback loop between the community fall team and the acute care therapists to reinforce patient outcomes

(Continued)

Table 2.
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High workload pressures, union disputes, high staff turnover, reduction in funding Example: A strong sense of burnout can influence the desire to change practice and can lower the prioritization of an issue when there is no positive reinforcement of appropriate actions	1. Emotion 2. Environmental context and resources	1. Automatic motivation 2. Physical opportunity	1. Persuasion, incentives, coercion, enabling, environmental restructuring, and modeling 2. Environmental restructuring, enabling, and restriction	• Raise awareness ○ Guideline recommendations ○ National Safety and Quality Health Service Standards ○ How new processes can be effective at reducing workload • Opinion leaders • Incentives/rewards for positive behavior change (food) • Audit and feedback with rewards
Lack of consistent leadership, guidance, oversight, and reinforcement of appropriate processes Example: The role of coordinating referrals to community services is person, not position, specific; therefore, during periods of leave, the current processes stop, increasing variability	Environmental context and resources	Physical opportunity	Environmental restructuring, enabling, and restriction	• Ensure that the coordination role is built into the staffing plan ○ Leave cover is provided ○ The role is clearly defined ○ The role is recognized • Establish a "fall committee" within the physical therapy department to oversee ongoing management of interventions, provide ongoing feedback to staff, and provide overall governance
Physical therapists forget to involve patients in the process of managing the risk of falls Example: Not consulting with patients about referring them for follow-up or not having discussions with patients about ways in which they can reduce their risk of falls	Memory, attention, and decision processes	Psychological capability	Education, training, and enabling	• Education sessions • Make the "Don't Fall For It. Falls Can Be Prevented!" booklet widely available • Modify initial assessment pro forma • Ongoing audit and feedback (including patient outcomes)
Lines of communication between primary care and tertiary care are not established	Environmental context and resources	Physical opportunity	Environmental restructuring, enabling, and restriction	• Establish consistent processes for identification, referral, and transfer • Establish and disseminate the fall risk pathway • Establish ongoing communication link between the physical therapy department fall committee and the community fall team
Goals/focus of primary and tertiary care settings are not transparent and therefore are unclear if they are aligned Example: A sense that each setting is focusing on different aims and is bound by different governance systems increases the difficulty of working together toward a common goal	1. Knowledge 2. Social/professional role and identity 3. Goals	1. Psychological capability 2. Reflective motivation (2 and 3)	1. Education, training, and enabling 2. Education, persuasion, incentives, and coercion (2 and 3)	• Establish consistent processes for identification, referral, and transfer • Establish and disseminate the fall risk pathway • Establish ongoing communication link between the physical therapy department fall committee and the community fall team • Identify common systems of governance and lines of reporting ○ National Safety and Quality Health Service Standards • Establish data sharing to meet reporting requirements

[a] COM-B System=the concept that capability, opportunity, and motivation interact to generate behavior; TDF=Theoretical Domains Framework; BCW=behavior change wheel; community fall team=Southern Community Falls Prevention Team; fall risk pathway=pathway to guide the identification and management of the risk of falls.

assist in the processes of triage and service matching was to access an electronic discharge summary. If this summary was absent or of poor quality, the likelihood of patients receiving appropriate management of the risk of falls after discharge from the hospital was reduced. Third, patients were not involved in the process of identifying their risk of falls or planning for the management of this risk (Appendix 3).

On the basis of these data, project aims were redefined and are summarized in Appendix 4.

Assessing the Problem (Step 2)

Table 2 shows the barriers and enablers that were identified in step 1 of the project. The identified theoretical domains with which barriers and enablers were most frequently associated were environmental context and resources, knowledge, and social/professional role and identity. Twelve of the 14 theoretical domains were considered to be relevant to behaviors in the project; intentions and behavioral regulation were the 2 domains that were not identified.

Forming Possible Solutions (Step 3)

A multifaceted intervention was designed to overcome the modifiable barriers and enhance the enablers while also considering what was likely to be feasible and relevant at the site and acceptable to the staff members who would be expected to implement the changes. The chosen behavior change strategies were presented and pilot tested with key stakeholders (physical therapists, Southern Community Falls Prevention Team, and consumers) and modified on the basis of feedback. The final behavior change strategies selected (Tab. 2) were education sessions for physical therapists about guideline recommendations and the consequences of failing to meet guideline recommendations; development of a "pathway" to guide the identification and management of the risk of falls; modification of an existing standardized initial assessment pro forma to prompt identification of the risk of falls and encourage documentation and appropriate action after identification; development of standardized processes for high-quality transfer of information (including paper and electronic options) to community service providers; and dissemination of the "Don't Fall For It. Falls Can Be Prevented!" booklet.[15] This booklet provides easily understandable written information for consumers to take with them after discharge and assists staff in discussions about the risk of falls with patients.

Mechanisms of Ensuring Sustainability

While the multifaceted intervention was being implemented, several strategies were used to promote project sustainability. "Snapshot audits" of the intervention strategies were conducted over a 3-month period, and feedback about outcomes was given to staff. This approach enabled the identification and modification of processes that were difficult to establish, allowed positive behavior to be reinforced, and kept the project at the forefront of the minds of the physical therapists who were changing their practice.

A "fall committee" was established within the physical therapy department; this committee was responsible for governing ongoing audits and providing feedback to staff, modifying processes in line with environmental or organizational changes (eg, consideration of the move to an electronic medical records system), maintaining lines of communication with primary care settings, and establishing lines of reporting from the committee up to executive-level management at the site. The committee agreed on a name for the project—the "Healthy Hips Project"—to build a brand and make the project easily identifiable.

Intervention processes were incorporated into standardized operating procedures for the physical therapy department and made widely available; this step included building the processes into the department's orientation manual to ensure that new staff members were made aware of the processes as soon as possible.

Finally, an allocation of staff time was incorporated into the staff roster to ensure that a specific staff member was always allocated to overseeing the processes of identification and referral to community services on an ongoing basis and that this position was provided with "cover" during periods of leave.

Evaluating the Selected Intervention (Step 4)

Measures of change were identified, and the primary outcomes selected were the proportion of patients with documentation of the risk of falls and the proportion of patients referred for a comprehensive assessment of the risk of falls after discharge from the hospital. Secondary outcomes were the percentage of time that the transfer of information about the risk of falls from the primary site met a standardized set of criteria for transfer quality and a change in the awareness of consumers of their own risk of falls and the management strategies put in place to mitigate this risk. Through the use of a time series approach to data collection, outcomes were measured at 3 points in time both before and after implementation of the behavior change strategies. The overall success of the implemented multifaceted intervention and project outcomes will be reported in a separate article upon project completion.

Discussion

A systematic approach in which the TDF[11,12] and the BCW[12,13] were used to underpin a theory-informed multifaceted intervention to improve management of the risk of falls after discharge from an acute care setting was undertaken. The use of the TDF to inform behavior change is a relatively new approach that was recently examined to inform the design of implementation interventions.[16–19] Previous studies focused primarily on changing the behavior of the medical profession (physicians/doctors); this approach has never been used to inform an intervention to improve management of the risk of falls in a retrospective manner. It is too early to determine whether the behavior change strategies have been successful; however, we have already been able to demonstrate that this approach was useful for designing a targeted intervention.

Although many resources have been directed at improving the quality and safety of health care by increasing the uptake and speed of knowledge translation,[20,21] behavior change strategies continue to have variable effects.[22] One of the benefits of using the TDF in our project was that the structured framework allowed us to make decisions in a systematic manner. By using the TDF with a 4-step method,[14] we were not only directed from identifying targeted behaviors to designing behavior change strategies but also given confidence in the intervention choices that were made. This approach enabled an analysis of possible influences on the behaviors being displayed at the site and provided a mechanism for determining and prioritizing intervention choices.[12] It was previously recommended that interventions should be multifaceted[23] but should not deviate too far from current practice to increase the likelihood of uptake. The use of the TDF allowed the selection of behavior change strategies that addressed the domains that were most frequently identified, thus prioritizing strategies on the basis of the likelihood of success.

An advantage of applying the TDF in a retrospective manner was that it saved time. The 2-year project funding did not allow for a more thorough step 1 and step 2, in which interviews and focus groups could be structured around the TDF, as previously described in the literature.[17,24] Although the use of the TDF has been recommended, this approach has also been reported to require considerable time and resources.[14] A prospective approach ensures that all domains are addressed with the target groups, as members of the groups are prompted to consider whether their behaviors occur in a manner relevant to the domains, but such an approach was considered too time-consuming for this project.

Another advantage of a structured approach is that at project completion, it will be possible to systematically analyze, through retrospective review, what has worked and why. It will be possible to consider whether the chosen behavior change strategies actually addressed the influences on behavior appropriately and whether barriers or enablers that were present at the beginning of the project continued to exist as the environment or culture changed. A review of the literature on strategies for improving management of the risk of falls in acute care hospital settings revealed that many investigators failed to use any sort of framework or systematic approach in their project design.[25–29] This situation made it impossible to replicate successful strategies described in the literature. This scenario is not uncommon; other systematic reviews revealed that many investigators in knowledge translation studies failed to use theoretical or modeling research to frame their research design.[30]

Some behavior change strategies that were identified as potentially appropriate at the site could not be implemented because of the environmental context. The data suggested that a "falls coordinator" role within the physical therapy department or even within allied health at the site would be beneficial for overseeing the ongoing success of processes not only for the risk of falls after discharge but also for consideration of the inpatient risk of falls. This role would require only a part-time position (0.2 full-time equivalent) to provide ongoing education and resources to staff. However, discussions with management were not successful in establishing this role; consequently, it was decided that this role will be built into existing positions. It is not clear whether this strategy will be successful because the role could end up being "lost" within the positions, and the engagement of staff members who take on the role may not be as extensive as that of someone specifically appointed to the role.

The overall success of the project will not be known until final data collection is complete. However, it is anticipated that the data will be unique because they address an intervention to improve management of the risk of falls across care settings, an area of practice that has not been considered. In the past, interventions focused on improving management of the risk of falls in acute care settings or once the patient has transitioned to another facility[5] or back to the community.[6] The transition itself has been neglected.

Limitations

The data from the project may not be relevant to larger-scale implementa-

tion interventions. Our approach was tried at 1 acute care setting and focused primarily on 1 health care professional group. Therefore, settings in which multidisciplinary teams need to be considered or multiple sites are involved may not be able to follow the approach described. Several other elements in the care pathway for management of the risk of falls were identified as deviating from best practice care; however, given project limitations (resources and time frames), only areas considered likely to achieve the greatest patient and hospital outcomes without deviating too far from current practice were chosen. Finally, final data collection is not yet complete. Therefore, although the data provide some insight into how useful the TDF was in the design and implementation of the project, it is not yet possible to comment on the contribution of the TDF to the overall success of the project.

Conclusion

A systematic approach involving the TDF and the BCW was useful in the design of an intervention to improve management of the risk of falls after discharge of patients from an acute care setting in South Australia. It not only provided a framework to assist in identifying barriers and enablers influencing behaviors at the site but also allowed these behaviors to be linked to potentially successful behavior change strategies. Including the opinions of consumers in the data collection phase was a vital source of information for driving behavior change strategies. The application of a theoretical framework will enable us, at project completion, to determine which strategies were successful in this particular setting and why.

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Appendix 1.

Steps for Developing a Theory-Informed Implementation Intervention to Change Clinical Behavior[14]

Identifying the Problem (Step 1)

1. Who needs to do what differently?

   a. Identify the evidence-practice gap.

   b. Specify the behavior change needed to reduce the evidence-practice gap (the clinical behavior or series of linked behaviors that you will try to change).

   c. Specify the health care professional group whose behaviors need to change (who performs the behaviors and when and where they perform the behaviors).

Assessing the Problem (Step 2)

2. On the basis of a theoretical framework, which barriers and enablers need to be addressed?

   a. From the literature and experience of the development team, select which theory(ies) or theoretical framework(s) is likely to inform the pathway(s) of change.

   b. Use the chosen theory(ies) or framework(s) to identify the pathway(s) of change and the possible barriers to and enablers of the pathway(s).

   c. Use qualitative methods, quantitative methods, or both to identify barriers to and enablers of behavior change.

Forming Possible Solutions (Step 3)

3. Which intervention components (behavior change techniques [BCTs] and mode or modes of delivery) could overcome the modifiable barriers and enhance the enablers?

   a. Use the chosen theory(ies) or framework(s) to identify potential BCTs to overcome the barriers and enhance the enablers (establish the content of the intervention; ie, what will actually be delivered?).

   b. Identify evidence to inform the selection of potential BCTs and mode or modes of delivery (how will each chosen technique be delivered?).

   c. Identify what is likely to be feasible, locally relevant, and acceptable and combine identified components into an acceptable intervention that can be delivered.

Evaluating the Selected Intervention (Step 4)

4. How can the behavior change be measured and understood?

   a. Identify mediators of change to investigate the proposed pathway(s) of change.

   b. Select appropriate outcome measures (for behavior change).

   c. Determine feasibility of outcomes to be measured (reliable and valid measures that are feasible).

Appendix 2.

Case Note Audit Data Relevant to Identification of the Risk of Falls and Quality of Clinical Transfer

Audit data on patients who were admitted with a hip fracture

- Ninety-four percent of 159 patients were not identified as having a risk of falls after discharge from the hospital by their treating physical therapists (ie, there was no documentation of an identified risk in the medical records).
- Thirty-one percent of 159 patients had discharge summaries completed by their treating physical therapists. Of the completed discharge summaries, documentation relating to patients at risk of falls was present only 4% of the time. Sixty-five percent of the time, high-quality transfer of information was not provided in the discharge summaries by physical therapists.

Audit data on patients who were identified as having a risk of falls after discharge (excluding those with a hip fracture)

- Of 50 patients who had been referred to the Southern Community Falls Prevention Team from the hospital, 8% had electronic discharge summaries completed by their treating physical therapists.

Appendix 3.

Summary of Telephone and In-Person Consumer Interview Baseline Data

Phone interviews (approximately 1 month after discharge from the hospital)

Fifty patients had been referred to the Southern Community Falls Prevention Team by their treating physical therapists.

- Eighty-eight percent of the patients were not aware that they had been referred for follow-up in the community.
- The patients were not aware of their risk and the subsequent need for any intervention.

Consumer interviews

Of 15 patients who had been admitted after a hip fracture and were nearing the end of their acute care inpatient stay, 2 were men and 13 were women, with a mean age of 80.4 years (SD=8.3, range=70–98).

- None of the 15 patients were aware of the fact that they had an increased risk of falls after discharge from the hospital.
- "Taking more care" was the most commonly identified strategy for the prevention of falls.
- Often not until the end of the interview (~30 minutes) did patients realize that a risk of falls might be something relevant to them.
- Topics of discussion that led them to this understanding included how the fall that led to the admission had occurred, similarities with other falls, possible intervention strategies that might be acceptable to them, and why their risk was now increased.
- The most effective tool for helping patients understand their risk of falls was the "Don't Fall For It. Falls Can Be Prevented!" booklet.[15]
- All patients wanted to keep the booklet and continue reading it at the completion of the interview.
- Many patients did not want a caregiver or family member to be present for the discussion because they wanted to hear the information and be in control of their own strategies for management of the risk of falls.

Appendix 4.

Redefined Project Aims After Step 1 of the Methodological Process

1. To establish a clear process for increasing the consistency and accuracy of identification of patients at risk of falls after discharge from the hospital.

2. To develop a structured process to ensure high-quality clinical transfer of information about patients who have been identified as having a risk of falls after discharge from the hospital from physical therapists to community services.

3. To develop and implement mechanisms to inform patients and their partners/caregivers about their risk of falls after discharge from the hospital and to include patients and their partners/caregivers in decisions about referral to appropriate community services for follow-up regarding the prevention of falls.