Teams communicating through STEPPS

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ABSTRACT

Objective: To evaluate the effectiveness of the implementation of a TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) program at an Australian mental health facility.

Design, setting and participants: TeamSTEPPS is an evidence-based teamwork training system developed in the United States. Five health care sites in South Australia implemented TeamSTEPPS using a train-the-trainer model over an 8-month intervention period commencing January 2008 and concluding September 2008. A team of senior clinical staff was formed at each site to drive the improvement process. Independent researchers used direct observation and questionnaire surveys to evaluate the effectiveness of the implementation in three outcome areas: observed team behaviours; staff attitudes and opinions; and clinical performance and outcome. The results reported here focus on one site, an inpatient mental health facility.

Main outcome measures: Team knowledge, skills and attitudes; patient safety culture; incident reporting rates; seclusion rates; observation for the frequency of use of TeamSTEPPS tools.

Results: Outcomes included restructuring of multidisciplinary meetings and the introduction of structured communication tools. The evaluation of patient safety culture and of staff knowledge, skills and attitudes (KSA) to teamwork and communication indicated a significant improvement in two dimensions of patient safety culture (frequency of event reporting, and organisational learning) and a 6.8% increase in the total KSA score. Clinical outcomes included reduced rates of seclusion.

Conclusion: TeamSTEPPS implementation had a substantial impact on patient safety culture, teamwork and communication at an Australian mental health facility. It encouraged a culture of learning from patient safety incidents and making continuous improvements.

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Teamwork and communication failures are frequent contributors to adverse events in health care.[1,2] Individual execution of clinical tasks is the focus of clinician training, and traditionally little has been done to prepare for the more tightly defined teamwork behaviour typical of other industries.[3,4] Similarities between health care and other complex industries such as aviation have been noted, including the need for effective decision making, in spite of incomplete or conflicting information, and the demand for coordination among professionals with varied skills and ranks.[5-7]

A large body of research has identified a set of core knowledge, skills and attitudes that, according to Salas and colleagues, apply to almost all teams.[8,9] The critical aspects of teamwork include team leadership, mutual performance monitoring (situation monitoring), back-up behaviour (mutual support) and communication. A retrospective review of closed indemnity claims in the United States indicated that failure to engage in one or more of these teamwork behaviours always contributed to an adverse event and indemnity payments, with an average of 8.8 teamwork failures per closed case. In 43% of the cases reviewed, application of teamwork behaviours would have prevented or mitigated the adverse event.[10] Formal teamwork training improves team performance and outcomes.[11,12] In the health care domain, teamwork training has been shown to improve team behaviours and staff attitudes and reduce errors.[4] Emergency departments adopting formal teamwork training have experienced a 67% increase in error-averting behaviour and a 58% reduction in observable errors.[4,13]

TeamSTEPPS (Team Strategies and Tools to Enhance Performance and Patient Safety) is an evidence-based teamwork training system involving four competency areas: leadership, situation monitoring, mutual support, and communication.[14] The program, developed by the US Agency for Healthcare Research and Quality and the US Department of Defense, uses principles of aviation crew resource management adapted for the health care sector.[15]

The TeamSTEPPS program has not previously been formally evaluated in Australia, nor has it been introduced into a mental health care environment. We report here on a case study of the implementation of TeamSTEPPS at an inpatient mental health facility in South Australia. We sought to determine whether the training intervention changed staff attitudes and behaviours and had an impact on patient care. Our aim was to evaluate the effectiveness of the intervention with measures developed to address three outcome constructs: observed team behaviours; attitudes and opinions; and clinical performance and outcomes.[5]

METHODS

Implementation of TeamSTEPPS

The implementation of a TeamSTEPPS program in a mental health facility was part of a larger study involving five hospital sites. Nominations received from SA health care sites in November 2007 to participate in the 8-month TeamSTEPPS project were reviewed by a steering committee. Sites were chosen based on a number of criteria, including availability, willingness to commit to the project, clinical and geographical diversity, amenability to cultural change, and availability of key multidisciplinary clinical staff committed to driving the change locally and an executive sponsor willing to dedicate time and personnel to the project. After a successful nomination, each site entered into a site assessment, the first phase of implementation.[14]

A total of five sites, including the mental health site, then proceeded to training, the second phase. Multidisciplinary staff were selected by the site to receive intensive education in a 2.5-day workshop under a train-the-trainer model, whereby a small group of senior clinical staff would be trained and then pass on their knowledge and skills to other staff. The workshop consisted of education on the evidence base, tools and strategies to support the desired skills and attitudes towards teamwork and communication; coaching; and development of site-specific action plans. Within 1 week after completion of the workshop, the health service trainers from participating sites (health service trainers) commenced delivery on site to their colleagues of a condensed 4-hour course to educate all staff in teamwork competencies, tools and strategies for putting the desired behaviours into practice. The delivery model was based on local factors — for example, staff availability, space and resources. Participants evaluated both forms of training (the 2.5-day workshop and the 4-hour course) using a 12-item questionnaire. After training, the staff who attended the 2.5-day workshop formed a change team to guide the implementation of the program.

The third phase of implementation was sustainment. The purpose of this phase was to embed the changes gained, refresh the knowledge of the staff, review local data for new improvement opportunities, and support staff who had taken on the role of coaching.

The project commenced in October 2007, but contact with the participating sites did not commence until January 2008. The post-training implementation period was up to 5 months (April to September), with the intervention concluding in September and the analysis completed in October 2008.

Evaluation of the program

The evaluation of the program was conducted by external researchers and involved observation and surveys of clinical and non-clinical staff using an uncontrolled before-and-after study design.

Ethics approval for the evaluation was given by the human research ethics committees of the University of South Australia and the Royal Adelaide Hospital.

Observation of team behaviours

The observational evaluation assessed the level of observed team behaviours and performance. Observers were embedded over a 2-week period for a minimum of 50 hours of observation at baseline and during the post-training and post-implementation stages. Observers were educated and trained in TeamSTEPPS, provided with instruction and guidance on the events to look out for, and taught how to record the information. They were also assessed for their inter-observer consistency. Observations were recorded using a combination of field notes, recording sheets and reflective diaries.

Surveys of staff attitudes and opinions

The 42-item Hospital Survey on Patient Safety Culture[16] was administered to assess staff opinions on patient safety, and error and incident reporting. Respondents rated each item on a five-point Likert scale, from 1 ("strongly disagree") to 5 ("strongly agree"). The proportion of positive responses (agree/strongly agree) were mapped to 12 unit-specific and hospital-wide domains, including those specific to teamwork and communication.

A second questionnaire was developed and administered to measure staff knowledge, skills and attitudes in relation to teamwork and communication. The 23-item knowledge, skills and attitudes questionnaire was based on an existing Total Team Assessment questionnaire,[17] the learning objectives of the TeamSTEPPS training, and a literature review.[18] Each item was scored on a five-point Likert scale. Using a scoring system for each question of 1 (strongly disagree) to 5 (strongly agree), the total score ranged from a minimum of 23 to a maximum of 115.

Seclusion rates

Seclusion rates, measured as the number of unique seclusion events per admission per month, were included as a clinical outcome. (Seclusion arises from the need to protect a patient from immediate or imminent risk to his or her safety or the safety of others. Seclusion, as an event, refers to the sole confinement of a person at any time in any place where the exits are locked from the outside and cannot be opened by the person from the inside. Any person who is subject to seclusion is continuously monitored, with details and justification of specific interventions clearly documented.) The seclusion rate was selected by the mental health facility as an indicator of clinical improvement, with updated seclusion rates regularly posted in the meeting room.

RESULTS

The results reported here relate to the mental health facility site.

Observed team behaviours and performance

Baseline observational data (before implementation of TeamSTEPPS) revealed inefficiencies in communication and teamwork during ward rounds and discharge planning meetings. Inefficiencies were identified as historical practices, confusion about the purpose and outcomes of ward rounds and discharge planning meetings, and an ever increasing attendance of health professionals at these meetings. Observational data showed that implementation of the TeamSTEPPS program was undertaken in a staged manner.

Post-implementation data demonstrated a change in the structure and process of the meetings that formalised meeting objectives, improved role clarity, and reduced unnecessary team membership (potentially achieving a cost saving of $900 per week, or over $50 000 annually).

A structured communication tool known as SBAR (situation, background, assessment, request/recommendation)[14] was introduced to support changes to clinical handover. After 1 month, multidisciplinary use of SBAR was demonstrated in virtually all patient presentations at handover. The SBAR framework was also used in written communication in patient clinical notes.

Historically, at ward rounds and discharge planning meetings, patient information had been presented by medical staff. As part of process change and in recognition of the role that nurses occupy in everyday patient management, nurses initiated the SBAR handover on patient progress and management at these meetings. This ensured opportunities for all staff closely involved in patient care to be an integral part of the decision-making process. Furthermore, decisions were made in a framework of collaboration and teamwork, resulting in widespread ownership of discharge and follow-up plans. Community workers were also involved in discharge planning meetings, strengthening the transition from in-patient care to community care.

Coaching, an element of sustainability in the program, was undertaken regularly by the change team. It incorporated education, encouragement and reminders to staff to use the SBAR format and to undertake team activities.

A "journey board" as a visual method of enhancing clinical communication was also introduced. The board was regularly updated by staff and provided access to up-to-date patient information at one predefined location.

Attitudes and opinions: patient safety culture

Most respondents to the patient safety culture survey were nursing and medical staff (56% registered nurses, 5% enrolled nurses, 11% residents and 4% consultants). Before implementation of the TeamSTEPPS program, the patient safety culture for nearly all domains tended to be lower at the mental health site than at all sites included in the study (Box 1). This was particularly true for

1 Proportion of positive responses for 12 domains of patient safety culture before and after implementation of the TeamSTEPPS program: mental health (MH) site versus all sites combined

	Proportion of positive responses							
	Before TeamSTEPPS			After TeamSTEPPS			Before–after comparison (MH site)	
Domain	MH site*	All sites†	Difference	MH site‡	All sites§	Difference	*Z* score	*P*
1 Communication openness	47%	59%	– 12%	58%	62%	– 4%	0.74	0.46
2 Feedback and communication about error	37%	57%	– 20%	56%	56%	0	1.45	0.15
3 Frequency of event reporting	28%	45%	– 17%	53%	42%	11%	2.02	0.04
4 Hospital handovers and transitions	22%	30%	– 8%	37%	33%	4%	1.20	0.23
5 Hospital management support for patient safety	49%	50%	– 1%	53%	53%	0	0.13	0.90
6 Non-punitive response to error	37%	45%	– 8%	50%	49%	1%	0.93	0.35
7 Organisational learning — continuous improvement	49%	65%	– 16%	79%	76%	3%	2.49	0.01
8 Overall perceptions of safety	41%	45%	– 4%	60%	51%	9%	1.45	0.15
9 Staffing	42%	29%	13%	42%	38%	4%	– 0.23	1.00
10 Supervisor/manager expectations and actions promoting safety	69%	73%	– 4%	79%	76%	3%	0.74	0.46
11 Teamwork across hospital units	33%	43%	– 10%	48%	45%	3%	1.12	0.90
12 Teamwork within hospital units	57%	73%	– 16%	72%	79%	– 7%	1.13	0.26

TeamSTEPPS = Team Strategies and Tools to Enhance Performance and Patient Safety. * $n = 45$; response rate, 75%. † $n = 280$; response rate, 64%. ‡ $n = 34$; response rate, 76%. § $n = 231$; response rate, 78%. ◆

domains 2 (feedback and communication about error), 3 (frequency of event reporting), 7 (organisational learning) and 12 (teamwork within hospital units). After implementation, two of these domains (3 and 7) showed significant improvement at the mental health site (*Z* test comparison of proportions, $P < 0.05$), and patient safety culture for only two of the domains was lower for the mental health site than for all sites combined (Box 1).

Attitudes and opinions: knowledge, skills and attitudes

There was an increase in total knowledge, skills and attitudes score for the mental health site of 6.8% following TeamSTEPPS implementation (Box 2). Although the increase was not statistically significant, the implementation at the mental health site suggested a greater effect size than was apparent for all sites combined (1.9%). Scores for three individual items in the mental health site data increased by more than 15% after implementation: “My manager focuses on building the skills that I need to perform my role”; “My manager coaches and supports me”; and “Staff work together to monitor and progress patient care plans”.

Attitudes and opinions: training evaluation

The evaluation of training was positive for both of the trained groups (senior clinical staff who attended the 2.5 day workshop and participants who received the 4 hours of instruction), with virtually all participants agreeing that the training was appropriate and would improve patient safety and that the TeamSTEPPS tools would facilitate leadership and improved communication.

2 Total knowledge, skills and attitudes (KSA) scores before and after TeamSTEPPS implementation

	Before TeamSTEPPS		After TeamSTEPPS		Before–after comparison	
Site	Sample size	Mean KSA score (SD)	Sample size	Mean KSA score (SD)	% change in KSA score	*P*
Mental health site	23	79.1 (12.0)	34	84.5 (12.6)	+ 7%	0.11*
All sites combined	206	84.2 (9.5)	226	85.9 (10.1)	+ 2%	0.048†

TeamSTEPPS = Team Strategies and Tools to Enhance Performance and Patient Safety. * Calculated using Student’s *t* test. † Calculated using analysis of variance. ◆

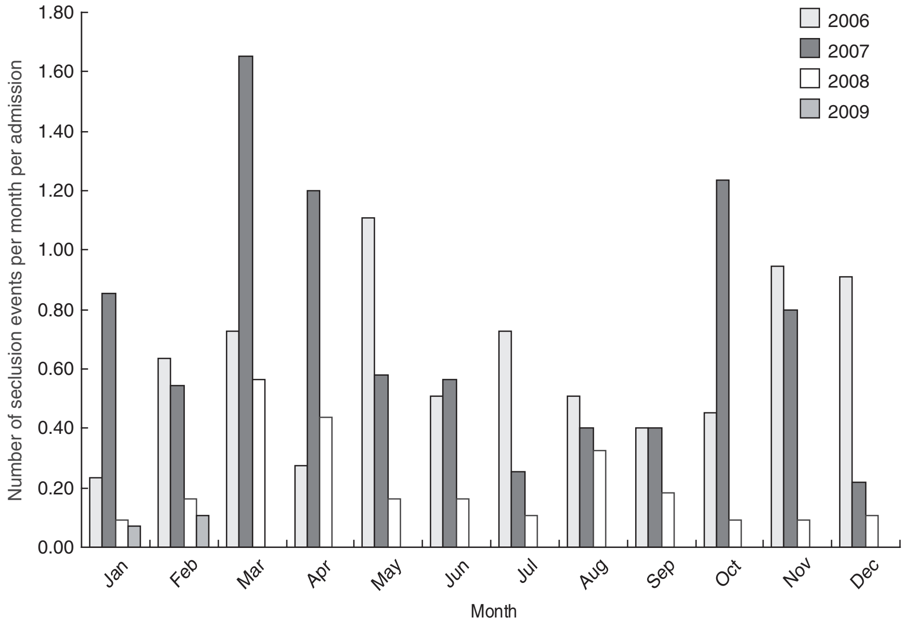
Clinical outcomes

Before the introduction of TeamSTEPPS, the initiation of seclusion in patients was determined by individual clinicians, and seclusion rates were variable (Box 3). The introduction of “huddles” (ad hoc gatherings of clinical staff to re-establish a clear and accurate understanding of the patient’s current status and plan of care)[14] and a structured team approach has established a team commitment to resolve aggression, with seclusion used as a last resort. Seclusion rates before implementation (ie, before February 2008) were significantly higher than after implementation (from May 2008) (Mann–Whitney *U* test, $Z = -4.1$; $P < 0.001$).

DISCUSSION

The advantage of observation as a research tool is that health care practitioners’ activities and behaviour can be captured in their own environment without having to rely on their willingness or ability to respond to ques-

3 Number of seclusion events* per month per admission at the mental health site, 2006–2009



* Seclusion refers to the sole confinement of a person at any time in any place where the exits are locked from the outside and cannot be opened by the person from the inside. ◆

tions.[19,20] The observational evaluation identified several key factors that contributed to the implementation of TeamSTEPPS at the mental health site. Firstly, the change team that was formed to support TeamSTEPPS implementation recognised the need for change. This also cultivated a "bottom-up" approach, which ensured that ownership of change was taken up and driven by the local change team. The recognition of barriers enabled the change team to address them early in the implementation. The implementation was supported by strong leadership, both locally, by the medical staff, and throughout the hierarchy, ensuring transparency and confidence in the change-management process. The local actions to review, display and strive for improved results in their measurement-driven improvement cycle (as demonstrated through the display of seclusion data) also assisted in staff engagement. Coaching of staff in the desired teamwork behaviour was also a feature. These are the principles that contribute to a successful implementation of TeamSTEPPS.[21]

Reducing the rate of seclusion is a national priority area in mental health.[22] The reduction in seclusion rates associated with the implementation of team activities (huddles) in our study is a significant finding.

Considering the complexity of behavioural change, the implementation was assessed in a relatively brief post-training intervention period of up to 5 months, with the change in culture demonstrated through the results of the patient safety culture survey — notably by the frequency of event reporting and the extent to which errors led to positive changes and organisational learning. Moreover, the changes to patient safety culture and knowledge, skills and attitudes to teamwork and communication tended to exceed those shown by overall data from all sites.

However, there were several domains in which there was nil, or minimal, improvement at the mental health site after TeamSTEPPS implementation. Issues around staffing, teamwork across hospital units, and hospital management support remained unchanged, suggesting that such higher-level aspects of hospital performance are more difficult to change within a bottom-up, short-term intervention period. These results are also indicative of change that would be required outside the direct influence of the TeamSTEPPS implementation, which was focused on one site. Thus these results are not unanticipated.

TeamSTEPPS has an established record, with significant objective data from US studies to support its efficacy. Our project set out to see whether it would be effective in Australia. The TeamSTEPPS project was funded by the Australian Commission on Safety and Quality in Health Care as part of the National Clinical Handover Initiative, and, as a result, was constrained by external timeframes. The project would have benefited from a longer intervention period, given the long-term nature of assessing behavioural change. Furthermore, the time constraints restricted the team's ability to accumulate large volumes of baseline data and resulted in data being accumulated while change was still expected to be underway. Further limitations included the selection of sites (which was based on subjective criteria) and the lack of existing validated tools (resulting in the need for the investigators to develop new tools or modify existing ones). Moreover, in spite of a high response rate, the small sample size of mental health facility data, combined with the relative weakness of the Z test, resulted in a relatively underpowered study. A sample size of >140 in each group (ie, before and after the intervention) would have been required to detect an improvement from 40% to 50% positive responses with a power of 80%, indicating that comparisons within the mental health unit were relatively underpowered. Finally, as control sites were not used, it is not possible to directly attribute cause and effect solely to the intervention.

There were no significant negative findings, and while positive changes are evident, it is premature to assess whether they will result in lasting cultural change. However, given the change in behaviour from baseline, a multifaceted intervention, a clear description of the problem to solve, and an action plan with ongoing measurement, there is increased probability that the changes gained at the site will be sustained.[23]

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COMPETING INTERESTS

None identified.

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