

A Complex Teamwork Intervention in a Surgical Ward in Norway

Oddveig Reiersdal Aaberg (✉ oddveig.aaberg@ntnu.no)

Universitetet i Agder <https://orcid.org/0000-0002-3310-0804>

Marie Louise Hall-Lord

Norges Teknisk-Naturvitenskapelige Universitet Fakultet for Medisin og Helsevitenskap

Sissel Iren Eikeland Husebø

Universitetet i Stavanger

Randi Ballangrud

Norges Teknisk-Naturvitenskapelige Universitet Fakultet for Medisin og Helsevitenskap

Research note

Keywords: Implementation, Interprofessional, Intervention, Patient safety, Surgical ward, Team training, TeamSTEPPS

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Abstract

Objectives: Interprofessional team training has a positive impact on team behavior and patient safety culture. The objective of the study was to explore the impact of an interprofessional teamwork intervention in a surgical ward on structure, process and outcome. In this paper, the implementation of the teamwork intervention is reported to expand the understanding of the future evaluation results of this study. **Results:** The evidence-based Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) program in the ward was implemented in three phases according to the program's implementation plan, which are built on Kotter's organizational change model. In the first phase, a project group with the leaders and researchers was established and information about the project was given to all health care personnel in the ward. The second phase comprised six hours interprofessional team training for all frontline health care personnel followed by 12 months implementation of TeamSTEPPS tools and strategies. In the third phase, the implementation of the tools and strategies continued, and refresher training was conducted. **Trial registration:** Trial registration number (TRN) is ISRCTN13997367. The study was registered retrospectively with registration date May 30, 2017. **Keywords:** Implementation, Inter-professional, Intervention, Patient safety, Surgical ward, Team training, TeamSTEPPS

Introduction

In today's specialized, complex and pressurized healthcare, harm caused by adverse events during hospital care are acknowledged as a serious threat to patient safety, with human factors as a central issue [1, 2]. Enhancing teamwork and communication between interprofessional healthcare personnel has a positive impact on patient safety in healthcare systems founded on human factors principles [1]. Interprofessional teamwork comprises different healthcare professions, which share a team identity and work closely together in an integrated and interdependent manner to solve problems and deliver healthcare services [3].

A considerable number of adverse events are related to surgical treatment [4, 5]. A microsystem, such as a surgical ward, has the greatest opportunity to improve work processes as part of interprofessional teamwork [6, 7].

There is limited amount of research on interprofessional team training in the context of surgical wards [8, 9], and in this paper the implementation of the teamwork intervention in a surgical ward will be described. The study protocol has been previously published [10].

Team training is an effective method to improve frontline healthcare personnel's teamwork competencies [9]. Team training is defined as "a set of tools and methods that form an instructional strategy," and is a methodology designed to educate team members with the competencies necessary for optimizing teamwork [11]. Teamwork competencies refer to the attitudes, behaviors and cognitions necessary for effective teamwork [12]. In this context, the attitudes are the affective attributes essential for effective team performance, behaviors are the skills and procedures needed for teamwork and cognitions are the necessary elements of knowledge and experience necessary for effective teamwork [12]. Interprofessional team training in hospitals has a positive impact on team behavior [9, 13], patient safety culture [14] and patient outcome [9].

Team Strategies and Tools to Enhance Performance and Patient Safety (TeamSTEPPS) [15] was chosen as the team training program in this study. This generic program is one of a few standardized training and research-based programs that address the impact of human factors on healthcare teams [16]. TeamSTEPPS was developed by the US Agency for Healthcare Research and Quality (AHRQ) in collaboration with the US Department of Defense [17-19]. The program aims to optimize patient safety and the quality of care by enhancing team structure and four teamwork competencies; communication, leadership, situation monitoring, mutual support [17, 18, 20]. Each of the four teamwork competencies has a set of tools or strategies that the interprofessional team members are supposed to utilize to ensure effective teamwork [15, 20]. The AHRQ gave permission to translate and use the program in Norway.

Despite previous research which shows that interprofessional team training interventions improve the quality of clinical practice, there is little knowledge about its impact on hospital wards. The objective of the study was therefore to explore the impact of an interprofessional teamwork intervention in a surgical ward on structure, process and outcome. Here, we report on the implementation of the TeamSTEPPS program as additional data provided to facilitate a better understanding of the evaluation results of this study.

Main Text

Research setting and sample

The interprofessional teamwork intervention was carried out in a surgical ward at hospital in eastern Norway. The ward was selected for convenience, and based on the management's interest to participate in the study. The target group was frontline healthcare personnel consisting of physicians, registered nurses (RN) and assistant nurses (AN) working at the ward. A consecutive sample of elective and emergency patients with the inclusion criteria being 18 years or older, understanding Norwegian, and being in a mental and physical health condition that made it ethically justifiable to participate, were included in the study. Furthermore, healthcare personnel in a surgical ward at a hospital in southern Norway constituted the control group.

Description of the intervention

The intervention was initiated by a research group consisting of four researchers from two universities in Norway. Two of the researchers and four of the leaders at the ward had attended a TeamSTEPPS master training. The TeamSTEPPS program and teaching materials were translated into Norwegian by a translation agency, and approved by three faculty members. The intervention was conducted according to the recommended TeamSTEPPS implementation plan [20], which is built on John Kotter

schan ≥ mod elwitheightstepsf or or ganizationalchan ≥ (seeFigure1 ∈ Supp ≤ mentaryFi ≤ s). TheTeamSTEPPS Interventionisdescribes eight steps incorporated in the different phases. The study period lasted for 12 months after the initial interprofessional team training.

Phase I. Setting the stage and deciding what to do - assessment and planning

Multiple actions occurred to assess organizational readiness for a TeamSTEPPS initiative [21]. After collection of the assessment profile of the surgical ward, the leaders decided that the ward was ready for the TeamSTEPPS intervention. A comprehensive planning for an interprofessional TeamSTEPPS training and implementation was jointly conducted by the leaders and the researchers. In advance of the team training, the physicians and nursing staff attended information meetings organized by the researchers.

Phase II: Make it happen - training and implementation

The onset for the TeamSTEPPS intervention was six hours of compulsory interprofessional team training conducted for all frontline healthcare personnel during work hours (n=41). TeamSTEPPS leaflets and pocket guides were distributed to all healthcare personnel. The team training was conducted by the leaders of the ward in collaboration with two of the researchers (RB and ORA), and completed over three days (three interprofessional groups) during three weeks in May 2016. The team training consisted of didactics, videos, role-play and high-fidelity simulation training with debriefing sessions. The first lecture aimed to create a sense of urgency (Kotter's step 1) by presenting the Sue Sheridan video [20], and by presenting the hospital's reports of adverse events. The two simulation sessions consisted of two scenarios: "A postoperative urology patient with infection" and "A postoperative gastroenterological patient with acute deterioration," both with a focus on communication and teamwork. At the end of the course, all healthcare personnel were asked to identify patient safety issues in the ward, and to suggest TeamSTEPPS tools to solve the problem. The six hours of team training was accredited for continuing education (CE) by for general surgery by the Norwegian Medical Association and for clinical advancement by the Norwegian Nurse Organization.

The initial team training was followed by a implementation phase in the ward. A Change Team was established (Kotter's step 2) consisting of multi-professional healthcare personnel from the ward (two registered nurses, two assistant nurses and four physicians), in addition to the Chair of the surgical department, a former patient and a researcher serving as a coach (ORA). The Change Team served as a guiding coalition and was led by the Nurse Unit Manager. A vision of "Zero errors" (0 patient harm errors) was set, and an action plan was developed based on the identified patient safety risk areas in the ward and approved by the Chair of the surgical department (Kotter's step 3). The action plan was communicated in unit staff meetings and by email to all employees (Kotter's step 4). The leaders empowered a broad-based action to make the implementation as smooth as possible, and to remove obstacles that could undermine the changes (Kotter's step 5). Posters with explanations of the TeamSTEPPS tools were placed in working stations at the ward. In addition, posters for patients and visitors were placed in the ward corridors, with a request to speak up if they perceived something that might be a threat to patient safety. One of the authors (ORA) coached the implementation by giving and gathering input from site visits and e-mail communications with the leaders and the clinical nurse specialist, and as a member of the Change Team, throughout the study period.

The Nurse Unit Manager and the Clinical Nurse Specialist led the implementation of tools and structural changes. Five TeamSTEPPS tools were implemented during the first six months of the study period (see Table 1 in Supplementary Files). Each tool was launched as "The tool of the month," and communicated in the weekly newsletters sent to the nursing staff and physicians. The introduction of new tools was marked in inventive ways. For example, structural changes that followed the implementation of tools were interprofessional huddles held beside the patient safety whiteboard after the daily interprofessional rounds.

The frontline healthcare personnel and their leaders celebrated short-term wins together (Kotter's step 6). Five months after the initial team training, the master-trained unit nurse manager and the clinical nurse specialist organized 75 minute TeamSTEPPS refresher training for the nursing staff. The master-trained Chief Surgeon conducted a 20 minute refresher training for the physicians.

Phase III: Make it stick – sustainment

The implementation of the tools and structural changes continued into the sustainment phase, with five more tools implemented during the next six months. After 11 months, one more 75 minute TeamSTEPPS refresher training was conducted for all the nursing staff. The leaders and the frontline healthcare staff used the tools in their daily work, and the changes were consolidated (Kotter's step 7). They anchored the change to let the change effort to become a lasting part of the organizational culture (Kotter's step 8). This step is the final leg of Kotter's leading change model. The implementation period was 12 months.

An overview of the intervention is illustrated in Figure 2 (in Supplementary Files), and more details are given in Table 1.

Evaluations

The intervention has been evaluated by quantitative questionnaires administered to healthcare personnel and patients on three occasions (before the intervention, and after 6 and 12 months), and by qualitative focus group interviews with healthcare personnel on three occasions (before the intervention, and after 6 and 12 months). Anonymous patient data from both local registers and medical records (by use of the Global Trigger Tool) was released before and during the intervention period. Evaluations have been conducted, and the results will be published.

Limitations

The main limitations of this study are as follows: 1) the change of the unit nurse manager during the study period might have influenced the results, 2) the research team had limited control of the intervention, and 3) the convenience sample of the intervention ward could be a possible bias.

AHRQ: Agency for Healthcare Research and Quality AN: Assistant nurse

CE: Continuing education RN: Registered nurse

TeamSTEPPS: Team Strategies and Tools to Enhance Performance and Patient Safety

US: United States

Declarations

Ethics approval and consent to participate

The study was approved by the Norwegian Centre for Research Data (Ref. NR. 43295, 46872, 47853, 47878), and by the Regional Committees for Medical and Health Research Ethics (2016/78). Permission was given by the head administration of the hospital. Information about the study and invitation to participate were distributed to healthcare personnel and patients in written form, referring to the principle of autonomy addressed by confidentiality and voluntariness. Written consent was obtained from healthcare personnel and patients who agreed to participate in the study. The study was conducted in accordance with the principles of the Helsinki Declaration [22].

Consent for publication

Not applicable.

Availability of data and material

Data sharing is not applicable to this paper, as no datasets or analyses were generated during the current paper.

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Competing interests

The authors declare they have no competing interest.

Authors' contribution

ORA, MLHL, SEH and RB contributed to the conception and design, the writing and critical revision of the manuscript and the approval of the final version published.

Authors' information

ORA: CCRN PhD Research Fellow

MLHL: RNT PhD Professor

SEH: CCRN PhD Professor

RB: CCRN PhD Associate Professor

References

1. Clinical Human Factors Group. *Implementing Human Factors in Healthcare - Tak \in g furthersteps*. 'How to' Guide to Human Factors 2013 [cited 2019 May 07 2019]; Available from: https://improvementacademy.org/documents/Projects/human_factors/Implementing-human-factors-in-healthcare-How-to-guide-volume-2-FINAL-2013_05_16.pdf.
2. WHO, *Human Factors in Patient Safety. Review of Topics and Tools. Report for Methods and Measures Working*, ed. W.H. Organization. 2009, Geneva.
3. Reeves, S., et al., *Interprofessional teamwork for health and social care*. 2010, Chichester: Wiley-Blackwell. XVI, 191 s. : ill.
4. de Vries, E.N., et al., *The incidence and nature of in-hospital adverse events: a systematic review*. *Quality and Safety in Health Care*, 2008. 17(3): p. 216-223.

5. Zegers, M., et al., *The incidence, root-causes, and outcomes of adverse events in surgical units: implication for potential prevention strategies*. Patient Saf Surg, 2011. 5: p. 13.
6. Mohr, J.J. and P.B. Batalden, *Improving safety on the front lines: the role of clinical microsystems*. BMJ Quality & Safety, 2002. 11(1): p. 45-50.
7. McGinnis, J.M., et al., *Best care at lower cost: the path to continuously learning health care in America*. 2013: Institute of Medicine, National Academies Press.
8. Aaberg, O.R. and S. Wiig. *Interprofessional team training in hospital wards: A literature review*. in *European Safety and Reliability Conference (ESREL)*. 2017. Portoroz, Slovenia: CRC Press 2017.
9. Hughes, A.M., et al., *Saving lives: A meta-analysis of team training in healthcare*. Journal of Applied Psychology, 2016. 101(9): p. 1266.
10. Ballangrud, R., et al., *STUDY PROTOCOL Open Access "Teamwork in hospitals": a quasi-experimental study protocol applying a human factors approach*. BMC Nursing, 2017.
11. Salas, E., N.J. Cooke, and M.A. Rosen, *On teams, teamwork, and team performance: Discoveries and developments*. Human Factors: The Journal of the Human Factors and Ergonomics Society, 2008. 50(3): p. 540-547.
12. Salas, E., et al., *The wisdom of collectives in organizations: An update of the teamwork competencies*, in *Team effectiveness in complex organizations: Cross-disciplinary perspectives and approaches*, E. Salas, G. Goodwin, and C. Burke, Editors. 2008, Psychology Press: New York. p. 39-79.
13. O'Dea, A., P. O'Connor, and I. Keogh, *A meta-analysis of the effectiveness of crew resource management training in acute care domains*. Postgraduate medical journal, 2014. 90(1070): p. 699-708.
14. Sacks, G.D., et al., *Teamwork, communication and safety climate: a systematic review of interventions to improve surgical culture*. BMJ quality & safety, 2015: p. bmjqs-2014-003764.
15. King, H.B., et al., *TeamSTEPPS™: Team Strategies and Tools to Enhance Performance and Patient Safety*, in *Advances in Patient Safety: New Directions and Alternative Approaches*, K. Henriksen, et al., Editors. 2008, Agency for Healthcare Research and Quality: Rockville (MD).
16. Gross, B., et al., *Crew resource management training in healthcare: a systematic review of intervention design, training conditions and evaluation*. BMJ Open, 2019. 9(2): p. e025247.
17. Alonso, A., et al., *Reducing medical error in the military health system: how can team training help?* Human Resource Management Review, 2006. 16(3): p. 396-415.
18. Alonso, A. and D. Dunleavy, *Building teamwork skills in health care: The case for coordination and communication competences*, in *Improving Patient Safety Through Teamwork and Team Training*, E. Salas and K. Frush, Editors. 2012, Oxford University Press: New York, USA. p. 288.
19. Salas, E., D.E. Sims, and C.S. Burke, *Is there a "Big Five" in teamwork?* Small group research, 2005. 36(5): p. 555-599.
20. TeamSTEPPS 2.0. *Agency for Healthcare Research and Quality*. 2012 Page last reviewed March 2019 [cited 2019 May 15]; Available from: <http://www.ahrq.gov/teamstepps/instructor/index.html>.
21. Kotter, J.P., *Leading change*. 2012, Boston, United States: Harvard Business Press.
22. WMA. *Declaration of Helsinki - Ethical principles for medical research involving human subjects*. 64th WMA General Assembly, Fortaleza, Brazil, October 2013. [cited May 07 2019]; Available from: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>

Table And Figures

Due to technical limitations, the table and figures are only available as downloads in the supplemental files section.

Supplementary Files

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