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Abstract

Purpose – This paper aims to test the effects on aspects of workplace communication relevant to teamwork, and social support, in hospital units, of a dialog training (DT) intervention based on knowledge of key quality aspects related to interpersonal work-related communication among healthcare workers.

Design/methodology/approach – A cluster randomized controlled study conducted among approximately 300 Swedish healthcare workers employed at ten hospital units. Workplace communication was measured in the form of participative safety, trust/openness, and social support. Effects were tested at three-month and six-month follow-ups. Repeated measurements were made.

Findings – The results indicated that DT had a positive influence on participative safety and social support from managers. A positive tendency was observed for trust/openness.

Originality/value – Developing and practicing good staff communication in hospital units is an important area for interventions designed to improve job performance and health.

Keywords Healthcare, Communication, Team learning

Paper type Research paper

1. Introduction

Communication, teamwork and social support: Good communication is an important resource in hospital units in terms of patient outcomes and safety as well as staff working environment and health (Eklöf *et al.*, 2014; Ezziane *et al.*, 2012; West *et al.*, 2006; West and Lyubovnikova, 2013; Wheelan *et al.*, 2003). Open and psychologically safe communication processes, and the availability of arenas for such processes, are important aspects of successful teamwork (Anderson and West, 1998; Ekvall, 1996; Gilley *et al.*, 2010; West and Lyubovnikova, 2013; Wheelan *et al.*, 2003). Poor teamwork has been found to be associated with an increased risk of psychiatric morbidity among hospital staff (Sinokki *et al.*, 2009). Conceptually, teamwork implies social support at work. Social support at work can be defined as access to help and support, a willingness to listen to problems and job-related feedback from colleagues and supervisors (House, 1981; Pejtersen *et al.*, 2010), and is beneficial in terms of mental health (Netterstrøm *et al.*, 2008). Adequate communication is necessary to request and provide social support.

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Good communication and good teamwork are also of importance for effective leadership in healthcare (Dellve and Wikström, 2009; Skagert *et al.*, 2008).

Characteristics of good communication in clinical teamwork: A review of research identified openness and space to talk about alternatives, while at the same time avoiding confrontation, conflict escalation and disharmony, as the characteristic feature of good communication in clinical teamwork (Ezziane *et al.*, 2012). This feature is also a key element in general team climate models (Anderson and West, 1998; Ekvall, 1996). Similar conclusions regarding the importance of good communication have been put forward in occupational health intervention research (Nielsen *et al.*, 2010; Nytrö *et al.*, 2000). Research on teamwork in general in healthcare contexts has also highlighted the importance of interacting face to face, as non-verbal signals could convey critical information (Eklöf *et al.*, 2014; Ezziane *et al.*, 2012; Gilley *et al.*, 2010). The dialog concept has been suggested as a model for good communication:

> […] a meeting with the other person face-to-face, which involves remaining in the tension between standing one's ground ("voicing") and at the same time being open to seeing things from the other person's viewpoint ("listening") (Grill *et al.*, 2014).

For a more in-depth introduction to dialog theory and perspectives on workplace learning, please refer to Grill *et al.* (2014, 2015).

A focus on common work goals is a feature of effective teams (Anderson and West, 1998; Ezziane *et al.*, 2012). Good, work-related communication thus focuses on workplace issues, not personal issues, when it comes to general individual attributes or personal relationships. Similarly, research into organizational renewal has concluded that common tasks and goals and their context are the areas that should be focused on in workplace development (Beer *et al.*, 1990).

Research (Argyris, 1993; Kluger and DeNisi, 1996) has emphasized that interpersonal feedback on work performance/behavior could counteract good communication, as it might possibly trigger defensiveness. Nevertheless, such feedback is a feature of social support at work (House, 1981; Pejtersen *et al.*, 2010) and may thus be an important feature of good workplace communication.

Research has also identified *obstacles to good workplace communication:* Grill *et al.* (2015) cited a number of aspects that have been identified in communication studies generally, namely, power asymmetry, organizational politics, defensive routines, stress-related cognitive impairment and lack of time and space to practice good communication due to acute situational work demands. Studies conducted in the Swedish healthcare system (Eklöf *et al.*, 2014; Grill *et al.*, 2011; Skagert *et al.*, 2008; Tengelin *et al.*, 2011) identified similar problems in hospital contexts.

Physicians and unit managers are key figures in hospital unit communication, but their participation in unit development work may be difficult to achieve due to prioritization and scheduling problems (Lindgren *et al.*, 2013; Skagert *et al.*, 2008). It is therefore important to empirically study interventions that are adapted to this realistic constraint.

Developing and practicing good staff communication in hospital units thus appears to be an important area for interventions aimed at job performance as well as health. It may be questioned, however, whether an intervention that is limited in scope in terms of time/volume and involvement of large parts of the hospital system can be sufficiently powerful to influence the conditions that counteract good communication. Will

obstacles to good workplace communication not neutralize attempts to change communication practice?

Desirable features of interventions for improved communication: In the light of the above, the research question in the present study was as follows: Based on knowledge of key quality aspects of interpersonal communication among healthcare workers, is it possible for occupational health consultants to make use of an intervention at the lowest level in the hierarchy to influence workplace communication in hospital units? Such an intervention should be founded on the features that are intrinsic to good communication and should include measures aimed at managing obstacles to good communication. It should feature face-to-face communication; it should concentrate on workplace issues, not private issues; it should focus on both voicing and listening; it should have mechanisms to create openness, including interpersonal, work-related feedback, as well as mechanisms to avoid defensiveness; and it should promote psychological safety. Actively involving unit managers and/or physicians adds power asymmetry to the intervention. Consequently, an intervention should involve the managers and (if practically possible) the physicians, but in roles that minimize the impact of power asymmetry.

Dialog training (DT) is a model for communication training in healthcare settings that is designed to incorporate the above features (Grill *et al.*, 2014; 2015); reference can also be made to the Section 2. An interview study among healthcare workers (Grill *et al.*, 2015) reported accounts of how DT could contribute to more open communication, greater trust and more awareness of norms and values that have a negative impact on teamwork. Grill *et al.* (2015) also identified phenomena that counteracted DT effects. These were associated with deeply rooted routines and norms that regulated how individuals and professions should relate and communicate, and also which issues were highly sensitive.

One notable feature of DT concerns the role of hospital unit managers. Their role is to listen to their subordinates without interfering (see Section 2). An interview study covering all the unit managers who took part in the present DT project (Grill *et al.*, 2014) included accounts of the managers learning about their subordinates' working conditions and their thoughts about work, as well as learning and practicing communication skills related to being receptive and better at listening and structuring conversations and which would be useful in everyday leadership. This learning could, however, prove stressful, and practicing new ways of communicating could be met with resistance.

The present cluster randomized intervention study investigated DT effects from a quantitative perspective and was performed in the group of healthcare workers from which the informants in Grill *et al.* (2014, 2015) were recruited. It studied the effects on communication-related factors at work, specifically openness and space for sharing information, talking about alternatives while avoiding confrontation, conflict escalation and disharmony and receiving social support from unit managers and colleagues.

1.1 Research questions and hypotheses

The research question in the present study was as follows: Based on knowledge of key quality aspects of interpersonal communication among healthcare workers, is it possible for occupational health consultants to make use of an intervention at the lowest level in the hierarchy to influence workplace communication in hospital units?

To operationalize workplace communication, the present study included two communication-related factors that are used in team research. The first is participative safety, which is characterized by the assessment that active participation and attempts to exert an influence, to interact and to share information and views are encouraged and that it feels psychologically safe to do so (Anderson and West, 1998). The second is trust/openness, which refers to emotional security in workplace relationships, openness in communication, active management of conflicts, interpersonal trust and freedom from explicitly negative communicative acts (Ekvall, 1996). We also studied social support at work, as this concept is related to the quality of communication.

Our hypotheses was that DT will have a positive effect on workplace communication in hospital units in terms of participative safety, trust/openness, social support from colleagues and social support from the unit manager. The hypotheses covered two time perspectives: three months post-training and six months post-training.

2. Method

2.1 Study design

The study was a cluster randomized controlled study that tested hypotheses about the effects of DT on participative safety and trust/openness (Section 2.4), referred to as communication factors, as well as social support among Swedish healthcare workers employed at ten care units. Units were recruited (for inclusion criteria, see Section 2.3: Unit recruitment and selection) in pairs (attempts were made to match the units within pairs based on size and the type of care, but this could not be fully achieved), and baseline measurements were made, after which units were randomly allocated within pairs to a DT condition or a control condition (see Section 2.2 and Table I). This meant that the intervention period was approximately two years, and that the influence of general fluctuations related to time was balanced between the intervention units and the

Pair	Study condition[a]	Hospital[b]	Type of care	n[c] List	Bl	3 mo.[d]	6 mo.[e]
1	Training	A	Psychiatry, outcare	24	23	22 (20)	19 (18)
	Control	A	Psychiatry, incare	21	16	12	9 (8)
2	Training	B	Orthopedics, incare	43	38	31 (30)	18 (17)
	Control	B	Medicine, incare	46	30	21 (18)	18 (16)
3	Training	B	Medicine, incare	43	35	24	18 (17)
	Control	A	Memory clinic	31	23	21 (20)	16 (15)
4	Training	C	Speech therapy	9	9	9 (8)	13 (8)
	Control	B	Child psychiatry, incare	26	19	18	12 (8)
5	Training	D	Intensive care	100	92	76 (75)	74 (71)
	Control	A	Intensive care	93	60	55	54 (44)
Training total				219	197	162 (158)	137 (131)
Control total				217	148	127 (122)	110 (95)
Total				436	345	289 (280)	247 (226)

Table I.
Characteristics of the participating units

Notes: [a]Cluster-randomization within pairs; [b]A: University hospital; B, C and D: Regional hospitals [c]Number on staff list; respondents at baseline (Bl), at three-month follow-up (3 mo.), and at six-month follow-up (6 mo.), respectively. [d]Number of individuals that also responded at Bl. in parentheses. [e]Number of individuals that also responded at Bl. and 3 mo. in parentheses

control units. Effects were tested at three-month and six-month follow-ups. Repeated measurements were used.

2.2 Intervention design and implementation

The basic idea behind performing a DT intervention in this study was to create an arena in which hospital unit staff, guided by a qualified specialist in group communication, could practice discussing topics pertinent to psychosocial working conditions. DT is also a form of leadership training with a focus on communication skills, specifically listening (see below). DT was designed to feature a number of communicative mechanisms: Face-to-face communication, voicing and listening, focusing on workplace issues, promoting psychological safety by managing openness and defensiveness, involving the unit manager and avoiding power asymmetry. The next section contains a brief description of the intervention process and its participants and indicates the communicative mechanisms that are addressed. For more details, see Grill *et al.* (2014, 2015).

2.2.1 The dialog training process, its participants and its mechanisms. The DT process started with a preparatory meeting between the unit manager and the DT trainer. Detailed information was provided about procedures and the inclusion criteria (see Section 2.3). The themes to be covered in the DT process were chosen by the manager. Mechanisms: Focusing on workplace issues; involving the manager.

The trainees were nurses, assistant nurses, administrators and various specialists (psychologists, counselors, speech therapists and physiotherapists) who worked at the units. See Table III for the distribution in the samples analyzed. It should be noted that physicians were not included due to the practical problems of scheduling physicians for this type of activity as physicians were not organized into units.

Two single training days (8 h/day) per group of six to eight persons were arranged, with a gap of approximately two months between the two days. The unit manager was present and listened but did not say anything. Mechanisms: Face-to-face communication; involving the manager; avoiding power asymmetry.

	Sample (mo)	DT (%)	Controls (%)
Registred nurses	3	52	40
	6	42	33
Auxiliary nurses	3	31	41
	6	26	35
Counsellor, dietician, occupational therapist, physiotherapist, psychologist, speech therapist	3	10	11
	6	18	22
Unit managers/supervisors	3	4	6
	6	4	6
Administrative staff	3	3	2
	6	8	4
Other	3	1	1
	6	2	0

Notes: [a]n = 280; [b]n = 226

Table II. Participants' professions in the three-month[a] and six-month[b] follow-up samples and the proportions belonging to the intervention group receiving DT and control group, respectively

DT used *standardized flashcards* with statements about typical issues pertinent to psychosocial working conditions. The cards were arranged into seven thematic areas: Leadership, social support, teamwork, change management/participation, quality, communication and workplace culture. Thematic areas were selected at the preparatory meeting. The cards were selected by those being trained at the start of each DT day. Mechanisms: Focus on workplace issues; avoiding power asymmetry.

The DT days consisted of a number of *dialogue rounds*. One card was used for each round. The first step in each DT round was for one person to agree or disagree with a statement on a card randomly drawn from the deck of selected cards, and to give a reason for their (dis)agreement by speaking about specific work situations. The next step was a group discussion about the specific situation(s) and the card statement. Finally, the group members summarized their discussion, and the unit manager took notes based on directives from the group. A new round then started. Mechanisms: Focus on workplace issues; avoiding power asymmetry; involving the manager; face-to-face communication; voicing and listening.

The role of the trainer was to stimulate dialogic discussions (a balance between voicing and listening), to clarify and stop non-dialogic discussion and to provide expert input relevant to what was happening in the DT process at that particular moment. The trainer also pointed out the importance of practicing voicing and listening between training days. Mechanisms: Promoting psychological safety by managing openness and defensiveness; voicing and listening; avoiding power asymmetry.

Trainers were licensed psychotherapists ($n = 4$) with experience of working with groups in workplace contexts. They were trained and supervised by an experienced DT specialist.

The role of the unit managers was to listen to the discussions (without speaking), to provide information when asked and to document the content of conversations based on directives from those being trained. The unit managers took part in all the training sessions at their units. This meant that the average time the unit managers spent in DT was six to eight full days. Mechanism: Avoiding power asymmetry.

2.2.2 Implementation. The implementation of DT was supervised by a DT specialist and the first author. No instance of failure to implement DT according to the manual was observed. However, practicing DT was generally speaking not easy, as the trainers faced resistance and uneasiness that put to the test their skills in promoting psychological safety by managing openness and defensiveness (Grill, 2014).

2.2.3 The control condition. Control units were visited by an experienced DT trainer who gave a presentation (approximately three hours) about dialog and workplace communication.

2.3 Participating units and individuals

The study was undertaken with participation by and financial support (for staff replacements during DT days) from the healthcare organization of the Västra Götaland Region in Sweden.

Unit recruitment and selection: Information about the DT study was distributed to unit managers via the line organization and human resource staff. The unit managers who expressed an interest, as well as their staff, were given detailed oral and written information by the first author about DT, the study design and the fact that participation would not entail any cost or extra working time. Unit level criteria for

inclusion were as follows: the unit manager expresses an interest in DT and there is also interest among the staff, there are no serious interpersonal conflicts within the unit and no reorganization of the unit is foreseen within one year. These criteria were applied for all units in this study, DT units as well as control units. The final decision regarding unit participation was taken by the unit manager. The criteria were met by 11 of the 26 units that were interested, and ten of these could participate within the timeframe of the project (Table I).

Individual-level recruitment and ethics: Individual-level recruitment took place through oral information at staff meetings from the first author and written information distributed to everyone on the staff lists. Individual study participation in the form of responding to questionnaires was voluntary. All study participants gave their informed consent to their participation. The study was approved by the Regional Research Ethics Committee in Gothenburg (No. 514-08).

Participation in DT was regarded as being part of unit development activities, i.e. a task decided by the unit manager. This meant that those being trained were not a biased selection of particularly dialog-minded persons working at the units. All but two participants from the DT group analyzed in this study participated in the DT. The two who did not participate were included in this study, as it concerned the workplace effects of the DT.

Data collection: Baseline data were collected before units were randomly allocated to DT or control conditions. Follow-up data from training and control units were collected three months and six months after the training. Questionnaires were distributed by mail to everyone on the staff list before the start of DT (baseline), at the first follow-up three months after completion of DT to those who responded at baseline and at the second follow-up three months later to those who responded to the first follow-up.

Response rates and analyzed samples: The baseline response rate (overall 79 per cent in relation to staff lists) was lower in the control group (68 per cent) than in the training group (90 per cent) (Table I). It should be noted that baseline measurements were made before randomization. The effect analyses used two samples: the three-month sample comprised those who provided data at baseline and at the first follow-up ($n = 280$; 81 per cent of the baseline sample; DT 80 per cent, controls 82 per cent). The six-month sample comprised the subgroup who also provided data at the second follow-up [$n = 226$; 66 per cent of the baseline sample; DT 64 per cent, controls 66 per cent (Table I)].

Dropout was mainly uncontrolled (no response), but in some cases, the person in question was on long-term leave, and in other cases, they had left the unit ($n = 42$), or stated explicitly that they did not wish to participate in the study ($n = 23$). The latter was indicated by the return of an empty questionnaire.

Nurses and auxiliary nurses were the most common professions (Table II). The gender distribution in the three-month sample was DT 94 per cent women, controls 88 per cent, and in the six-month sample, DT 86 per cent women, controls 84 per cent.

2.4 Measurement of communication factors and social support

Participative safety is characterized by the assessment that active participation, attempts to exert an influence, to interact and to share information and views, is encouraged and that it feels psychologically safe to do so (Anderson and West, 1998).

This was measured using a scale from the Team Climate Inventory (Agrell and Gustafson, 1994; Anderson and West, 1998). The eight items (Table III) were formulated as statements, and a five-point (1-5) agree–disagree response format was used. Cronbach's alpha was 0.90, 0.91 and 0.95 for baseline, three-month follow-up and six-month follow-up, respectively. Participative safety scores were computed as item means.

Trust/openness refers to emotional safety in workplace relationships. High scores indicate a perception of open communication, active management of conflicts and interpersonal trust. Low scores indicate a perception of "being talking about behind one's back", defensive communication and interpersonal distrust. It was measured using a scale from a Swedish version of the Situational outlook questionnaire (Ekvall, 1996; Isaksen *et al.*, 2000). The five items (Table III) were formulated as statements, and a four-point (0-3) disagree–agree response format was used. Cronbach's alpha was 0.82, 0.86 and 0.85 for baseline, three-month follow-up and six-month follow-up, respectively. Trust/openness scores were computed as item means.

Social support referred to help and support, willingness to listen to problems and job-related feedback from colleagues and supervisors. Social support from colleagues and supervisors was measured using two scales from the Copenhagen psychosocial questionnaire, 2nd version (Pejtersen *et al.*, 2010). The scales featured three items each, and the five-point response format was based on frequency, i.e. never–seldom–sometimes–often–always (1-5). Cronbach's alpha for social support from colleagues was 0.64, 0.70 and 0.74 for baseline, three-month follow-up and six-month follow-up, respectively. Corresponding figures for social support from managers were 0.81, 0.85 and 0.86. Factor scores were computed as item means.

Individual change scores for all the above factors were computed as the difference between baseline and each follow-up.

Table III. Exploratory factor analysis of communication factor items, varimax rotated solution

	Factor[a]	
	1	2
Participative safety items		
We share information in the team rather than keeping it to ourselves	0.79	
We have a "we are all in it together" attitude	0.71	
We all influence each other	0.72	
People keep each other informed about work-related issues in the team	0.81	
People feel understood and accepted by each other	0.70	0.41
Everyone's view is listened to, even if it is in a minority	0.59	0.42
There are real attempts to share information throughout the team	0.79	
There is a lot of give and take	0.69	0.41
Trust/openness items[b]		
One does not need to be afraid of "stabs in the back"		0.68
People do not engage in dirty talk behind the back		0.81
People trust each other	0.41	0.68
Conflicts and differences in view are treated openly and are usually cleared out	0.42	0.67
Contacts and conversations between people are open and straightforward	0.37	0.70

Notes: [a]Factor loadings > 0.35 shown; [b]First author's translation from Swedish

2.4.1 Conceptual distinctness of the communication factors. The theoretical definitions (see above) as well as the items on the participative safety and trust/openness scales (Table III) were semantically similar, but the latter scale had items that were more negatively worded, implying "darker" or more emotionally charged aspects of communication. To explore the conceptual distinctness of the scales from a statistical perspective, all the items were factor analyzed (principal components, roots >1, varimax rotation, loadings >0.40), interpreted (Gorsuch, 1983) using the baseline sample. Two rotated factors emerged that explained 61 per cent of the variance (Table III). An interpretation based on factor loadings >0.40 suggested that participative safety and trust/openness could be interpreted as concepts that were different yet related. The unique features of participative safety are information sharing, mutual influence and a sense of having a common task, and the unique features of trust/openness are openness and freedom from explicitly negative communicative behaviors (Table III).

2.5 Data analysis

To avoid normality assumptions regarding the change variables and to reduce regression-to-the-mean effects of extreme change scores, the statistical effect model was non-parametric and was based on ranked, within-individual change scores. Effect analyses used two-sided Mann–Whitney U-tests to compare differences between the intervention and control groups with regard to the change between baseline and the three-month follow-up and between baseline and the six-month follow-up. The limit of statistical significance was set at $p < 0.05$.

3. Results

The hypothesis that DT would have an effect on participative safety was supported. The effect was strongest at the six-month follow-up (Table IV).

The hypothesis that DT would have an effect on trust/openness was not supported at $p < 0.05$. The observed tendency was in favor of DT (Table V).

The hypothesis that DT would have an effect on social support from colleagues was not supported (Table VI).

The hypothesis that DT would have an effect on social support from supervisors was supported at the six-month follow-up (Table VII).

4. Discussion

4.1 Results

The results indicated that it was possible for occupational health consultants to influence communication factors and social support with an intervention, i.e. DT, based on knowledge of key quality aspects of hospital communication implemented at the lowest level in the hospital hierarchy. Specifically, the results indicated that DT positively influenced participative safety and social support from managers. The hypothesis concerning the effect on trust/openness was not supported, although a positive tendency was observed.

Results suggested that DT was successful mainly in the way it affected information sharing, mutual influence and a sense of having a common task, i.e. the unique features of participative safety. DT appeared to be less powerful in affecting openness with regard to more interpersonally charged issues and freedom from explicitly negative communicative behaviors (unique features of trust/openness). This may be understood in the light of the fact that work in hospital units can be psychologically demanding (Eklöf *et al.*, 2014; Kivimäki *et al.*, 2010). This

Table IV.
DT effects on participative safety at three- and six-month follow-ups, respectively

	N	Baseline mean	Mean change (min; max)[c]	Mean rank for change	Mann–Whitney U (*p*)
Total baseline group	345	3.58			
Baseline to 3 mo.[a]					
DT	158	3.66	0.07 (−1.88; 2.00)	149.70	8185 (0.030)
Control	122	3.53	−0.09 (−2.25; 1.88)	128.59	
Baseline to 6 mo.[b]					
DT	131	3.68	0.04 (−2.38; 1.63)	124.43	4791 (0.003)
Controls	95	3.57	−0.20 (−2.50; 1.63)	98.43	

Notes: [a]Three-month sample; [b]six-month sample (see Section 2.3) [c]Could vary ± 4

contributes to stress and stress contributes to interpersonal conflict and even processes that ultimately result in bullying (Samnani and Singh, 2012). Under such conditions, emotionally charged topics may tend to be avoided in open communication. In the light of this, it is worth noting that the results at the six-month follow-up suggested that DT may have had a delayed effect on trust/openness, which may have been preceded by positive changes in participative safety.

The above discussion concerning communication factors is supported by a qualitative interview study conducted among participants in the present DT study. Grill *et al.* (2015) reported accounts of more open communication, more trust and more awareness of norms and values that were negative for teamwork. Grill *et al.* (2015) also identified phenomena that DT participants perceived as being counteractive to good workplace communication. These were related to deeply rooted routines and norms that regulated how individuals and professions should relate and communicate and which issues were highly sensitive.

Another non-supported hypothesis concerned social support from colleagues, implying that this measure was sensitive to work aspects that could not be influenced by communication training alone. Stressful working conditions may have made it difficult in practice for the healthcare workers to provide social support to colleagues.

The effect observed for social support from a manager merits special attention. To manage a hospital unit, the manager must be aware of which issues and views are of concern among the staff. Unit managers spent several whole days listening (without interfering) to their subordinates' discussions about issues related to work at their unit. They also observed dialog trainers in action (a form of role modeling). DT could thus be regarded as a form of leadership development. An interview study featuring all DT unit managers who took part in the present study (Grill *et al.*, 2014) reported managers' accounts of learning about their subordinates' working conditions and thoughts about work. The accounts also included the opportunity for the managers to learn and practice communication skills related to being better at listening, structuring discussions and being receptive and which are useful in everyday leadership. However, this learning

	N	Baseline mean	Mean change (min-max)[c]	Mean rank for change	Mann–Whitney U(p)
Total baseline group	343	1.47			
Baseline to 3 mo.[a]					
DT	158	1.53	0.02 (−1.80; 1.60)	147.40	8548 (0.102)
Controls	122	1.40	−0.12 (−2.20; 1.80)	131.56	
Baseline to 6 mo.[b]					
DT	130	1.55	−0.08 (−2.00; 2.00)	119.77	5295 (0.066)
Controls	95	1.43	−0.20 (−1.60; 2.00)	103.74	

Notes: [a]3-month sample; [b]6-month sample (See 2.3) [c]could vary ± 3

Table V. DT effects on trust/openness at three- and six-month follow-ups, respectively

could also be stressful, and practicing new ways of communicating could be met with resistance.

It is worth noting that the effect on participative safety, as well as the observed inclination toward trust/openness, tended to increase between the three-month and six-month follow-ups, and that the effect on social support from managers was observed at the last follow-up. These observations suggest that positive intervention effects could be transferred from DT to unit practice and are not doomed to be neutralized by workplace factors that are unfavorable for good communication, at least within a six-month perspective. We strongly emphasize, however, that DT is designed to be a form of ongoing training and that it acknowledges the eroding effects on workplace communication caused by the factors mentioned in the Section 1.

4.2 Limitations

It should be noted that our definition of "workplace communication" was narrow. It concerned aspects that research into team effectiveness has found to be important; in our case participative safety and trust/openness.

The controlled design and cluster randomization were strengths of the present study, although it was only possible to recruit a limited number of units to be randomized. Because of unit-specific conditions and conditions related to the type of care and the hospital the units belonged to, it cannot be ruled out that the intervention and control groups were not equivalent at baseline. The response rate at baseline was lower among the controls, and the baseline values for communication factors and social support were less favorable. This may suggest that within this group, there could have been conditions that were less favorable for the development of communication and social support from the managers and which also made responding to a questionnaire less likely. Consequently, it cannot be ruled out that in this respect, the study was biased in favor of DT. On the other hand, as the control condition had lower baseline values for communication factors and social support, the regression effect (Bland and Altman, 1994) would have deflated observed training effects and may thus have balanced out selection bias in favor of DT.

Table VI.
DT effects on social support from colleagues at 3- and 6-month follow- ups, respectively

	N	Baseline mean	Mean change (min-max)[c]	Mean rank for change	Mann–Whitney U(p)
Total baseline group	342	3.41			
Baseline to 3 mo.[a]					
DT	159	3.49	0.00 (−1.33; 1.67)	142.62	9283 (0.61)
Controls	121	3.36	−0.03 (−1.67; 1.33)	137.71	
Baseline to 6 mo.[b]					
DT	130	3.51	−0.09 (−1.67; 1.33)	111.79	6018 (0.84)
Controls	94	3.40	−0.04 (−1.67; 1.67)	113.48	

Notes: [a]3 month sample; [b]6-month sample (See 2.3) [c]could vary ± 4

The individuals who were trained were not a selection of particularly dialog-minded workers at the DT units. Although this made the design more realistic for a study of a workplace, a drawback was that it could have meant that those being trained who were more negative to DT did not respond to follow-up questionnaires, biasing the DT group data toward the positive.

The idea that our positive results should be due to higher initial probability of positive development in the DT group should be viewed in the light of the fact that our inclusion criteria, which were checked during meetings with managers and staff, meant that there should be no major conflicts and organizational instability at the units, and the observation that baseline measurements for communication factors and social support were not dramatically different.

Another issue concerning internal validity is the possibility that the more intense attention that was paid to the DT groups, in comparison to controls, may have accounted for the observed DT effects, a so-called Hawthorne effect (Kompier, 2006). A recent review (McCambridge *et al.*, 2014) found inconsistent evidence for a Hawthorne effect and concluded that little is known about under what conditions it may operate and its magnitude. Against this background, any discussion about how seriously the internal validity of the present study is threatened by any Hawthorne effect is speculative, but the possibility should be acknowledged. We argue that, as attention was an essential feature of DT (Section 2.2.1.), it would be meaningless to control for it.

In summary, there were conditions that could have biased our results in both directions. This implies that our results should be interpreted with caution. However, our results on the whole, combined with the qualitative studies by Grill *et al.* (2014, 2015), indicate that DT can help to achieve better communication and better support from the unit manager for healthcare workers. However, it should be emphasized that one of the requirements when considering DT is that there should be no major problems regarding the psychosocial climate at the workplace in question.

Effect analyses were made on the individual level, and no attempt was made to measure communication factors on an aggregated level, as is the case in climate research (Schneider

	N	Baseline mean	Mean change (min-max)[c]	Mean rank for change	Mann–Whitney U (*p*)
Total baseline group	341	3.16			
Baseline to 3 mo.[a]					
DT	159	3.29	−0.11 (−3.00;1.33)	145.52	8662 (0.183)
Controls	120	3.04	−0.18 (−2.33;2.33)	132.68	
Baseline to 6 mo.[b]					
DT	130	3.33	−0.03 −2.00;1.33)	122.86	4634 (0.003)
Controls	93	3.02	−0.34 (−3.67;2.00)	96.82	

Notes: [a]Three-month sample; [b]six-month sample (see Section 2.3) [c]could vary ± 4

Table VII. DT effects on social support from supervisor at 3 - and 6 month follow ups, respectively

et al., 2013). The large number of staff at most units, in combination with individual working schedules, meant that stable within-unit teams did not exist, making it impossible to identify climate-carrying sub-units that could be meaningfully compared from a sociopsychological, group-level climate perspective.

A study based on measurements aggregated at the unit level would have required a larger number of units than was possible to recruit for the present study. This problem was due in part to resources within the research project, although there were also recruitment difficulties related to the inclusion criteria, which required the units to be relatively stable in terms of organization and that the managers should have sufficient time to take part in the training. Hospital reorganizations are common, and lack of time is an acknowledged problem among Swedish hospital unit managers (Skagert *et al.*, 2008). This implies a serious problem for interventions in workplace communication. Organizational instability is in itself a threat to good communication and makes interventions aimed at improving communication difficult.

Finally, it should be noted that the present DT study did not involve physicians, who are an important group in healthcare communication (Eklöf *et al.*, 2014). Involving physicians in unit-level communication improvement is a challenge in itself (Lindgren *et al.*, 2013), and the effects of DT featuring physicians merits further research.

Considering the threats to validity discussed above, one could question the meaningfulness of trying to achieve experimental control in complex working systems (Griffiths, 1999; Nielsen and Randall, 2013). Complementary studies are desirable. In the case of DT, two qualitative studies are available (Grill *et al.*, 2014, 2015) that present experiences from DT participants.

Further research into interventions similar to DT should give more attention to organizational and social factors that has been shown to be relevant when designing and interpreting (quasi) experimental studies in workplace contexts, i.e. the organizational context and its power structures, how the intervention is understood and appraised by individuals and stakeholder groups, and include different approaches to effect study (Nielsen and Abildgaard, 2013; Nielsen and Randall, 2013). This implies complex study designsand substantial support from the organizations under study. The present

study, however, indicates that a structured intervention into workplace communication relevant for teamwork, despite the complexity of its organizational context, may have effects in its local context and in a short-time perspective.

5. Conclusion

Communication among healthcare workers can be influenced positively by DT, i.e. an intervention founded on face-to-face communication, focusing on workplace issues and featuring the practicing of voicing and listening combined with mechanisms to avoid defensiveness and negative influence from power asymmetry. The results, combined with the qualitative study by Grill *et al.* (2014), also suggest that DT can help achieve better social support from the unit manager. It should be emphasized that one of the requirements when considering DT is that there should be no major problems regarding the psychosocial climate at the workplace in question.

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