A quantitative study on personnel's experiences with patient handovers between the operating room and the postoperative anesthesia care unit before and after the implementation of a structured communication tool

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Abstract

Postoperative handover of patients has been described as a complex work process challenged by interruptions, time pressure and a lack of supporting framework. The purpose of this study was to investigate involved personnel's experiences with the quality of patient handovers between the operating room and the postoperative anesthesia care unit (PACU) before and after implementation of a structured tool for communication. The study was conducted in a hospital in South-eastern Norway. Personnel completed a questionnaire before (n=116) and after (n=90) implementation of the Identification-Situation-Assessment-Recommendations (ISBAR)- tool. Analysis included summative statistics, t-tests and generalized linear regression analysis. Statistical significance assumed at $P < 0.05$.

The overall impression of quality in handovers improved significantly after implementation of the ISBAR ($P = 0.001$). Personnel's experiences were improved in relation to that handovers followed a logical structure, available documentation was used and all relevant information was communicated ($P < 0.001$). Moreover, personnel found it easier to establish contact at the beginning of the handover, ambiguities were resolved and documentation was more complete ($P = 0.001$). *Profession* was associated with seven of the statements, relating to whether relevant information is clearly communicated, whether possible risks and complications are discussed, contact easily established, and to completeness of documentation and information. In addition, findings indicate significantly more negative experiences among receiving personnel both pre- and post-implementation.

Implementation of a structured tool for communication in patient handovers, may

improve quality and safety in patient handovers between the operating room and the PACU. Research is needed to define optimal patient handovers and to determine the effect of handover quality on patient outcomes.

Introduction

The risks associated with perioperative care and anesthesia do not end when the patient leaves the operating room- the potential for complications continues during the patient transfer to the postoperative anesthesia care unit (PACU).¹ In the PACU, patient care is transferred from the Nurse Anesthetist (NA)/Anesthesiologist/Surgical Nurse (SN) to a PACU Registered Nurse (RN) or Critical Care Nurse (CCN). The handover is usually completed at the patient's bedside, with the NA/SN verbally reporting to the RN/CCN. The handover includes the exchange of essential medical information, which occurs throughout all phases of care, and is at risk of degradation and miscommunication.² During the recovery period, the patient is at risk of potential complications after surgery or anesthesia. Furthermore, patients are often subject to a downscale in monitoring and observation, which makes them vulnerable to incidents and errors.^{1,3,4} Postoperative handover of patients have been described as a complex work process challenged by interruptions, time pressure and a lack of supporting framework.³

According to the Joint Commission approximately 80% of medical errors are due to communication failure during the patient transfer process.⁵ Nagpal *et al.*⁶ found that only 55.8% of all relevant information is transferred from the operating room to the PACU. Moreover, studies have shown that the verbal information transfer are unstructured, and that important information is omitted.^{7,8} Poor communication and incomplete transfer of information may threaten patient safety, and may lead to unplanned readmissions and adverse events.^{9,10}

Studies suggest that the use of a checklist during handovers could help providers correctly exchange information and increase the adequacy for nurse receivers.¹ The Situation, Background, Assessment and Recommendation (SBAR) tool has become the Joint Commission's suggested best practice for standardized communication in healthcare, structuring critical verbal information, and is also recommended by the World Health Organization (WHO).¹¹ The Identification-Situation-Background-Assessment-Recommendation (ISBAR) – a

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variant of the SBAR – is utilized in hospitals, *e.g.* in Denmark and Australia.¹²⁻¹⁴

Recent studies have mainly been conducted on handovers between *e.g.* ambulance personnel and the emergency department, from specialist- to primary healthcare services or between in-hospital personnel shifts.^{15,16} A systematic review of the literature found 31 studies examining postoperative handoffs.⁴ Of these, only four studies included an intervention to improve the process.

Aims

The study was grounded in feedback from PACU nurses that the quality of patient handovers needed improvement, especially related to transfer of sufficient and critical information. Consequently, the study aims were: i) to investigate the personnel's experiences with the quality of patient handovers between the operating room and the PACU before and after implementation of a tool aiming at improving communication during patient handovers (the ISBAR); ii) to investigate whether there were different experiences with patient handover quality among transferring and receiving personnel; iii) to investigate whether factors such as gender, age, professional background and years of experience were associated with these experiences.

Materials and Methods

The study had a cross-sectional, quantitative design, with two points of measurement, using a questionnaire to investigate personnel's experiences with patient handovers.

Setting and participants

The study was conducted in a hospital in a county in South-eastern part of Norway, which has a catchment area of approximately 290,000 inhabitants. The surgical ward in the hospital conducts about 8000 acute or elective surgical interventions each year, distributed on different specialties; gastroenterology, gynaecology, endocrinology, mammae surgery, urology, orthopedics, ear/nose/throat- and vascular surgery, as well as trauma surgery. The PACU is located in immediate proximity to the operating room.

A consecutive sampling method was used: All the NAs, anesthesiologists, SNs, RNs and CCNs involved in patient handovers were invited to participate in a questionnaire study before and after implementation of the ISBAR tool. Table 1 gives an overview of respondents' professional background, age and years of experience pre- and post-implementation (Table 1). There were significant differences in gender pre- and post implementation, with 75.7% female pre-, and 87.4% post-implementation ($P < 0.001$). Only one anesthesiologist responded to the questionnaire (pre-intervention), and has been excluded from the analysis.

Procedure

The operating room and PACU personnel were informed about the study aims and procedures during professional meetings. In addition, all personnel received email information, and information was included in weekly newsletters sent out by leaders in the respective wards.

Questionnaires were printed out in paper and delivered to all personnel directly involved in patient handovers. Completed questionnaires were returned in a sealed box in a room at each ward, and collected by researchers once a week. Reminders to complete the questionnaire were sent out twice by email, to all of the invited personnel, before end of data collection.

The pre-implementation questionnaire study was conducted over three weeks, in January 2017. The questionnaire study was repeated six months after implementation, in November 2017.

Implementation

The implementation of the ISBAR tool was conducted in three phases.

Development and local adjustment

The ISBAR tool was based on the translated version implemented in Rikshospitalet, Oslo University Hospital, and locally adapted by the research group, which consisted of one NA, one SN, one CCN as well as the project leader/first author, also NA. Before implementation, the ISBAR was sent out to five NAs, five SNs and five CCNs respectively, to test the face- and content validity of the tool, assessing the adequacy, appropriateness and understandability of the tool as well as language and usage instructions.¹⁷ This revealed no problematic issues in any of these aspects.

Education of involved personnel

Coursing was conducted by members of the research group during personnel meetings, as well as through information distributed by email.

Implementation (April 2017)

This included information to leaders as well as surgeons which could possibly be affected by the process, due to a potentially longer handover time. Moreover, a resource group with CCNs was established, taking part in patient handovers the two first weeks of the implementation, in addition to members from the research group.

The questionnaire

A handover quality rating form (HQRF) developed by Manser *et al.*,^{18,19} and translated to Norwegian by Reine *et al.*²⁰ (the N-HQRF) was used. The questionnaire includes three factors predicting handover quality: *information transfer*, *shared understanding* and *working atmosphere*. The N-HQRF consists of 19 statements. Response alternatives are *agree*, *partly agree*, *partly disagree* and *disagree*. Since the questionnaire was adjusted to our purpose, we chose to conduct a repeated test of face- and content validity as described with the ISBAR (piloted to 5 NAs, 5 SNs, 5 CCNs), revealing no problematic issues related to adequacy, appropriateness and understandability of the tool, as well as language.

The questionnaire also included information about professional background, years of experience from the current ward (0-2, 3-5, 6-9, 10 or more), gender and age.

The post-intervention questionnaire also included a question whether ISBAR was used in patient handovers, and whether the respondent perceived that using the

ISBAR has led to safer and higher quality patient handover.

Internal consistency of the N-HQRF was assessed by Cronbach's $\alpha = 0.7$, which is assumed acceptable.²¹

Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 24 (IBM Corporation, IBM SPSS Statistics for Windows, Version 21.0. New York, Armonk, 2012).

Answers were dichotomized into either *positive* or *negative* experiences: *Agree* and *partly agree* were collated, as well as *disagree* and *partly disagree*. Summative statistics were used to present characteristics of the sample. T-tests were used to present differences pre- and post-implementation and between personnel. A generalized linear regression model using profession, age, gender and years of experience as independent variables, and each statement as dependent variables was used to detect factors associated with experiences. Significance was assumed at $P < 0.05$.

Ethical considerations

The Regional Committee for Medical and Health Research Ethics in Norway judged the study as quality improvement (ref. no. 2016/2104A). Approval was sought and received from the Norwegian Social Sciences Data Services (ref. no. 51479).

The study was based on the principles in the declaration of Helsinki,²² on voluntary participation, anonymity, and confidentiality. It is not possible to recognize any of the respondents in the study results. Consent was assumed when respondents completed and returned the questionnaire.

Results

As described in Table 1, there were no significant differences between the transferring and receiving ward in the pre- and post-implementation study regarding age or years of experience.

Comparison of pre- and post-intervention responses

Significant differences on the questionnaire statements pre- and post-implementation of the ISBAR are presented in Table 2.

Table 2 shows that the overall impression of quality in handovers improved significantly ($P = 0.001$). Personnel's experiences were improved in relation to that handovers followed a logical structure, available documentation was used and all relevant information was communicated

($P<0.001$). Moreover, personnel found it easier to establish contact at the beginning of the handover, ambiguities were resolved and documentation was more complete ($P=0.001$).

Differences between personnel pre- and post-implementation

Table 3 gives an overview of significant differences between transferring and receiving nurses pre- and post-implementation (Table 3).

Table 3 shows that receiving nurses had significantly more negative experiences on six of the statements, related to completeness of information and utilization of available documentation. Transferring nurses experienced to a larger extent that it was difficult to establish contact at the beginning of handovers.

Experiences with the ISBAR tool

Approximately 91% of transferring personnel claimed to be using the ISBAR in patient handovers, and this was supported by 96.7% of receiving personnel stating that the transferring personnel used the ISBAR. The effect of using the ISBAR was indicat-

ed through that 92.1% stated that ISBAR had led to a better and safer patient handover. Nevertheless, 13.6% claimed that ISBAR did not have any effect on patient safety or quality in patient handovers.

Factors impacting the experiences

Few significant associations were identified. The statement *The person handling over the patient is under time pressure* was negatively associated with years of experience ($P=0.008$).

Profession was associated with seven of the statements; namely *All relevant information is selected and communicated* (Beta=0.06 (Standard Error (SE)=0.03), $R^2=0.07$, $P=0.02$), *The person handling over the patient communicate her/his assessment of the patient clearly* (Beta=0.09 (SE=0.03), $R^2=0.08$, $P=0.04$), *Possible risks and complications are discussed* (Beta=0.12 (SE=0.03), $R^2=0.09$, $P<0.001$), *It is easy to establish good contact at the beginning of a handover* (Beta=-

Table 1. Respondents' professional background, age and years of experience pre- and post- implementation.

		Pre (n=116)	Post (n=90)	P-value
Transferring	NA	62.5	25	0.65
	SN	42.4	45	
Receiving	CCN/RN	63.6	50.5	
Age (mean)		48.0	47.4	0.94
Experience (years)	0-2	14.7	0-2	0.73
	3-9	31	3-9	
	10+	53.4	10+	

NA, nurse anesthetist; SN, surgical nurse; CCN, critical care nurse. RN, registered nurse. Proportion of the population in percentage. Transferring: transferring ward – the operating personnel room. Receiving: receiving ward – the postoperative anesthesia care unit personnel. Experience: respondents' work experience from current ward, in years, reported in percent. Significance level, $P<0.05$. Independent samples t-test, equal variances assumed.

Table 2. Significant differences pre- and post- implementation.

Statement	Pre (n=116)		Post (n=90)		P-value
	Often/Agree	Seldom/Disagree	Often/Agree	Seldom/Disagree	
The person taking over the responsibility is under time pressure	69.7	30.3	60.5	39.5	0.01
The handover followed a logical structure	81.2	18.8	97.8	2.2	<0.001
The person handling over the patient continuously used available documentation to structure the handover	47	57.3	85.7	14.3	<0.001
All relevant information is selected and communicated	87.6	12.4	97.8	2.2	<0.001
It is easy to establish good contact at the beginning of a handover	81.2	18.8	89.1	10.9	0.001
Questions and ambiguities are resolved	87.8	12.2	95.6	4.4	<0.001
The team jointly assure that the handover is complete	53.8	46.2	73.3	26.7	<0.001
Documentation is complete	73.3	26.7	91	9	<0.001
The patients' experience is considered carefully during handover	69	31	77.3	22.7	0.007
Overall, the quality of the handovers is very high	82.6	17.4	93.3	6.7	<0.001

Proportion of responses in percent. Significance level, $P<0.05$. Independent samples t-test, equal variances assumed.

Table 3. Significant differences between transferring and receiving personnel pre- and post implementation.

Statement	Transferring	Pre		P-value	Transferring	Post		P-value
		Receiving				Receiving		
Available documentation used for structure	2.4 (0.09)	2.7 (0.08)	0.01		-	-	-	
Relevant information communicated	1.8 (0.07)	2.1 (0.06)	<0.01		1.8 (0.06)	2.0 (0.05)	0.04	
Possible risks discussed	2.2 (0.09)	2.6 (0.07)	<0.01		2.2 (0.08)	2.6 (0.08)	<0.001	
Easy to establish contact	2.3 (0.08)	2.1 (0.03)	0.03		2.1 (0.1)	1.9 (0.06)	0.04	
Documentation complete	1.8 (0.07)	2.5 (0.06)	<0.01		1.9 (0.07)	2.1 (0.05)	0.001	
Too much information	2.9 (0.07)	3.2 (0.06)	<0.01		-	-	-	
Overall, the quality of the handovers is very high	2.0 (0.07)	2.2 (0.06)	0.03		-	-	-	
Attempts are made to minimize interruptions	-	-	-		2.5 (0.1)	2.2 (0.06)	0.03	

Responses in mean, standard error in parenthesis. 1=always, 2=often, 3=seldom, 4=never. Significance level, $P<0.05$. Independent samples t-test, equal variances assumed.

0.05 (SE=0.02), $R^2=0.05$, $P=0.045$), *Documentation is complete* (Beta=0.12 (SE=0.03), $R^2=0.09$, $P<0.001$), *There is too much information given* (Beta=0.09 (SE=0.03), $R^2=0.08$, $P=0.001$), and *Too much information is asked for* (Beta=0.09 (SE=0.03), $R^2=0.07$, $P=0.001$).

Discussion

Results indicate that implementation of the ISBAR tool in handovers of patients between the operating room and the PACU improve quality and safety. Personnel's experiences were improved in relation to that handovers followed a logical structure, available documentation was used and all relevant information was communicated after implementation of the ISBAR tool. Moreover, personnel found it easier to establish contact at the beginning of the handover, ambiguities were resolved and documentation was more complete. Receiving personnel reported of more negative experiences with patient handovers than transferring personnel.

Results indicate that both transferring and receiving personnel had more positive experiences with patient handovers after implementation of the ISBAR tool. The experience of overall patient handover quality increased from 82.6% to 93.3%. Handovers followed a more logical structure, available documentation was used and all relevant information was communicated after implementation of the ISBAR tool. This is in line with earlier studies, showing that standardized handover tools result in better flow of information, a reduction in omission of relevant information and an increase in involved personnel satisfaction.^{3,6,20,23} In addition, studies have shown a decrease in number of defects per handoff.²³ This aspect was not approached in the current study.

Moreover, personnel found it easier to establish contact at the beginning of the handover, ambiguities were resolved and documentation was more complete. This has also been suggested in studies indicating that structured communication tools have a positive effect on teamwork.^{3,6}

Initiating a project focusing on improving patient handover may have led to an increased emphasis among personnel. In addition, the study was grounded on input from receiving personnel that improvement was needed. Nevertheless, e.g. Cornell *et al.*²⁴ found that using SBAR helped nurses to be more focused and spend less time during handovers. However, Petrovic *et al.*²³ found that the mean duration of handoffs increased by 2 minutes ($P<0.01$).²³ We did

not include information about the time aspect in the current study.

Post-implementation findings may have been affected by other factors, due to the implementation itself. Implementation science literature suggests that there are many factors that can impede implementation of a new program, e.g., resources, leadership support or communication.^{25,26} During implementation, more personnel were present in the PACU ward, posters with information were placed in the ward, leaders supported the implementation (and ice-cream was served at the end of the two first weeks). A study on implementation challenges showed that communicating with team members and other areas in the organization, utilizing information technology solutions, creative use of staff and flexible schedules, and obtaining additional resources are factors that decrease implementation challenges.²⁷

Moreover, results show that receiving personnel had more negative experiences regarding safety and quality of patient handovers. This was related to if available documentation was used and complete, if relevant information was communicated, and possible risks discussed. This relation is also identified in the analysis of factors associated with personnel's experiences, since *profession* was significantly associated with seven of the statements. This is in line with studies showing that transferring and receiving nurses have different expectations concerning content and timing of information, and that transferring nurses have more positive evaluations of handover quality compared with the receiving nurses.^{7,20,28} Moreover, differences has been found between health professions in terms of how effectively they hand over the patient, and on the awareness of severity of adverse events relating to poor handovers.²⁸ The explanation to this may be that receiving personnel is taking over the responsibility for the patient, and hence have a greater need to have the total overview of the patients' condition.

Limitations

One limitation could be that different personnel were included in the pre- and post-implementation phases. Nevertheless, few significant differences between the two groups were identified (only gender). The sample sizes pre- and post-implementation were also relatively small, and few were men. The study took place in one hospital only, hence findings may not be generalizable to other wards and settings.

Moreover, the post-implementation questionnaire study was conducted only six months after implementation of the ISBAR.

Studies have shown that the use of checklists in healthcare represents challenges with implementation and compliance,²⁹⁻³¹ which has also been shown when implementing the ISBAR.³²⁻³⁴ Results could have been different if we had conducted the post-implementation study at a later point.

We did not compare the ISBAR tool with other approaches to improving patient handovers, or focus on patient outcomes such as patient mortality or morbidity. This would be interesting to include in further studies of quality and safety in patient handovers between the operating room and the PACU. It is also possible that the positive changes was due to the Hawthorne effect.³⁵

Conclusions

Results indicate that implementation of a structured tool for communication in patient handovers, such as the ISBAR, may improve quality and safety in handovers of patients between the operating room and the PACU. Moreover, this may positively impact personnel's experiences with different aspects of the handover, such as teamwork. Innovative research is needed to define optimal patient handovers and to determine the effect of handover quality on patient outcomes.

References

1. Robins H, Dai F. Handoffs in the postoperative anaesthesia care unit: use of a checklist for transfer of care. *AANA J* 2015;83:264-8.
2. ElBardissi A, Regenbogen S, Greenberg C, et al. Communication practices on 4 Harvard surgical services: a surgical safety collaborative. *Ann Surg* 2009;250:861-5.
3. Møller T, Madsen M, Fuhrmann L, Østergaard D. Postoperative handover: characteristics and considerations on improvement. A systematic review. *Eur J Anaesth* 2013;30:229-42.
4. Segall N, Bonifacio A, Schroeder S. Can we make postoperative patient handovers safer? A systematic review of the literature. *Anesth Analg* 2012;115:102-15.
5. Joint Commission. Joint Commission introduces new, customized tool to improve hand-off communications. 2012. Available from: <http://www.joint-commission.org/issues/article.aspx?Article=RZiHoUK2oak83WO8RkCmZ9hVSIJT8Zbrl4NznZ1LEUK%3D>.
6. Nagpal K, Abboudi M, Manchanda C,

- et al. Improving postoperative handover: a prospective observational study. *Am J Surg* 2013;206:494-501.
7. Smith A, Pope C, Goodwin D, Mort M. Interprofessional handover and patient safety in anaesthesia: observational study of handovers in the recovery room. *Br J Anaesth* 2008;101:332-7.
 8. Siddiqui N, Arzola C, Iqbal M, et al. Deficits in information transfer between anaesthesiologists and postanesthesia staff: an analysis of patient handover. *Eur J Anaesthesiol* 2012;29:438.
 9. Naylor M. Nursing intervention research and quality of care: influencing the future of healthcare. *Nurs Res* 2003;52: 380-5.
 10. Alper E, O'Malley T, Greenwald J. Hospital discharge and readmission. UpToDate 2017 [Epub ahead of print].
 11. World Health Organization (WHO). Human factors in patient safety. Review of topics and tools. Report for methods and measures working group of WHO patient safety. WHO: Geneva, Switzerland; 2009. Available from: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiI_7PPxs3iAhUowqYKHdTzCtwQFjAAegQIAxAC&url=https%3A%2F%2Fwww.who.int%2Fpatient-safety%2Fresearch%2Fmethods-measures%2Fhuman_factors%2Fhuman_factors_review.pdf&usg=AOvVaw3Q_ZMIKGNnTY8Dy9EyEQ6N
 12. Department of Health and Ageing, Government of South Australia. ISBAR. A standard mnemonic to improve clinical communication. Australia: SA Health; 2011. Available from: <https://www.sahealth.sa.gov.au/wps/wcm/connect/public/content/sa+health+internet/resources/isbar+a+standard+mnemonic+to+improve+clinical+communication>
 13. Andreoli A, Fancott C, Velji K, et al. Using SBAR to communicate falls risk and management in inter-professional rehabilitation teams. *Healthc Q* 2010;13:94-101.
 14. Dansk Selskab for Patientsikkerhed. [Håndbog i sikker mundtlig kommunikation]. 2007. Available from: <http://www.patientkommunikation.dk/media/1078/smk-haandbogen.pdf>
 15. Wood K, Crouch R, Rowland E, Pope C. Clinical handovers between pre-hospital and hospital staff: literature review. *Emerg Med J* 2015;32:577-81.
 16. Humphries C, Jagnathan S, Penniyammakal J, et al. Investigating clinical handovers and healthcare communication for outpatients with chronic disease in India: a mixed-methods study. *PLoS One* 2018;13:e0207511.
 17. Polit D, Beck C. Nursing research principles and methods. 9th ed. Baltimore: Lippincott Williams & Wilkins; 2012.
 18. Manser T, Foster S, Gisin S, et al. Assessing the quality of patient handoffs at care transitions. *Qual Saf Health Care* 2010;19:1-5.
 19. Manser T, Foster S, Flin R, Patey R. Team communication during patient handover from the operating room: more than facts and figures. *Human Factors* 2013;55:138-56.
 20. Reine E, Manser T, Rustøen T. Quality in postoperative patient handover. *J Nurs Care Qual* 2019;34:E1-7.
 21. Tavakol M, Dennick R. Making sense of Cronbach's alpha. *Int J Med Educ* 2011;2:53-5.
 22. World Medical Association. Declaration of Helsinki - Ethical principles for medical research involving human subjects. WMA; 2015. Available from: <https://www.wma.net/policies-post/wma-declaration-of-helsinki-ethical-principles-for-medical-research-involving-human-subjects/>
 23. Petrovic M, Aboumatar H, Scholl A, et al. The perioperative handoff protocol: evaluating impacts on handoffs and provider satisfaction in adult perianesthesia care units. *J Clin Anesthesia* 2014;27:111-9.
 24. Cornell P, Gervis M, Yates L, et al. Improving shift report focus and consistency with the situation, background, assessment recommendation protocol. *J Nurs Adm* 2013;43:422-8.
 25. Chaudoir R, Dugan A, Barr C. Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implement Sci* 2013;8:22.
 26. Kadu M, Stolee P. Facilitators and barriers of implementing the chronic care model in primary care: a systematic review. *BMC Fam Pract* 2015;16:12.
 27. Sullivan J, Adjognon L, Omonyale L, et al. Identifying and overcoming implementation challenges: experience of 59 noninstitutional long-term services and support pilot programs in the Veterans Health Administration. *Health Care Manage Rev* 2018;43:193-205.
 28. Carroll J, Williams M, Gallivan T. The ins and outs of change of shift handoffs between nurses: A communication challenge. *BMJ Qual Saf* 2012;21:586-03.
 29. Manias E, Geddes F, Watson B, et al. Perspectives of clinical handover processes: a multi-site survey across different health professionals. *J Clin Nurs* 2015;25:80-91.
 30. Lyons V, Popejoy L. Time-out and checklists: a survey of rural and urban operating room personnel. *J Nurs Care Qual* 2017;32:3-10.
 31. Pickering S, Robertson E, Griffin D, et al. Compliance and use of the World Health Organization checklist in U.K. operating theatres. *Br J Surg* 2013;100:1664-70.
 32. Rydenfalt C, Johansson G, Odenrick P, et al. Compliance with the WHO Surgical Safety Checklist: deviations and possible improvements. *Int J Qual Health Care* 2013;25:182-7.
 33. Kitney P, Buttigieg D, Bennet P, et al. Handover between anaesthetists and post anaesthetic care unit nursing staff using ISBAR principles. *AORN* 2016;29:30-7.
 34. Yegane S, Shahrami A, Hatamabadi H, Hosseini-Zijoud S-M. Clinical information transfer between EMS staff and Emergency Medicine Assistants during handover of trauma patients. *Prehosp Disaster Med* 2017;32:541-7.
 35. McCambridge J, Witton J, Elbourne D. Systematic review of the Hawthorne effect: New concepts are needed to study research participation effects. *J Clin Epidemiol* 2014;67:267-77.