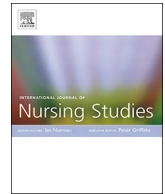




Contents lists available at ScienceDirect

International Journal of Nursing Studies

journal homepage: www.elsevier.com/locate/ijnsCompliance with a structured bedside handover protocol: An observational, multicentred study[☆]S. Malfait^{a,b,*}, K. Eeckloo^{a,c}, W. Van Biesen^{a,c}, M. Deryckere^b, E. Lust^b, A. Van Hecke^{a,b}^a Ghent University Hospital, Belgium^b Faculty of Medicine and Health Sciences, Department of Public Health – University Center for Nursing and Midwifery, Ghent University, Belgium^c Faculty of Medicine and Health Sciences, Ghent University, Belgium

ARTICLE INFO

Keywords:

Bedside handover
Hospitals
Implementation
Intervention compliance
Nursing
Observations
Handover duration

ABSTRACT

Background: Bedside handover is the delivery of the nurse-to-nurse shift handover at the patient's bedside. The method is increasingly used in nursing, but the evidence concerning the implementation process and compliance to the method is limited.

Objectives: To determine the compliance with a structured bedside handover protocol following ISBARR and if there were differences in compliance between wards.

Design: A multicentred observational study with unannounced and non-participatory observations (n = 638) one month after the implementation of a structured bedside handover protocol.

Settings and participants: Observations of individual patient handovers between nurses from the morning shift and the afternoon shift in 12 nursing wards in seven hospitals in Flanders, Belgium.

Methods: A tailored and structured bedside handover protocol following ISBARR was developed, and nurses were trained accordingly. One month after implementation, a minimum of 50 observations were performed with a checklist, in each participating ward. To enhance reliability, 20% of the observations were conducted by two researchers, and inter-rater agreement was calculated. Data were analysed using descriptive statistics, one-way ANOVAs and multilevel analysis.

Results: Average compliance rates to the structured content protocol during bedside handovers were high (83.63%; SD 11.44%), and length of stay, the type of ward and the nursing care model were influencing contextual factors. Items that were most often omitted included identification of the patient (46.27%), the introduction of nurses (36.51%), hand hygiene (35.89%), actively involving the patient (34.44%), and using the call light (21.37%). Items concerning the exchange of clinical information (e.g., test results, reason for admittance, diagnoses) were omitted less (8.09%–1.45%). Absence of the patients (27.29%) and staffing issues (26.70%) accounted for more than half of the non-executed bedside handovers. On average, a bedside handover took 146 s per patient.

Conclusions: When the bedside handover was delivered, compliance to the structured content was high, indicating that the execution of a bedside handover is a feasible step for nurses. The compliance rate was influenced by the patient's length of stay, the nursing care model and the type of ward, but their influence was limited. Future implementation projects on bedside handover should focus sufficiently on standard hospital procedures and patient involvement. According to the nurses, there was however a high number of situations where bedside handovers could not be delivered, perhaps indicating a reluctance in practice to use bedside handovers.

What is already known about the topic?

- The bedside handover is increasingly used in nursing practice

because it enhances communication among nurses and between nurses and patients.

- The body of knowledge on bedside handovers is weak and lacks

[☆] This paper was submitted as an entry for the European Academy of Nursing Science's Rosemary Crow award, sponsored by the International Journal of Nursing Studies. The award is open to current doctoral students or recent graduates of the academy's program.

* Corresponding author at: U.Z. K5, 3rd Floor, De Pintelaan 185, B-9000 Ghent, Belgium.

E-mail addresses: Simon.Malfait@UGent.be (S. Malfait), Kristof.Eeckloo@UZGent.be (K. Eeckloo), Wim.VanBiesen@UGent.be (W. Van Biesen), Elisa.Lust@UGent.be (E. Lust), Ann.VanHecke@UGent.be (A. Van Hecke).

URL: <http://mailto:Elisa.Lust@UGent.be> (E. Lust).

<https://doi.org/10.1016/j.ijnurstu.2018.04.011>

Received 26 September 2017; Received in revised form 27 March 2018; Accepted 16 April 2018
0020-7489/ © 2018 Elsevier Ltd. All rights reserved.

studies on the implementation process, the use of structured content and observational studies to inform practice.

- To improve quality of care through bedside handovers, information on its process is necessary.

What this paper adds

- High compliance rates for structured content of bedside handover can be acquired with a minimum of training, indicating that executing a bedside handover is a logical and feasible process for nurses.
- This multicentred, observational study identifies the average duration for a bedside handover per patient, the most common causes of not executing a bedside handover and the items that are most frequently omitted.
- Influencing contextual factors for executing a bedside handover include the nursing care model, length of stay and the type of ward. The impact of each of these factors is, however, limited.

1. Introduction

The bedside handover, the nurse-to-nurse handover performed at the patient's bedside, is gaining interest due to its claimed positive effects on patients', nurses' and clinical outcomes (Gregory et al., 2014). Despite these reported advantages, a comprehensive body of knowledge based on rigorous, longitudinal, and large-scale studies remains lacking (Smeulers et al., 2014; Gregory et al., 2014; Malfait et al., 2017a). Moreover, next to measuring the effectiveness and impact, the characteristics of how the bedside handover is performed are largely unknown (Clarke and Persaud, 2011). This contrasts with the current paradigm in nursing science, stating that the description of the implementation process of a method is essential (Van Achterberg, 2013).

Current studies on the bedside handover describe the use of unstructured bedside handover with little cohesion (Laws and Amato, 2010; Novak and Fairchild, 2012), indicate a limited clarity about the exact duration of bedside handovers per patient (Gregory et al., 2014), and behavior by nurses to prevent the patient from participating (Tobiano et al., 2017). The use of unstructured bedside handovers should especially raise concern (Laws and Amato, 2010). Unstructured handovers are an important cause of medical errors and communication breakdowns, and might undermine patient safety during handovers (Gregory et al., 2014). Structured handovers, at the bedside or not, are essential for safe and comprehensive information transfer between nurses and are advised (Riesenberg et al., 2009). The increasing use of bedside handovers (Ferguson and Howell, 2015) underlines the need for such structured handovers even more, but studies on structured bedside handovers are limited (Novak and Fairchild, 2012; Smeulers et al., 2014; Johnson et al., 2016). This contrast with the importance of such studies for the nursing profession in overcoming the gap between practice and research (Candy et al., 2011). Determining compliance rates with an intervention creates insight into the reasons for sub-optimal performance, protects patients from the negative consequences of substandard adherence, and ensures patient safety (Van Achterberg and Sales, 2011). For structured handovers, all the above is applicable. Therefore, the goal of this study is to describe the compliance rates to a structured bedside handover protocol.

This research is part of a larger multicentred, matched-controlled, longitudinal, mixed methods study of the feasibility, appropriateness, meaningfulness and effectiveness of bedside handovers (Malfait et al., 2017a). The study is ongoing in the Flemish region of Belgium and replaces the traditional handover with a structured-content bedside handover, in which patient participation and nurse-to-nurse communication were essential elements. The main advantage of this study, in comparison to previous studies (Smeulers et al., 2014), was the multicentred approach. This approach enabled insight across contexts (Van Achterberg and Sales, 2011). The design of the study was based on the

medical research council (MRC) framework (2000, 2008, 2015). An essential part of this framework and thus the study was evaluating whether the intervention was correctly implemented and complied with in practice.

2. Aim

The observational study aimed to determine the compliance with a structured bedside handover protocol following ISBARR (i.e., Introduction-Situation-Background-Assessment-Recommendations-Readback) and to determine if there were differences in compliance between types of wards.

3. Materials and methods

3.1. Recruiting, settings and participants

At the beginning of the study, a call for participation was sent out to all general and university hospitals in Flanders together with the research protocol (Malfait et al., 2017a). When hospitals were willing to include wards in the study, an exploratory meeting took place with the head nurse and the chief nursing officer to discuss their eligibility in the study. Wards were eligible for participation in the study if they did not practice bedside handover and no major changes (e.g., merger of a ward or hospital) were ongoing on the ward or in the hospital. Twelve wards in seven hospitals engaged in the study: five surgical wards, four wards for medical rehabilitation and three geriatric wards. As one of the conditions of the overall study was to include different contexts (Van Achterberg and Sales, 2011; Smeulers et al., 2014; Malfait et al., 2017a); the settings of the wards differed substantially. An overview of the settings can be found in Appendix A (in Supplementary material).

3.2. The bedside handover: development, education and process

Bedside handover is a process in which the nurse-to-nurse handover is performed at the patient's bedside (Gregory et al., 2014). To develop the structured bedside handover protocol, three steps were taken. The first step was the development of a draft protocol. Because a predefined structure is essential for optimal execution (Novak and Fairchild, 2012), different methodologies for structuring a handover were explored (Riesenberg et al., 2009). The ISBARR structure was chosen because ISBARR provides a preparatory step (i.e., Introduction) and a summarising step (i.e., Readback), is commonly known in Belgian health-care and is relatively easy to learn (Randmaa et al., 2014). Based on experiences from a pilot study (Schillemans et al., 2010), the bedside handover would only be performed from the morning shift to the afternoon shift to avoid unnecessarily waking patients. The second step comprised of both patients and nurses tailoring the structured bedside handover protocol to the specific demands of the ward through an adapted, three-phased version of accelerated co-design: (1) patients and nurses individually, (2) patients and nurses in focus groups and (3) patients and nurses together (Locock et al., 2014; Malfait et al., 2017a,b). In the third step, each tailored protocol was formalised in a checklist and peer-checked by the nursing staff and the ward's supervisor to ensure completeness. Variation in the composition of the checklists between wards was minimal. Only the used terminology of individual items differed, not the used structure of the protocol.

To familiarize the nurses with the bedside handover, an educational program was used. This educational program combined theoretical knowledge transfer (i.e., slideshow presentation and an information brochure) with practical, hands-on workshops in which the process was simulated and practiced in small groups of nurses. Depending on nurses' needs, derived from individual diagnostic interviews to determine barriers and enablers for implementation (Malfait et al., 2017a), a two hour educational program (concerning bedside handover) or a six hour educational program (concerning patient participation, bedside

handover and ISBARR) was given.

The process of the bedside handover was as follows: At the beginning of the afternoon shift, all nurses (including the nurses from the early shift) gathered in the nursing station. A short safety briefing, discussing ward-related issues, was performed in one or two minutes. Next, each nurse of the afternoon shift teamed up with the nurse from the early shift who was assigned to her section of the ward. They would enter the first patient's room and provide a handover, using the structured content protocol. For patients whom both nurses knew (i.e., third shift in a row), the background and assessment section could be skipped. This process was continued until all patients in the section were discussed. If patients were absent, nurses would deliver the handover at the mobile nursing unit (e.g., a cart which stores and transports medications and medical supplies and a computer system mounted on the cart for transmitting and receiving data as a nurse performs patient rounds; Curtis et al., 1996).

3.3. Observations (data collection)

Data were collected between October 1, 2016, and January 30, 2017, by use of the developed checklists and by the primary researcher. During the observations, a nurse from the morning shift was followed while (s)he was delivering the structured-content bedside handover to her colleague of the afternoon shift. An example of the checklist used for the observations is provided in Appendix B (in Supplementary material).

During the observations, two parameters were also registered in addition to the checklist. The time needed to execute the bedside handover per patient was registered. This additional observation was mainly based on the fact that in current literature, only two studies with indications of handover duration per patient could be found: a case study (Chaboyer et al., 2010) and a study on the use of electronic structured content (Johnson et al., 2016). The duration of the bedside handover was recorded with a chronometer. Time registration was started when nurses left the nursing station to provide a handover at the bed of their first patient, and interval times were taken when nurses started walking to the next patient. At the end of all handovers, time was stopped when nurses engaged in patient care. Also, the reasons for not conducting a bedside handover were identified by asking nurses why they discussed a patient case in the corridor. These questions were asked directly after the handover.

The days of the observations were randomly chosen and included both weekdays and days in the weekend. All observations were unannounced and non-participatory. A goal of 50 individual patient observations per ward was set as a minimum in the research protocol (Malfait et al., 2017a). This accounted for approximately 5 percent of all individual patient bedside handovers on each ward during the data collection period.

3.4. Analysis

Compliance with the structured content protocol was calculated by dividing the number of executed items by the number of items that had to be executed:

$$\text{compliance (\%)} = \frac{\text{number of executed steps}}{\text{number of steps in protocol}}$$

A linear, mixed-model analysis, or multilevel analysis, was used to determine differences in compliance between wards. This method was preferred over one-way ANOVAs because it overcame possible difficulties for the multilevel data clustering (Jaeger, 2008). The ward (level 1) and hospital (level 2) were used as random effects to overcome problems with possible clustering (Heck et al., 2012). To enable post hoc analyses of the influence of contextual determinants (Van Achterberg, 2013), several structure- and workforce-related variables were defined before data collection and registered per ward. The type of

nursing care model on the ward was identified by the model of Johnson and Cowin (2013); devolved/two-tier/centralised) through individual interviews with nurses and head nurses. The type of ward (geriatric/surgical/medical rehabilitation) was identified through the official governmental codes of the ward. The hours of training on the use of bedside handover and ISBARR ($> 2 \text{ h}/\leq 2 \text{ h}$) were registered by the researchers. The average handover time per patient ($\leq 2 \text{ min}/ > 2 \text{ min}$) was calculated per ward by use of the researchers' time calculations. The length of stay ($< 4 \text{ weeks}/\geq 4 \text{ weeks}$) was identified, based on governmental indicators per ward. The nurse/patient ratio ($< 1 \text{ on } 10/\geq 1 \text{ on } 10$) was calculated by use of the working schedules during the observations. Analyses were performed by use of SPSS 24.0 (IBM, 2016).

To calculate the percentages of the reasons for not conducting bedside handover, the numbers for each reason were divided by the number of situations where the bedside handover was not conducted. A one-way ANOVA was used to determine whether there were differences between the types of wards concerning the reasons for not delivering a bedside handover.

3.5. Reliability of the data

To determine the quality and correctness of the observations the primary researcher made, 20% of all observations were performed concomitantly by a second researcher. This enabled the calculation of the inter-rater agreement (Cohen's kappa or Cohen's κ). According to Landis and Koch (1977), inter-rater agreement between 0.61 and 0.80 can be regarded as substantial. Inter-rater agreement higher than 0.81 indicates an almost perfect inter-rater agreement.

3.6. Ethical considerations

The study was approved by the central ethics committee of the Ghent University Hospital (B670201627044) and the local ethics committees of each hospital. Informed consent from both nurses and patients was obtained before the observations.

4. Results

In total, 638 observations were performed in the 12 wards. On average, there were approximately 53 observations per ward (mean 53.17; SD = 1.99). No ward had fewer than 50 observations.

4.1. Cohen's kappa: reliability of the data

In total, 145 of the 638 observations (22.73%) were performed by two researchers simultaneously. There was high agreement between two observers, with a kappa of 0.81 ($p < 0.001$).

4.2. Compliance with the structured bedside handover protocol

Overall, average compliance with the structured bedside handover protocol was 83.63%. Surgical wards (85.34%) and wards for medical rehabilitation (85.90%) had an average compliance rate above 80%, geriatric wards (79.63%) had an average compliance rate just under 80%. The results also showed that 84% of all the bedside handovers complied with the structured handover for 70% or more.

The linear mixed-model analysis showed several significant differences between groups concerning compliance with the structured content. Surgical nursing wards had a slightly higher compliance rate throughout the observations ($\beta = 0.031$; 95% CI = 0.005/0.016; $p = 0.017$) in comparison to geriatric wards and wards for medical rehabilitation. Wards with a two-tier nursing care model had lower compliance rates ($\beta = -0.034$; 95% CI = $-0.062/-0.005$; $p = 0.021$) compared to centralised and decentralized care models. Wards with an average patient's length of stay over four weeks had a

Table 1
Percentage of handovers in which an item was omitted.

Item in protocol	Phase in ISBARR	All wards	Geriatric wards	Surgical wards	Medical rehabilitation
Identification of the patient	Identification	46.27%	62.25%	41.52%	36.25%
Introduction of nurse to patient and vice versa	Identification	36.51%	54.97%	30.99%	25.00%
Hand hygiene	Basic nursing process	35.89%	45.70%	36.26%	26.25%
Asking the patient whether (s)he has anything to add or has questions	Basic nursing process	34.44%	36.42%	40.94%	25.63%
Using the call light	Basic nursing process	21.37%	19.21%	18.71%	26.25%
Closing the curtains (in semi-private rooms)	Basic nursing process	8.92%	10.60%	7.60%	8.75%
Medical history or relevant co-morbidity	Background	8.09%	7.28%	14.62%	1.88%
Latest test results (if already addressed by physician)	Background	7.05%	8.61%	10.53%	1.88%
Reason for admittance/diagnoses	Situation	4.77%	10.60%	2.92%	1.25%
Proposed treatment and next step	Recommendations	3.94%	4.64%	5.85%	1.25%
Asking visitors to leave the room	Basic nursing process	3.94%	1.99%	7.02%	2.50%
Provisional date of discharge	Situation	3.94%	0.66%	10.53%	0.00%
Providing information on fluid policy	Assessment	2.90%	0.00%	6.43%	1.88%
Clinical situation	Assessment	2.28%	3.97%	2.92%	0.00%
Wound care and bandages	Recommendations	1.87%	0.00%	4.09%	1.25%
Medication policy	Assessment	1.45%	1.32%	2.92%	0.00%

lower rate of compliance with the structured content protocol ($\beta = 0.041$; 95% CI = 0.020/0.063; $p < 0.001$) than wards with a shorter patient's length of stay. The hours of training, provided time for the handover and nurse-patient ratio showed no differences in the compliance rates. An overview of the detailed results of the linear mixed-model analysis to determine differences in compliance rates can be found in Appendix C (in Supplementary material).

4.3. Omitted items of the structured bedside handover protocol

When looking at the types of ward separately, five items in the protocol were omitted most frequently: Identification of the patient (i.e., asking the patient's name, noting the date of birth and checking the identification bracelet); introduction between the nurses and patient; adherence to the hospital's standards for hand hygiene; asking the patient whether (s)he had any more questions or things to add; using the call light to indicate they are in a room. Although the ranking of these five items differed, they were similar across wards. An overview of the percentage of handovers in which a specific item of the structured bedside handover protocol is omitted is provided in Table 1. Per omitted step, the related phase of ISBARR was reported.

4.4. Nurses' reasons for not delivering bedside handover

In 28.53% of all the observations, the handover was not delivered at the patient's bedside. This rate did not differ between the types of ward ($df = 2$; $F = 0.594$; $p = 0.572$). Surgical wards failed in delivering bedside handovers in 35.21% of the observations. Geriatric wards failed in 25.00% of the cases and medical rehabilitation wards in 22.75%. Patients not being present on the ward (e.g., external consult), staffing issues (e.g., being short-staffed due to illness), and patients sleeping were the most reported reasons. Although there was variation in the reasons for not conducting a bedside handover between type of wards, these variations were not statistically significant ($p = 0.054$ – 0.876).

Furthermore, it became apparent from the observations that (1) not a single patient refused to receive a bedside handover, and (2) nurses decided themselves not to deliver a bedside handover without consulting the patient. Table 2 provides an overview of the reasons the bedside handover was not delivered.

4.5. Average handover duration per patient

Overall, the median time needed for a bedside handover for one patient was 146 s. On surgical wards, the median time was similar. Medical rehabilitation wards had a higher median duration of the bedside handover, but the range was smaller. Geriatric wards had a lower median bedside handover duration but a higher variation. Fig. 1

provides an overview of the handover duration per patient.

5. Discussion

This observational study had two aims: to determine (1) the compliance with a structured bedside handover protocol following ISBARR and (2) if there were differences in compliance between types of wards. Based on the results of this study, four important insights about the bedside handover can be made and added to the current body of knowledge.

When delivered, the overall compliance rates to the content of the structured bedside handover protocol are high in comparison to previous reports on intervention compliance (Van Os-Medendorp et al., 2008). This indicates that, with minimal training (max. six hours), a bedside handover can be executed with an appropriate level of quality and compliance with the structured content. Seemingly, performing a bedside handover is a feasible process for nurses. Only three influencing contextual factors for the rate of compliance with the structured bedside handover protocol are identified in our study, but their impact is low. While contextual factors should be taken into account when planning an implementation process (Van Achterberg, 2013), their limited influence in this study means that the implementation of a structured bedside handover protocol should not be limited to certain types of ward.

In contrast to the fact that clinical aspects (e.g., wound care and medication) are rarely forgotten, as reported in previous qualitative studies (Gregory et al., 2014), two clusters of items were forgotten more often across wards. The first group was linked to personal interaction with patients: introduction between nurses and patients was skipped, and the patient was not actively involved. Possible explanations for this behavior are the nurses' urge to maintain power and control in the patient–nurse relationship (Longtin et al., 2010) or avoiding the patient from asking question as this could lengthen the duration of the bedside handover (Anderson et al., 2015). A second cluster concerns regular and standard hospital procedures: identifying the patient or hand hygiene adherence. This demonstrates that these patient safety-related actions are still not fully embedded in daily practice (Tromp et al., 2012; Westbrook et al., 2011). Bedside handover training should address these issues, in order to avoid adverse effects of bedside handovers, like suddenly increased infection rates.

In almost 30% of the observed cases, nurses decided unilateral not to deliver the bedside handover and in one-third of all cases where a bedside handover was delivered, nurses did not actively involve patients. Although not delivering the bedside handover is logical in the case of a patient not being present due to surgery or an examination, the explanation on why the bedside handover was not delivered or the patient was not involved in other cases remains uncertain. These two

Table 2
Reasons for not delivering bedside handover, as reported by nurses.

Reason	All wards %	Geriatric wards %	Medical rehabilitation wards %	Surgical wards %
Patient not on ward	28.57	7.50	14.58	44.68
Staffing issues	28.02	45.00	31.25	19.15
Patient sleeping	12.09	12.50	27.08	4.26
Patient will be discharged today	10.99	12.50	4.17	13.83
Infectious disease	8.79	12.50	16.67	3.18
Cognitive/psychiatric disorder	3.85	5.00	0.00	5.32
Other (e.g., palliative care)	3.30	0.00	2.08	5.32
Toilet	2.20	5.00	4.17	0.00
Language issue	2.20	0.00	0.00	4.26

observations could indicate a reluctance amongst nurses to use bedside handovers and avoid patient participation, which has been reported before and possibly originates from increased accountability, confidentiality concerns, and participation-avoiding behavior (Anderson et al., 2015; Gregory et al., 2014; Bruton et al., 2016; Mardis et al., 2016; Tobiano et al., 2017). As bedside handovers have the potential to improve patient safety and patient participation, this reluctance should be closer looked into.

To the best of our knowledge and based on recent systematic reviews on bedside handover (Anderson et al., 2015; Gregory et al., 2014; Mardis et al., 2016), only two studies have reported handover duration per patient (Chaboyer et al., 2010; Johnson et al., 2016). Our study is multicentred and also identifies the range in duration when performing a bedside handover, measured over different types of wards. In doing so, this study enables nursing managers to make a more adequate estimate of the duration of bedside handovers. Because time pressure and overtime could lead to decreased job satisfaction, increased absenteeism and overall burnout (Bae and Fabry, 2014), making a fairly adequate estimation of the effects of implementing bedside handovers on working hours is important. Unexpected time constraints could result in a more difficult implementation process or even a rejection of the method (Ploeg et al., 2007).

5.1. Limitations of the study

A major limitation of this study is the determination of compliance with the structured content protocol only one month after implementation. As shown in other studies concerning compliance (Gould et al., 2017), longer follow-up is needed to avoid temporarily or seasonal trends. As pointed out (Van Achterberg, 2013), follow-up in the long term is an essential next step. In our overall research protocol,

long-term follow-up is planned (Malfait et al., 2017a). Also, the presence of the observer possibly created a Hawthorne effect, leading to socially desirable behavior and increased performance. In defence, the results of this study are similar to previous, qualitative findings (Gregory et al., 2014), indicating that nurses did not adapt their behavior due to the researcher's presence. Furthermore, digitally recording would have been a more precise methodology to manage the data collection (Johnson et al., 2016), possibly preventing a Hawthorne effect and enhancing reliability of the data. Permission of the ethical boards for this methodology could not be obtained. Therefore, performing the observations with the calculations of Cohen's kappa was chosen as the second best option. Another limitation is that the study was conducted in a single country, possibly affecting transfer to other countries. The RN4cast, a European study of the nursing workforce, has shown that there are substantial differences in the nursing workforce between countries in terms of education and nurse-patient ratios (Aiken et al., 2014). Both education and staffing have a significant impact on patient participation behavior, which is essential during bedside handovers (Malfait et al., 2017b). The results presented here (i.e., not executing a bedside handover due to staffing shortage) support this claim. Finally, by adapting the protocols to the specificity of a ward, generalisability could be endangered; but by adapting and tailoring the process to a ward's needs, a greater chance of success was to be expected (Kerr et al., 2014). In reality, differences between protocols were minimal to non-existent.

5.2. Future research

Multilevel analyses have shown that there are differences between wards that should be looked at more closely. Increasing insight in the type of ward, care model, and average length of stay could inform

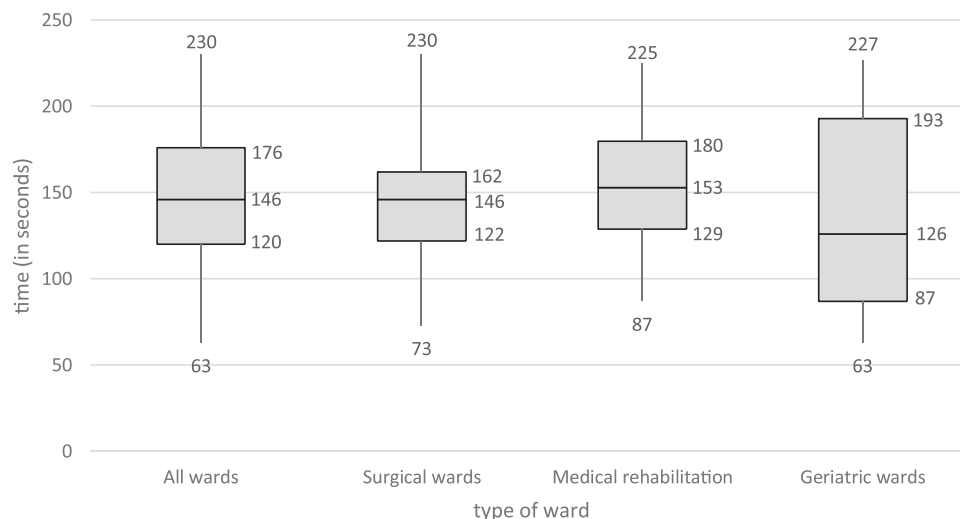


Fig. 1. Median handover duration per patient in seconds, including minimum, Q1, Q3 and maximum.

practice and provide additional information in adapting bedside handovers to the specific aspects of individual wards. Bedside handover duration should also be further looked into, taking into account possible determinants and explanations for why the duration differs between settings (Gregory et al., 2014). Next, follow-up is needed to determine the sustainability of the structured bedside handover protocol and whether compliance remains stable. Following up after initial implementation is an important challenge for nursing science (Wiltsey Stirman et al., 2012). The high number of cases in this study where the bedside handover was not delivered adds quantitative support to previous claims that nurses are reluctant to use the bedside handover and actively try to avoid patient participation during handovers (Chaboyer et al., 2010; Tobiano et al. 2017). Bedside handover could be beneficial, but it is often not performed for reasons that remain unclear. The reasons for this reluctance should be further investigated. The data from this study show that no patient refused to participate in a bedside handover. This could indicate that the infringement of privacy is perhaps not such an acute problem as reported by nurses (Anderson et al., 2015; Gregory et al., 2014; Mardis et al., 2016).

6. Conclusion

Due to the observational and multicentre character of this study, five contributions to the body of knowledge concerning bedside handovers are made. First, high compliance rates to the structured content after minimal training demonstrates that the nurses have the necessary competence to execute a bedside handover with the help of a structured content protocol. Second, three influencing contextual factors of the compliance rate could be identified: type of ward, nursing care model, and patient's length of stay. Their impact is limited, which indicates that bedside handover is suitable for most nursing wards. Third, when training nurses in bedside handovers, special attention should be given to incorporating standard hospital procedures and involving the patient. Fourth, whereas there might be legitimate reasons for not delivering a bedside handover, the high numbers of situations reported by nurses where bedside handovers cannot be delivered, indicate a reluctance in practice to use these handovers. Fifth, the average needed time per patient for delivering a bedside handover was 146 s and could range from 63 to 230 s.

Conflict of interest

No conflict of interest has been declared by the authors.

Funding statement

Funding for this research is granted by the Ghent University Hospital in October 2015, in the context of a Clinical Research Fund. The Clinical Research Fund is a yearly price that is awarded to an innovative research proposal. All proposals are peer-reviewed and judged by a selection committee. There was no involvement of this funding body in the conception, design and writing of the study protocol. This research has received no further grants from any funding agency in the public, commercial or social-profit sectors.

Author contributions

All authors have contributed to the conception, design and writing of the study protocol. All authors have had a significant doing in drafting and revising the article for important intellectual content.

Appendices A, B and C. Supplementary data

Supplementary data associated with this article can be found, in the online version, at <https://doi.org/10.1016/j.ijnurstu.2018.04.011>.

References

- Aiken, L.H., et al., 2014. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *Lancet* 383 (9931), 1824–1830. [http://dx.doi.org/10.1016/S0140-6736\(13\)62631-8](http://dx.doi.org/10.1016/S0140-6736(13)62631-8).
- Anderson, J., Malone, L., Shanahan, K., Manning, J., 2015. Nursing bedside clinical handover—an integrated review of issues and tools. *J. Clin. Nurs.* 24 (5–6), 662–671. <http://dx.doi.org/10.1111/jocn.12706>.
- Bae, S.H., Fabry, D., 2014. Assessing the relationships between nurse work hours/overtime and nurse and patient outcomes: systematic literature review. *Nurs. Outlook* 62 (2), 138–156. <http://dx.doi.org/10.1016/j.outlook.2013.10.009>.
- Bruton, J., Norton, C., Smyth, N., Ward, H., Day, S., 2016. Nurse handover: patient and staff experiences. *Br. J. Nurs.* 25 (7), 386–393. <http://dx.doi.org/10.12968/bjon.2016.25.7.386>.
- Candy, B., Holman, A., Leurent, B., Davis, S., Jones, L., 2011. Hospice care delivered at home, in nursing homes and in dedicated hospice facilities: a systematic review of quantitative and qualitative evidence. *Int. J. Nurs. Stud.* 48 (1), 121–133. <http://dx.doi.org/10.1016/j.ijnurstu.2010.08.003>.
- Chaboyer, W., McMurray, A., Wallis, M., 2010. Bedside nursing handover: a case study. *Int. J. Nurs. Pract.* 16, 27–34. <http://dx.doi.org/10.1111/j.1440-172X.2009.01809.x>.
- Clarke, C.M., Persaud, D.D., 2011. Leading clinical handover improvement: a change strategy to implement best practices in the acute care setting. *J. Patient Saf.* 7, 11–18. <http://dx.doi.org/10.1097/PTS.0b013e31820c98a8>.
- Curtis, G.E., Livezey, C.S., McDonnell, G.D., Grady, M.L., Minor, R.J., 1996. U.S. Patent No. 5,536,084. U.S. Patent and Trademark Office, Washington, DC.
- Ferguson, T.D., Howell, T.L., 2015. Bedside reporting: protocols for improving patient care. *Nurs. Clin. North. Am.* 50 (4), 735–747. <http://dx.doi.org/10.1016/j.cnur.2015.07.011>.
- Gould, D.J., Moralejo, D., Drey, N., Chudleigh, J.H., Taljaard, M., 2017. Interventions to improve hand hygiene compliance in patient care. *Cochrane Database Syst. Rev.* (Issue 9), CD005186. <http://dx.doi.org/10.1002/14651858.CD005186.pub4>.
- Gregory, S., Tan, D., Tilrco, M., Edwardson, N., Gamm, L., 2014. Bedside shift report: what does the evidence say? *J. Nurs. Adm.* 44 (10), 541–545. <http://dx.doi.org/10.1097/NNA.0000000000000115>.
- Heck, R., Thomas, S., Tabata, L., 2012. Multilevel Modeling of Categorical Outcomes Using IBM SPSS. Routledge, New York.
- IBM Corp. Released, 2016. IBM SPSS Statistics for Windows, Version 24.0. IBM Corp, Armonk, NY.
- Jaeger, F., 2008. Categorical data analysis: away from ANOVAs (transformation or not) and towards logit mixed models. *J. Mem. Lang.* 59 (4), 434–446. <http://dx.doi.org/10.1016/j.jml.2007.11.007>.
- Johnson, M., Cowin, L.S., 2013. Nurses discuss bedside handover and using written handover sheets. *J. Nurs. Manag.* 21, 121–129. <http://dx.doi.org/10.1111/j.1365-2834.2012.01438.x>.
- Johnson, M.J., Sanchez, P., Zheng, C., 2016. Reducing patient clinical management errors using structured content and electronic nursing handover. *J. Nurs. Care. Qual.* 31 (3), 245–253. <http://dx.doi.org/10.1097/NCQ.0000000000000167>.
- Kerr, D., Lu, S., McKinlay, L., 2014. Towards patient-centred care: perspectives of nurses and midwives regarding shift-to-shift bedside handover. *Int. J. Nurs. Pract.* 20, 250–257. <http://dx.doi.org/10.1111/ijn.12138>.
- Landis, J.R., Koch, G.G., 1977. The measurement of observer agreement for categorical data. *Biometrics* 33, 159–174 [no doi available].
- Laws, D., Amato, S., 2010. Incorporating bedside reporting into change-of-shift report. *Rehabil. Nurs.* 35 (2), 70–74. <http://dx.doi.org/10.1002/j.2048-7940.2010.tb00034.x>.
- Loccock, L., et al., 2014. Testing accelerated experience-based co-design: a qualitative study of using a national archive of patient experience narrative interviews to promote rapid patient-centred service improvement. *HS&DR* 2 (4), 1–70. <http://dx.doi.org/10.3310/hsdr02040>.
- Longtin, Y., Sax, H., Leape, L.L., Sheridan, S.E., Donaldson, L., Pittet, D., 2010. Patient participation: current knowledge and applicability to patient safety. *Mayo. Clin. Proc.* 85 (1), 53–62. <http://dx.doi.org/10.4065/mcp.2009.0248>.
- Malfait, S., Eeckloo, K., Lust, E., Van Biesen, W., Van Hecke, A., 2017a. Feasibility, appropriateness, meaningfulness and effectiveness of patient participation at bedside shift reporting: mixed-method research protocol. *J. Adv. Nurs.* 73 (2), 482–494. <http://dx.doi.org/10.1111/jan.13154>.
- Malfait, S., Eeckloo, K., Hecke, A., 2017b. The influence of nurses' demographics on patient participation in hospitals: a cross-sectional study. *Worldviews Evid. Based Nurs.* 14 (6), 455–462. <http://dx.doi.org/10.1111/wvn.12254>.
- Mardis, T., Mardis, M., Davis, J., Justice, E.M., Riley Holdinsky, S., Donnelly, J., Ragozine-Bush, H., Riesenber, L.A., 2016. Bedside shift-to-shift handoffs: a systematic review of the literature. *J. Nurs. Care Qual.* 31 (1), 54–60. <http://dx.doi.org/10.1097/NCQ.0000000000000142>.
- Medical Research Council, 2000. A Framework for Development and Evaluation of RCTs for Complex Interventions to Improve Health. Medical Research Council, London [no doi available].
- Medical Research Council, 2008. Developing and Evaluating Complex Interventions: New Guidance. Medical Research Council, London. <http://dx.doi.org/10.1136/bmj.a1655>.
- Medical Research Council, 2015. Process Evaluation of Complex Interventions: Medical Research Council Guidance. Medical Research Council, London. <http://dx.doi.org/10.1136/bmj.h1258>.
- Novak, K., Fairchild, R., 2012. Bedside Reporting and SBAR: improving patient communication and satisfaction. *J. Pediatr. Nurs.* 27 (6), 760–762. <http://dx.doi.org/10.1016/j.pedn.2012.09.001>.

- Ploeg, J., Davies, B., Edwards, N., Gifford, W., Miller, P.E., 2007. Factors influencing best-practice guideline implementation: lessons learned from administrators, nursing staff, and project leaders. *Worldviews Evid. Based Nurs.* 4 (4), 210–219. <http://dx.doi.org/10.1111/j.1741-6787.2007.00106.x>.
- Randmaa, M., Mårtensson, G., Leo Swenne, C., Engström, M., 2014. SBAR improves communication and safety climate and decreases incident reports due to communication errors in an anaesthetic clinic: a prospective intervention study. *BMJ Open* 4. <http://dx.doi.org/10.1136/bmjopen-2013-004268>.
- Riesenberg, L.A., Leitzsch, J., Little, B.W., 2009. Systematic review of handoff mnemonics literature. *Am. J. Med. Qual.* 24 (3), 196–204. <http://dx.doi.org/10.1177/1062860609332512>.
- Schillemans, S., Vermeir, P., Jolie, C., Leune, T., Vandijck, D., DeSmet, G., Vogelaers, D., Vermassen, F., 2010. The Impact of Nurse-to-nurse Bedside Communication on Patient Satisfaction and Resource Use. *Congressional Communication, Athens, Greece*.
- Smeulders, M., Lucas, C., Vermeulen, H., 2014. Effectiveness of different nursing handover styles for ensuring continuity of information in hospitalised patients. *Cochrane Database Syst. Rev.* 6, CD009979. <http://dx.doi.org/10.1002/14651858.CD009979.pub2>.
- Tobiano, G., Whitty, J.A., Bucknall, T., Chaboyer, W., 2017. Nurses' perceived barriers to bedside handover and their implication for clinical practice. *Worldviews Evid. Based Nurs.* 14 (5), 343–349. <http://dx.doi.org/10.1111/wvn.12241>.
- Tromp, M., Huis, A., de Guchteneire, I., van der Meer, J., van Achterberg, T., Hulscher, M., Bleeker-Rovers, C., 2012. The short-term and long-term effectiveness of a multidisciplinary hand hygiene improvement program. *Am. J. Infect. Control* 40, 732–736. <http://dx.doi.org/10.1016/j.ajic.2011.09.009>.
- Van Achterberg, T., Sales, A.E., 2011. Implementation science for nursing: evidence needed. Call for papers for a special issue. *Int. J. Nurs. Stud.* 48 (10), 1163–1164. <http://dx.doi.org/10.1016/j.ijnurstu.2011.09.001>.
- Van Achterberg, T., 2013. Nursing implementation science: 10 ways forward. *Int. J. Nurs. Stud.* 50, 445–447. <http://dx.doi.org/10.1016/j.ijnurstu.2013.02.004>.
- Van Os-Medendorp, H., Eland-de Kok, P., van Linge, R., Bruijnzeel-Koome, C., Grypdonck, M., Ros, W., 2008. The tailored implementation for the nursing program 'Coping with Itch'. *J. Clin. Nurs.* 17 (11), 1460–1470. <http://dx.doi.org/10.1111/j.1365-2702.2007.01982.x>.
- Westbrook, J., Rob, M., Woods, A., Parry, D., 2011. Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience. *BMJ Qual. Saf.* 20 (12), 1027–1034. <http://dx.doi.org/10.1136/bmjqs-2011-000089>.
- Wiltsey Stirman, S., Kimberlye, J., Cook, N., Calloway, A., Castro, F., Charns, M., 2012. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement. Sci.* 14 (7), 17. <http://dx.doi.org/10.1186/1748-5908-7-17>.