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Brief Report

Compliance with evidence-based guidelines for the prevention of central line–associated bloodstream infections in a Belgian home care setting: An observational study

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This study assessed the compliance of Belgian home care nurses with good practice recommendations to prevent central line–associated bloodstream infections. The compliance to 3 care bundles was 0% (0 out of 7), 13.3% (2 out of 15), and 22.2% (2 out of 9), respectively. This finding is important given the increasing number of home care patients with an intravascular catheter and underscores the need for quality improvement strategies to prevent central line–associated bloodstream infections in home care.
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BACKGROUND

The shift from hospital to home care increased the number of technical nursing activities (eg, intravascular [IV] catheter care) performed by home care nurses (HCNs) and indwelling devices (eg, IV catheters) used in home care, putting patients at risk for catheter-related infections associated with mortality, morbidity, readmissions, and additional costs.[1-4]

Depending on the definitions used, the prevalence of central line–associated bloodstream infections (CLABSIs) in home care ranges from 0 to 10.04 per 1,000 device days and from 2.4% to 80.9% of patients.[1,2,5] This variation may be owing to differences in infection prevention (IP) policies and practices and lack of infection control professionals in home care.[2,4,6] Consequently, recent data about CLABSI prevention skills of HCNs are scarce. American HCNs recently reported 90% compliance to infection control practices, but a hand hygiene compliance of 59.2% was observed in Australian HCNs.[3,7]

The aim of this prospective, observational study was to assess the compliance of Belgian HCNs with evidence-based guidelines for CLABSI prevention.

METHODS

Conveniently selected home care agencies in the vicinity of a Belgian university hospital were asked to purposively select HCNs who would administer IV medication, flush IV catheters or change dressings on IV catheters in the next month. Staff members and head nurses were excluded.

One researcher (E.S.) phoned the HCNs, introduced herself as a nurse who was interested in joining the HCNs during catheter care, and scheduled an appointment with the HCNs. After receiving the oral consent of the nurses and the patients, each HCN was directly observed by 1 infection control nurse (E.S.) during only 1 home care visit throughout the study (January 10, 2017, to March 1, 2018). An observation tool was developed based on the guidelines and the literature.[3,4,8-10] Local protocols were not taken into account. The content validity of the tools was confirmed by 16 Belgian experts in IV catheter care, IP, and home care. To avoid observation bias, neither the aim of the study nor the content of the observations was revealed to the HCNs. To prevent improvement initiatives or changes in practice during the study, no feedback was provided to the HCNs during or after the observations.

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Table 1
Care bundle compliance

	Item no.	Item description	Level of evidence	Compliance n (%)
Bundle A	**Dressing changes at the catheter insertion site; n = 7**			
	1	Use of ABHR before dressing change	A[8] IB[4,9]	3 (42.8)
	2	Use of medical or sterile gloves during dressing change	IC[4]	2 (28.6)
	3	Maintaining the aseptic technique by using sterile compresses and sterile instruments	B[4,8]	2 (28.6)
	4	Use of ≥0.5% chlorhexidine in alcohol 70% to disinfect the insertion site during at least 15 s during dressing changes	IA[4,8]	5 (71.4)
	5	Antiseptic is allowed to air dry prior to applying the dressing on the insertion site	IB[4,8]	7 (100)
	6	Application of a sterile, transparent, semipermeable polyurethane dressing or a sterile gauze dressing	D[8] IA, II[4]	6 (85.7)
	7	Dating the dressing to ensure timely removal	Expert opinion[10]	2 (28.6)
		Total compliance for bundle A		0 (0)
Bundle B	**Flushing and locking central vascular catheters; n = 15**			
	1	Use of ABHR before flushing and locking the catheter	IB[4]	12 (80)
	2	Scrubbing the access ports or catheter hubs during at least 15 s	D[8]	4 (26.7)
	3	Apply the aseptic technique by scrubbing the access ports or catheter hubs with sterile compresses	B[4,8]	10 (66.7)
	4	Scrubbing the access ports or catheter hubs with chlorhexidine ≥0.5% in alcohol 70%	D[8] IA[4]	9 (60)
		Total compliance for bundle B		2 (13.3)
Bundle C	**Preparing and administering medication; n = 9 observations**			
	1	Use of ABHR before preparing and administering medication	IB[4]	7 (77.8)
	2	Scrubbing the access ports or catheter hubs during at least 15 s	D[8]	5 (55.6)
	3	Apply the aseptic technique by scrubbing the access ports or catheter hubs with sterile compresses	B[4,8]	7 (77.8)
	4	Scrubbing the access ports or catheter hubs with chlorhexidine ≥0.5% in alcohol 70%	D[8] IA[4]	6 (66.7)
		Total compliance for bundle C		2 (22.2)

ABHR, alcohol-based hand rub; *A*, directly based on level I evidence; *B*, directly based on level II evidence or extrapolated recommendations from level I evidence; *D*, directly based on level IV evidence or extrapolated recommendations from level I, II, or III evidence; *IA*, evidence from meta-analysis of randomized controlled trials; *IB*, evidence from at least 1 randomized controlled trial; *IC*, evidence based on level III evidence or extrapolated recommendations from level I or II evidence; *II*, evidence from at least 1 controlled study without randomization.

The primary outcomes were the compliance rates to 3 care bundles for CLABSI prevention (Table 1). Compliance is defined as the percentage of observations in which all bundle items were carried out. In addition, hand hygiene and the work environment of HCNs were observed.

Quantitative data were coded, descriptively analyzed, and expressed as absolute numbers and percentages. The ethics committee of the University Hospitals Leuven granted approval of this study.

RESULTS

Twenty-five HCNs were included. They carried out 7 dressing changes (22.6%), 15 flushes and locks of catheters (48.4%), and 9 administrations of medication (29%). Compliance to individual bundle items and total care bundles are described in Table 1. Several items had a low compliance (eg, use of alcohol-based hand rub [ABHR] before dressing changes, maintaining aseptic technique during dressing changes, and adequately scrubbing access ports), which resulted in low total care bundle compliances of 0% (0 out of 7), 13.3% (2 out of 15), and 22.2% (2 out of 9).

ABHR was used before 22 (71%) and after 8 (25.8%) care activities (Fig 1). Twelve (46.2%) HCNs were compliant with the basic requirements for hand hygiene (no rings or jewelry on the hands or forearms, no artificial nails or nail polish on the nails, short and clean nails, and a uniform with short sleeves).

During 29 care activities (93.6%), HCNs could use a table as a work surface. HCNs (n = 5; 17.2%) infrequently cleaned and/or disinfected this table before providing aseptic care. However, some HCNs placed a visibly clean towel (n = 3; 10.3%), a cleanable plate (n = 6; 20.7%), and/or a surgical drape (n = 15; 51.7%) on the table. These drapes were not always used consistently (eg, touched with hands, sterile, nonsterile, and soiled materials were put on the same drape).

Six observations (19.4%) revealed a cluttered work environment, leaving nurses with a limited workspace on a cluttered table (n = 4; 12.9%) or with no space to work on other than the patient's bed (n = 2; 6.5%), resulting in the impossibility of providing consistent proper aseptic care. Separating clean or sterile materials from soiled ones was not always possible.

DISCUSSION

To evaluate the compliance of HCNs with CLABSI prevention guidelines, 3 care bundles ([A] dressing changes at the catheter insertion site, [B] flushing IV catheters, and [C] preparing and administering IV medication) were developed. The bundles were based on international guidelines and content validation, which ensures the relevance of our study results for HCNs.

A low total bundle compliance of 0% (0 of 7), 13.3% (2 of 15) and 22.2% (2 of 9), respectively, was caused by an overall low compliance to several individual bundle items (eg, use of ABHR before dressing changes, maintaining the aseptic technique during dressing changes, and adequately scrubbing access ports or catheter hubs before flushing and administering medication). These items need to be addressed to improve the quality of IV catheter care in home care by the implementation of straightforward guidelines, further surveillance of IP practices in home care, and education of HCNs. Furthermore, attention is needed for hand hygiene after IV catheter care, basic requirements for hand hygiene and cleaning or low-level disinfection of work surfaces before aseptic procedures.

CONCLUSIONS

To our knowledge, this is the first study that assessed IP practices in the Belgian home care setting by using direct observations. These direct observations may imply a risk of the Hawthorne effect.[9] However, this frequently used approach was applied because this is the gold standard to monitor hand hygiene compliance and the only method to get better insight into the work environment of HCNs.[7,9] The generalizability of our results is limited, and further study is needed since this study was solely carried out nearby a Belgian university hospital and has a small sample size; however, we do not suspect selection bias. Despite the small sample size, our results are

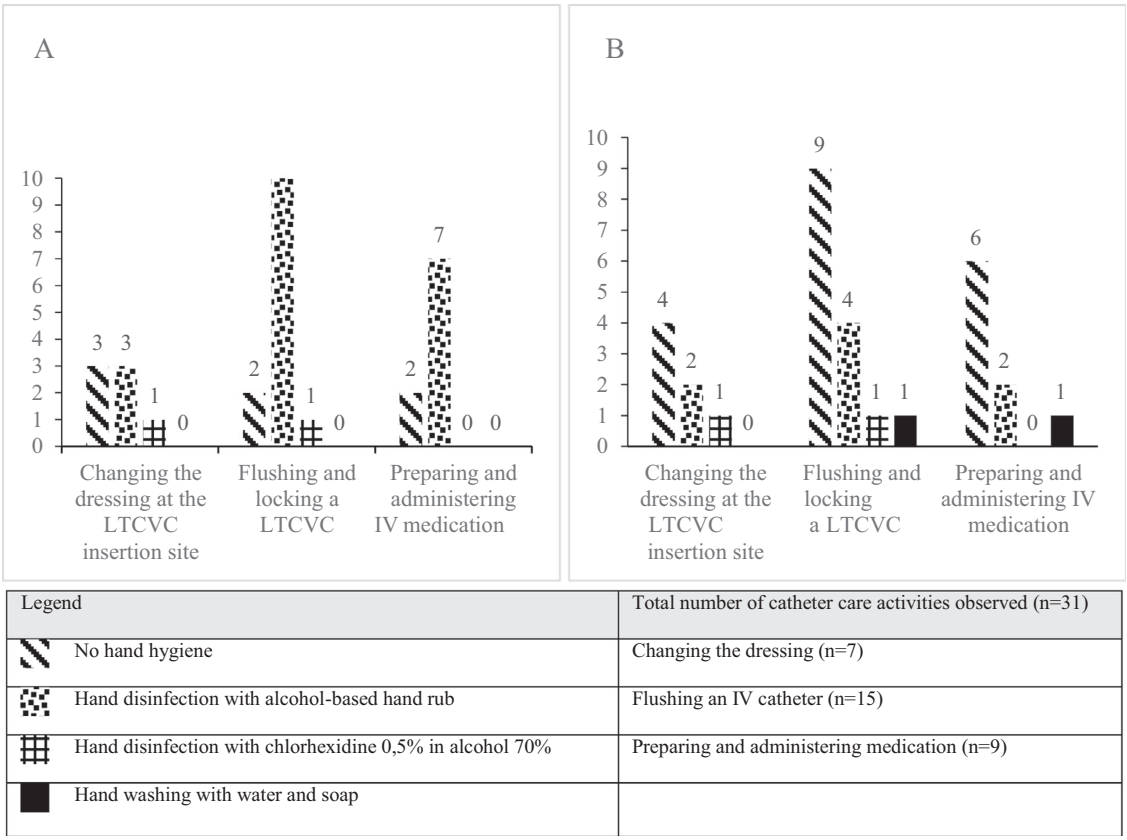

Fig 1. (A) Hand disinfection before the aseptic procedure. (B) Hand disinfection after the aseptic procedure. *IV*, intravascular; *LTCVC*, long-term central vascular catheter.

important because IP in home care is an understudied topic in international literature that will become more important because of increased transfer of hospital to home care.

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