REVIEW

Provision and consumption of alcohol-based hand rubs in European hospitals

S. Hansen, F. Schwab and P. Gastmeier, on behalf of the PROHIBIT study group, D. Pittet, W. Zingg, H. Sax, P. Gastmeier, S. Hansen, H. Grundmann, B. van Benthem, T. van der Kooi, M. Dettenkofer, M. Martin, H. Richet, E. Szilágyi, O. E. Központ, P. B. Heczko, A. Holmes, Y. Kyratsis, R. Ahmad, B. Allegranzi, A. Magiorakos, B. Cookson and A. W. Wu

Charité – University Medicine Berlin, Institute for Hygiene, Berlin, Germany

Abstract

Hand hygiene is considered to be the most effective way of preventing microbial transmission and healthcare-associated infections. The use of alcohol-based hand rubs (AHRs) is the reference standard for effective hand hygiene. AHR consumption is a valuable surrogate parameter for hand hygiene performance, and it can be easily tracked in the healthcare setting. AHR availability at the point of care ensures access to optimal agents, and makes hand hygiene easier by overcoming barriers such as lack of AHRs or inconvenient dispenser locations. Data on AHR consumption and availability at the point of care in European hospitals were obtained as part of the Prevention of Hospital Infections by Intervention and Training (PROHIBIT) study, a framework 7 project funded by the European Commission. Data on AHR consumption were provided by 232 hospitals, and showed median usage of 21 mL (interquartile range (IQR) 9–37 mL) per patient-day (PD) at the hospital level, 66 mL/PD (IQR 33–103 mL/PD) at the intensive-care unit (ICU) level, and 13 mL/PD (IQR 6–25 mL/PD) at the non-ICU level. Consumption varied by country and hospital type. Most ICUs (86%) had AHRs available at 76–100% of points of care, but only approximately two-thirds (65%) of non-ICUs did. The availability of wall-mounted and bed-mounted AHR dispensers was significantly associated with AHR consumption in both ICUs and non-ICUs. The data show that further improvement in hand hygiene behaviour is needed in Europe. To what extent factors at the national, hospital and ward levels influence AHR consumption must be explored further.

Keywords: Europe, HAI prevention, hand hygiene, hand rub consumption, hospital
Article published online: 28 September 2015

Corresponding author: S. Hansen, Institute for Hygiene and Environmental Medicine, Charité – University Medicine Berlin, Campus Benjamin Franklin, Hindenburgdamm 27, D-12203 Berlin, Germany
E-mail: sonja.hansen@charite.de

Introduction

Hand hygiene is considered to be the most effective way of preventing microbial transmission and healthcare-associated infections (HAIs), but healthcare workers' compliance remains suboptimal [1–4]. Hand disinfection with alcohol-based hand rubs (AHRs) removes organisms most effectively, and is the reference standard for effective hand hygiene [5,6].

To increase hand hygiene compliance among healthcare workers, direct observation combined with feedback data has been described as the best way to convince staff of the need for improvement and motivate them to achieve and sustain best-practice targets [7]. However, direct compliance observations are costly and time-consuming, and they are often not performed in a standardized way, making interhospital comparison difficult. Ensuring the comparability of results depends, to a great degree, on the types of observer, the level and type of training that the observers receive, the duration of observation periods, and the number of hand hygiene opportunities observed [8].

Measurement of AHR consumption as a surrogate parameter for hand hygiene performance is a simpler way to characterize the frequency of hand hygiene actions and compare them between units or hospitals [9]. Good correlations

http://dx.doi.org/10.1016/j.cmi.2015.09.019

between AHR consumption and observed hand hygiene compliance rates—and between AHR consumption and HAI reduction—have been described in the literature [10,11]. Hospital use of AHR has also been monitored in the context of several national hand hygiene campaigns in Europe. For example, AHR consumption was integrated into the German Krankenhaus-Infektions-Surveillance-System to provide national reference data [12,13], and, in France, it has been a quality indicator with mandatory annual public reporting since 2006 [14]. In addition to AHR consumption measurement, hospitals should consider periodic observation to ensure sufficient hand hygiene compliance.

To improve hand hygiene, the WHO recommends a 'system change', which includes the availability of AHRs at the point of care as one key component of its 'Clean Care Is Safer Care' campaign. Dispensers located at the point of care ensure access to AHRs, and make hand hygiene easier by overcoming barriers such as a lack of optimal agents or inconvenient dispenser locations [6,15].

Data on AHR consumption and availability at the point of care in European hospitals were obtained as part of the Prevention of Hospital Infections by Intervention and Training (PROHIBIT) study, a framework 7 project funded by the European Commission.

Methods

The PROHIBIT survey was developed by an interdisciplinary group, and comprised questionnaires that explored infection control organization and activities and process/outcome parameters at the hospital level, in intensive-care units (ICUs), and in medical and surgical wards.

European surveillance representatives were invited to act as national contact points and to identify up to 30 hospitals to participate in the survey between September 2011 and March 2012. Overall, data from 309 hospitals in 24 countries were included in the PROHIBIT reference dataset. The complete methods of the survey and characteristics of the 309 hospitals are described elsewhere [16].

According to the WHO, AHRs at the point of care are defined as AHRs at the place where the patient, the healthcare worker and care or treatment come together, and at which AHRs should be easily accessible [15].

ICU and ward head nurses provided data on AHR availability (liquid, gel, or foam) in wall-mounted or bed-mounted dispensers at patient points of care (bed space, examination room, or treatment/procedure area) and in individual pocket or belt bottles. Nurses reported AHR availability in quartiles (0–25%, 26–50%, 51–75% or 76–100% of points of care).

Leading infection control personnel provided retrospective data on AHR consumption for the year 2010. Data were analysed descriptively as mL/patient-day (PD) in ICUs, medical wards, and surgical wards. Data at the country level were summarized according to United Nations geographical region [17]. The association between AHR consumption and good AHR availability (76–100% of points of care) was analysed with the Wilcoxon rank sum test (two-sided). p-Values of <0.05 were considered to be significant. All analyses were performed with SPSS version 22 (IBM SPSS Statistics, Somer, NY, USA) and SAS 9.3 (SAS Institute, Cary, NC, USA).

Results

Data on AHR availability were obtained from 396 ICUs and 1029 non-ICUs (514 medical and 515 surgical wards) from all 309 hospitals. Most ICUs (86%) had AHRs available at 76–100% of points of care, but only approximately two-thirds (65%) of non-ICUs did.

Data on AHR consumption at the ICU and non-ICU level were provided by 249 hospitals, with a median of 423 beds (interquartile range (IQR) 265–800 beds). More of the hospitals were located in eastern Europe (32%) and southern Europe (29%) than in western Europe (21%) and northern Europe (17%). As shown in Table I, AHR consumption was higher in ICUs than in non-ICUs, and it varied across Europe, with lower consumption being seen mainly in southern and eastern European countries. Hospital-wide consumption data for 232 hospitals showed a median AHR usage of 21 mL/PD (IQR 9–37 mL/PD), with higher consumption in specialized and tertiary hospitals (39 mL/PD (IQR 9–79 mL/PD) and 23 mL/PD (IQR 13–36 mL/PD), respectively).

A further analysis showed a significant association between AHR consumption and high AHR availability in ICUs, medical wards, and surgical wards (Fig. 1).

Discussion

We analysed data from 24 countries on AHR availability and consumption, to determine the structure and performance of hand hygiene in hospitals in Europe.

Our findings on AHR consumption were similar to the results of the Point Prevalence Survey of HAI and Antimicrobial Use in Europe, which showed a median hospital-wide consumption of 18.7 mL/PD (IQR 10.3–30.6 mL/PD) in 805 hospitals in 2011–2012 [18]. In both surveys, AHR usage varied by hospital type, with lower consumption in primary and secondary hospitals, which is not surprising, given that