



Use of ventilator utilization ratio for stratifying alcohol-based hand-rub consumption data to improve surveillance on intensive care units

W. Wetzker*, K. Bunte-Schönberger, J. Walter, C. Schröder, P. Gastmeier, C. Reichardt

Charité – Universitätsmedizin Berlin, Institut für Hygiene und Umweltmedizin, Berlin, Germany

ARTICLE INFO

Article history:

Received 13 June 2016

Accepted 26 October 2016

Available online 3 November 2016

Keywords:

Hand hygiene

Compliance

Surveillance

Hand-rub consumption

Ventilator utilization ratio



CrossMark

SUMMARY

Background: Germany has established a nationwide surveillance system of alcohol-based hand-rub consumption (AHC) per patient-day in hospital settings as a surrogate parameter for hand hygiene (HH) compliance. Analysis of AHC data in intensive care units (ICUs) shows not only a wide range of consumption between units of different specialties, but also within units of one specialty. This seems to reflect variation in the number of HH opportunities per patient-day between ICUs due to variation in complexity of care.

Aim: To investigate whether ventilator utilization ratio (VUR) might be a good surrogate for describing complexity and intensity of care on ICUs and whether stratification by VUR works as a new method of setting benchmarks for AHC data.

Methods: Data from 365 ICUs participating in the German national nosocomial infection surveillance system (KISS) were used. VUR was calculated by dividing the number of ventilator-days per unit by the number of patient-days per unit. AHC was stratified according to VUR in quartiles.

Findings: The median AHC was 107 mL/patient-day [interquartile range (IQR): 86–134] and the median VUR was 33% (IQR: 22–45%). The Spearman rank correlation coefficient was 0.28 ($P < 0.0001$). After stratifying AHC according to VUR, the AHC in quartile I was significantly lower compared to quartile IV. There was also significant difference between quartile I and quartiles II and III.

Conclusion: Stratification of AHC data according to VUR is suggested to improve the quality of benchmark parameters based on AHC data as surrogate parameter for HH compliance in ICUs.

© 2016 The Healthcare Infection Society. Published by Elsevier Ltd. All rights reserved.

Introduction

Appropriate hand hygiene (HH) compliance is considered the single most effective measure to prevent and control healthcare-associated infections and to reduce the spread of multidrug-resistant pathogens.^{1–5} Therefore improving HH compliance is a good quality indicator for patient safety

* Corresponding author. Address: Charité – Universitätsmedizin Berlin, Institut für Hygiene und Umweltmedizin, Hindenburgdamm 27, D-12203 Berlin, Germany.

E-mail address: wibke.wetzker@charite.de (W. Wetzker).

programmes in hospitals, and surveillance of HH compliance is highly recommended. Direct observation by independent, trained personnel using the World Health Organization's 'My five moments for hand hygiene' model is considered the gold standard method for HH compliance measurement.^{6–8} However, healthcare workers may be prompted to clean their hands when they become aware of the observer. The so-called Hawthorne effect may result in higher compliance rates.^{9,10} In addition, direct observation is time-consuming and associated with high costs, and observers may also violate patient privacy.^{7,8}

Some countries have established surveillance systems on a national level to determine consumption of products for hand antisepsis and handwashing as a surrogate parameter for HH behaviour, e.g. France and Germany.^{11,12} This method was also used worldwide for national campaigns (such as the 'Clean-yourhands' campaign in England and Wales) and within the concept of multi-modal interventions to measure their effect on HH compliance.^{5,13–15} In Germany alcohol-based hand-rub is the product of choice for medical hand decontamination. National HH guidelines recommend the use of alcohol-based hand-rub in all HH opportunities except in care for patients with *Clostridium difficile* diarrhoea, where the use of alcohol-based hand-rub should be followed by hand washing. If hands are visibly soiled, hand washing with soap and water is also recommended. Analysis of early data from the campaign showed, that hand washing counted for less than 3% of all hand hygiene actions. Therefore, hand washing is not included into surveillance data in Germany.

Based on the assumption that type of patients and number of HH opportunities per day remain relatively constant at the individual units, alcohol-based hand-rub consumption (AHC) data are stratified by type of unit for analysis. However, for benchmarking AHC data at the ICU level, it should be considered that there is an appreciable variation between the different types of ICUs (surgical, medical, neonatal, interdisciplinary, etc.) and between ICUs of the same type as regards to the complexity of care.^{12,16} The aim of this study, therefore, was to investigate whether ventilator utilization ratio (VUR) might be a good surrogate for describing complexity and intensity of care on ICUs and whether stratification by VUR works as a new method of setting benchmarks for AHC data.

Methods

Annual data for the year 2014 from two components (ICU-KISS and Hand-KISS) of the German national nosocomial infection surveillance system were used for analysis. ICUs provide annual AHC and patient-days for the Hand-KISS component.

Table I

Stratification of alcohol-based hand-rub consumption (AHC) in intensive care units (ICUs) according to ventilator utilization ratio (VUR) in 2014

VUR	No. of ICUs	Patient-days	Annual AHC (L)	Distribution of AHC per patient-day (mL/patient-day)					
				Mean	P10	P25	Median	P75	P90
<22%	89	268,471	26,432	98	66	78	95	113	133
≥22%, <33%	92	337,131	39,894	116	74	91	110	131	160
≥33%, <45%	91	365,545	42,837	117	70	84	106	145	176
≥45%	93	422,306	55,419	131	80	101	124	156	198
Total	365	1,393,453	163,582	117	70	86	107	134	176

P10, P25, P75, P90: percentile at 10%, 25%, 75% and 90%, respectively.

Within the ICU-KISS component the following data are collected on a monthly basis: patient-days and device-days for urinary tract catheter, invasive ventilation, and central venous catheter. The methods for ICU-KISS and HAND-KISS have been described in detail previously.^{12,17,18} Based on these data, VUR was calculated for each ICU by dividing the total number of ventilator-days by the total number of patient-days (multiplied by 100). ICUs were then stratified by the following VUR quartiles: quartile I, <22%; quartile II, between 22 and 33%; quartile III, between 33 and 45%; and quartile IV, >45%.

Reference data for AHC were calculated for each quartile. Correlation of VUR and AHC was determined using Spearman's rank correlation coefficient and incidence rate ratios were calculated.

Results

In 2014 a total of 1110 ICUs provided data for HAND-KISS with a median AHC of 105 mL/patient-day. In addition, 766 ICUs provided data for ICU-KISS in 2014. Data from 365 ICUs participating in both components in 2014 were used for this analysis. In this group, the median AHC was 107 mL/patient-day [interquartile range (IQR): 86–134] and the median VUR was 33% (IQR: 22–45%). The Spearman rank correlation coefficient was 0.28 ($P < 0.0001$) representing a weak but significant correlation between AHC and VUR. Table I shows AHC per patient-day stratified according to VUR. The median AHC in quartile I was 95 mL/patient-day compared to 124 mL/patient-day in quartile IV.

A significant 34% lower AHC rate was found comparing quartile I with quartile IV (Table II). There was also a significant increase in AHC when data of quartiles I and II (18%) and quartiles III and IV (12%) were compared. There was a negligible difference in AHC of 1% between quartiles II and III. Figures 1 and 2 illustrate the variance of data within quartiles indicating the highest dispersion of values for quartile IV.

Discussion

Continuous surveillance of AHC in combination with the use of benchmark data is a very valuable tool in infection prevention and control and may lead to a significant improvement in HH performance in patient care.^{5,12,19} The high level of interest in this method of quality management with 1110 ICUs participating voluntarily in HAND-KISS in 2014 supports this assumption for hospitals in Germany. However, HH compliance in German ICUs is still below optimal.²⁰ Therefore further efforts to increase and explore HH compliance are necessary.

Download English Version:

<https://daneshyari.com/en/article/5668396>

Download Persian Version:

<https://daneshyari.com/article/5668396>

[Daneshyari.com](https://daneshyari.com)