

Stethoscope Cleaning During Patient Care

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ABSTRACT

BACKGROUND: We conducted a cross-sectional survey of healthcare workers in two community teaching hospitals to better understand clinicians' beliefs and practices related to cleaning of their stethoscopes. The study was conducted from September 2015 to May 2016.

PARTICIPANTS: Among the total 358 responses received, 45%, 40%, 10% and 5% were from attending physicians, medical students, nurses, and resident physicians, respectively.

KEY RESULTS: Although the majority of the respondents (76%) frequently used a stethoscope at work, and almost all (93%) believed that stethoscopes can be involved in pathogen transmission, only 29% of participants reported cleaning their stethoscopes after every use.

CONCLUSIONS: Hospitals should include stethoscope cleaning into their overall infection prevention efforts.

KEYWORDS: stethoscope, cleaning, healthcare workers

INTRODUCTION

We live in an era of increased efforts aimed at preventing healthcare-associated infections. [1] Many US institutions, including ours, have adopted formal infection control policies regarding stethoscope cleaning, in accordance with the Centers for Disease Control and Prevention (CDC) guidelines for cleaning, disinfection, and sterilization of medical equipment, devices and supplies but the frequency and best method are not clearly specified in these guidelines.[2] Most institutions have dedicated significant resources to improving compliance with hand-hygiene [3] and have developed rigorous protocols for the prevention of catheter-associated infections,[4] or surgical-site infections.[5] In contrast, stethoscope cleaning has received relatively little attention, despite its frequent use in clinical practice. In this study, we sought to characterize healthcare workers' beliefs and practices related to stethoscope cleaning in two community hospitals.

METHODS

We conducted an anonymous internet-based cross-sectional survey from September 2015 to May 2016, administered by email to physicians, nurses, and medical students in the

outpatient and inpatient setting of two university-affiliated community hospitals. We inquired about 1) frequency of stethoscope use and frequency of stethoscope cleaning during a typical clinical practice day; 2) agent(s) used for stethoscope cleaning; and 3) belief that stethoscope may be a vector of nosocomial pathogen transmission; and 4) knowledge of and previous training related to institutional stethoscope cleaning policies. We used the chi-square test to determine differences between different respondent groups, and analyzed the data in STATA 14.1 SE for Windows.

The study was conducted as part of a larger quality improvement effort aimed at hospital infection prevention, and met the criteria for "exempt" status by our Institutional Review Board. These hospitals have stethoscope disinfection policies based on CDC guidelines.

RESULTS

A total of 358 healthcare workers participated in the survey, with attending physicians, medical students, nurses, and resident physicians responding in a proportion of 45%, 40%, 10%, and 5%, respectively. A total of 61% of our participants came from general medicine and/or its subspecialties, while 15% were from surgical specialties, and 24% were from other specialties (radiology, pediatrics, emergency medicine).

The main results of our survey are summarized in **Table 1**. Respondents from medical specialties were more likely to use a stethoscope most of the time at work ($P < 0.001$). Attending physicians were more likely to report cleaning their stethoscope after every use ($P = 0.001$) and to believe that a specific institutional policy related to stethoscope cleaning does not exist. In contrast, medical students were more likely to report cleaning their stethoscope whenever they remembered to do so ($P < 0.001$), and to report not knowing whether an institutional policy related to stethoscope cleaning exists. Nurses were less likely to report having received any previous training on stethoscope cleaning ($P = 0.003$), compared to other respondent groups.

DISCUSSION

We found that the majority of our clinicians use a stethoscope frequently during their practice, and almost all believe that the stethoscope could be involved in pathogen transmission

Table 1. Response summary for our healthcare worker survey related to stethoscope cleaning during clinical practice.

Topic	N	%
Stethoscope Use During Typical Patient Care Day		
Most of the time	272	76
Some of the time	53	15
Rarely or never	33	9
Stethoscope Cleaning During Typical Patient Care Day		
After every use	102	29
At least once a day	84	24
At least once a week	23	6
Whenever participant remembers	141	39
Does not use stethoscope in patient care	8	2
Agent(s) Used for Stethoscope Cleaning During Typical Patient Care Day		
Isopropyl alcohol – based ^a	239	67
Ethyl alcohol – based hand sanitizers ^b	98	27
Other ^c	21	6
Knowledge of Institutional Stethoscope Cleaning Policy		
Not sure policy exists	199	55
Policy does not exist	142	40
Aware policy exists	17	5
Previous training on Stethoscope Cleaning		
None remembered	321	90
Yes, as a student	31	8
Yes, at current workplace	6	2
Believes stethoscope can be involved in nosocomial pathogen transmission		
Yes	332	93
Maybe	21	6
No	4	1
Total	358	100

^aIncludes rubbing alcohol, or alcohol-based wipes, preps or disinfectant pads

^bavailable mostly as Purell throughout clinical areas

^c includes soap and water, bleach-based wipes, and CaviWipes

within the healthcare setting. However, less than one-third of our clinicians clean their stethoscope after every use, or even daily. The majority of our respondents also report minimal to no training regarding stethoscope cleaning, and are not aware of an institutional policy in this regard, suggesting that stethoscope cleaning has not received much attention as a component of institutional efforts aimed at hospital infection prevention.

Our study is limited by under-representation from several healthcare worker categories (such as allied health professionals and nurses, for example), reflects the experience of only two community teaching hospitals that may not be generalizable to other institutions, and likely suffers from the inherent bias associated with self-reporting. Our study is also limited by the over-inclusion of medical students, who rotate transiently on clinical wards, and may not be

fully aware of existing institutional policies, as shown by our results. Their experience highlights the importance of including specific infection control aspects into their clinical training, which should be emphasized both theoretically in the classroom, as well as practically through role-modeling at the bedside. Nevertheless, our findings are similar to those of Ali S et al, who recently found in a similar survey that 11% of the healthcare professionals attending their Medical Grand Rounds admitted to having never cleaned their stethoscope.[6] Although prior studies implicating the stethoscope as a direct vector of nosocomial pathogen transmission and subsequent infection development are lacking, evidence of stethoscope bacterial colonization of both diaphragm and ear pieces certainly exists [7], with physicians' stethoscopes carrying significantly more pathogens compared to nurses' stethoscopes in one study [8]. Similarly, a study of stethoscopes used by physicians and students practicing in a pediatric ward found a bacterial colonization rate of 86%, including staphylococcal species, gram-negative rods, and drug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* and *Acinetobacter baumannii*. [9] A study done at Leicester Royal Infirmary in the UK isolated *Clostridium difficile* colonies on 4.9% of physician's stethoscopes. [10]

There was general agreement among our clinicians that the potential for nosocomial pathogen transmission exists, as previously recognized [11]. However, there is less healthcare consensus regarding the optimal frequency of stethoscope cleaning, or what the most effective disinfectants might be. Previous studies have shown isopropyl alcohol to effectively reduce bacterial burden when applied to contaminated stethoscope diaphragms [8, 12], and this was the agent most commonly used by our healthcare workers, as it is easily accessible on the hospital wards.

In conclusion, we believe that healthcare institutions should include reminders, training, and policies related to stethoscope cleaning into their overall infection prevention efforts aimed at reducing nosocomial pathogen transmission and healthcare associated infections.

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References

1. Doll M, Hewlett AL, Bearman G. Infection Prevention in the Hospital from Past to Present: Evolving Roles and Shifting Priorities. *Curr Infect Dis Rep*, 2016. **18**(5): p. 16.
2. Rutala WA, Weber DJ, & Healthcare Infection Control Practices Advisory Committee. (2008). *Guideline for Disinfection and Sterilization in Healthcare Facilities, 2008* [Rep.]. Retrieved April 30, 2017 from Centers for Disease Control and Prevention website: <https://www.cdc.gov/infectioncontrol/pdf/guidelines/disinfection-guidelines.pdf>
3. Gould DJ, et al. Interventions to improve hand hygiene compliance in patient care. *Cochrane Database Syst Rev*, 2010(9): p. CD005186.
4. Blot K, et al. Prevention of central line-associated bloodstream infections through quality improvement interventions: a systematic review and meta-analysis. *Clin Infect Dis*, 2014. **59**(1): p. 96-105.
5. Tanner J, et al. Do surgical care bundles reduce the risk of surgical site infections in patients undergoing colorectal surgery? A systematic review and cohort meta-analysis of 8,515 patients. *Surgery*, 2015. **158**(1): p. 66-77.
6. Ali S, et al., Have you cleaned your stethoscope today? *J Hosp Infect*, 2016, Aug 31; available at: <http://dx.doi.org/10.1016/j.jhin.2016.07.024>.
7. Lokkur PP, Nagaraj S. The prevalence of bacterial contamination of stethoscope diaphragms: a cross sectional study, among health care workers of a tertiary care hospital. *Indian J Med Microbiol*, 2014. **32**(2): p. 201-2.
8. Marinella MA, Pierson C, Chenoweth C. The stethoscope. A potential source of nosocomial infection? *Arch Intern Med*, 1997. **157**(7): p. 786-90.
9. Youngster I, et al. The stethoscope as a vector of infectious diseases in the paediatric division. *Acta Paediatr*, 2008. **97**(9): p. 1253-5.
10. Alleyne S, et al. Stethoscopes: potential vectors of *Clostridium difficile*. *J Hosp Infection* 2009;**73**:187-189.
11. Brook I. The stethoscope as a potential source of transmission of bacteria. *Infect Control Hosp Epidemiol*, 1997. **18**(9): p. 608.
12. Nunez S, et al. The stethoscope in the Emergency Department: a vector of infection? *Epidemiol Infect*, 2000. **124**(2): p. 233-7.

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