

## BACTERIAL CONTAMINATION OF STETHOSCOPIES

Huda A. Bukharie, ABIM, Hussain Al-Zahrani, PhD, Abdullah M. Rubaish, ABIM, Mohammed F. Abdulmohsen, MD

King Fahd Hospital of the University, Al-Khobar, Saudi Arabia

**خلفية الدراسة:** المسماع الطبي هو أحد وسائل الفحص الطبي الأساسية ولكنه وللأسف يمكن أن يسبب انتقال العدوى الجرثومية من مريض إلى آخر في حالة عدم الاهتمام بتنظيفه .  
**طريقة الدراسة:** لقد تم أخذ مسحات من أقماع وأحجية المساميع الخاصة بمائة عامل في الحقل الطبي السريري ، في مواقع محددة في مستشفى الملك فهد الجامعي بالخبر ... وفي أثناء جمع المساميع الطبية قام كل صاحب مسماع بتعبئة الاستبيان السابق إعداده .  
**نتائج الدراسة:** لقد تبين تلوث 30 ( 30 % ) من أصل مائة سماعة بالجراثيم المختلفة . وكانت غالبية الجراثيم التي تم عزلها من النوع إيجابي الجرام . وكانت الجراثيم العنقودية موجبة الجرام تمثل 12% من حالات التلوث والجراثيم المكورة موجبة الجرام 9% فقط من العينة البحثية .  
ولم يتم فصل الجراثيم العنقودية موجبة الجرام والمقاومة للمثليين من أي من المساميع الطبية موضع الدراسة .  
ومن نتائج الاستبيان اتضح أن 21% من الممارسين للعمل الطبي يهتمون بتنظيف مساميعهم يومياً ، 47% يقومون بتنظيفها أسبوعياً ويقوم 32% منهم بتنظيفها كل عام فقط ولا يقوم أحد منهم على الإطلاق بتنظيفها بعيد فحص كل مريض . ولقد تبين أيضاً من الاستبيان أن الممرضات أكثر اعتناءً بتنظيف المساميع مقارنة بباقي أفراد العينة البحثية .  
**الخلاصة:** - يعتبر عدم الاستخدام الآمن للمسماع الطبي وسيلة لنشر العدوى الجرثومية بين المرضى . وبالتالي فإن تعقيم المسماع الطبي بطريقة جيدة بعيد فحص كل مريض هو أحد الطرق المهمة لمنع انتشار العدوى وخاصة في الأقسام التي تتواجد فيها الجراثيم المقاومة للمضادات الحيوية كأقسام رعاية الحالات الحرجة وقسم علاج الأورام .  
**الكلمات المرجعية:** المسماع الطبي، المملكة العربية السعودية، التلوث الجرثومي.

**Background:** A stethoscope, an essential tool of the medical profession, can become a source of nosocomial infection.

**Objective:** To determine the frequency of bacterial contamination of stethoscopes as well as the practices used for cleaning them.

**Methods:** Cultures were taken from 100 stethoscopes used by different medical personnel in different hospital services. The stethoscopes were collected while the staff filled in a questionnaire.

**Results:** Thirty (30%) out of the 100 stethoscopes surveyed were contaminated with microorganisms. The majority of organisms isolated were gram-positive bacteria (gram positive bacilli 12%, gram-negative bacteria 9%, gram-positive cocci 9%). None of the stethoscopes grew methicillin-resistant staphylococcus aureus. Overall, 21% of the health personnel cleaned their stethoscopes daily, 47% weekly, and 32% yearly. None of the health care workers cleaned their stethoscopes after every patient. Nurses cleaned their stethoscopes more often than physicians and medical students.

**Conclusion:** Stethoscopes may be important in the spread of infectious agents. Their regular disinfection after use on each patient should be considered, particularly in such areas of the hospital, as the critical care units, and oncology units which house many patients with antibiotic-resistant organisms.

**Key Words:** Stethoscope, Contamination, Saudi Arabia

### INTRODUCTION

Nosocomial infection has been recognized for over a century as both a critical problem affecting the quality of health care and a leading cause of morbidity, mortality and increased health care cost.<sup>1</sup> Stethoscopes are essential tools of the medical

profession and because of their universal use might be a source of microorganisms that cause nosocomial infections. Stethoscopes come in direct contact with numerous patients daily and their disinfection after each use is not an established practice.

### Correspondence to:

Dr. Huda A. Bukharie, Department of Internal Medicine, P.O. Box 2208, Al-Khobar 31952, Saudi Arabia  
E-mail: hudawe000@yahoo.com

Several studies in medical literature have demonstrated that many physicians' stethoscopes are contaminated with pathogenic bacteria and could serve as a mode for transmission of infection.<sup>2-4</sup> This phenomenon may be a particular problem in areas where the outbreak of multidrug resistant bacteria, such as, methicillin-resistant *Staphylococcus aureus* (MRSA), occurs or where patients with increased susceptibility to infection are to be found. We evaluated the problem by surveying the current practice of stethoscope hygiene among health care professionals and screened their stethoscopes for microorganisms during an outbreak of MRSA.

## MATERIALS AND METHODS

King Fahd Hospital of the University is a 440-bed, primary-through-tertiary care hospital located in the Eastern Province of Saudi Arabia. During a campaign to educate health care workers on the sources of MRSA, swabs were randomly taken from 100 stethoscopes used by different medical personnel in different hospital services. Stethoscopes were collected while the staff completed a simple self explanatory questionnaire which explored the category of the health personnel, and the frequency of cleaning their stethoscopes (never, once a year, once a week, daily or after each patient). Cultures from stethoscopes were obtained by swabbing the diaphragm and the bell of the stethoscope with a sterile swab moistened with saline. These swabs were immediately streaked onto blood agar plates and incubated in air at 37°C for 48 hours. Cultures were identified by colony morphologic characteristics, Gram stain characteristics, and standardized microbiological biochemical tests.

## RESULTS

A total of 100 stethoscopes were examined. The types of bacteria isolated from the stethoscopes are summarized in Table 1. There was, as expected, a predominance of microorganisms commonly found as cutaneous flora. Several other potentially pathogenic microorganisms were also isolated. These include *Escherichia coli* and *Klebsiella* species. No methicillin-resistant staphylococci were isolated.

The frequency of cleaning of stethoscope by the staff is shown in Table 2. Nurses and respiratory therapists cleaned their stethoscopes more often than doctors or medical students. None of the health personnel cleaned their stethoscopes after each patient.

**Table 1:** Results of cultures from 100 stethoscopes

Isolate	No. of isolates (%)
No growth	70 (70)
Gram positive bacilli	12 (12)
Staphylococcus epidermidis	9 (9)
Escherichia coli	7 (7)
Klebsiella species	2 (2)

**Table 2:** Frequency of cleaning stethoscopes among 100 health care personnel

Frequency	Nurses (N=40)	Doctors (N=30)	Students (N=22)	R.T.* (N=8)
	No. (%)	No. (%)	No. (%)	No. (%)
Never or very occasionally	9 (23)	15 (50)	8 (36)	0 (0)
Once a week	20 (50)	13 (43)	11 (50)	3 (38)
Daily	11 (28)	2 (7)	3 (14)	5 (62)
After each patient	0 (0)	0 (0)	0 (0)	0 (0)

\*RT=Respiratory therapists

## DISCUSSION

Health care workers are a potential source of nosocomial infections. Many endemic pathogens are transmitted through hand carriage, and since the time of Semmelweis, hand washing has been repeatedly shown to reduce the risk of nosocomial infections.<sup>5,6</sup> However, transmission of infection through medical devices is also well documented. Outbreaks of nosocomial infections attributed to electronic thermometers,<sup>7</sup> blood pressure cuffs,<sup>8</sup> and latex gloves<sup>9</sup> have been reported. Several studies have investigated the presence of pathogenic bacteria on stethoscopes as a source of infection.<sup>2-4</sup>

The results of our study demonstrate that stethoscopes that are utilized in clinical practice on a daily basis carry potentially pathogenic microorganisms. Since normal skin flora consists primarily of gram-positive bacteria, it is not surprising that fewer gram-negative bacteria were isolated. The frequency of contamination of stethoscopes observed in this study is lower than the 70% to 100% reported in the literature.<sup>2-4</sup>

Coagulase negative *staphylococcus* is a microorganism which frequently causes severe systemic infections, including catheter-associated and device-associated sepsis. Intact skin is an efficient barrier against most infective agents. However, small skin lesions are frequent and this route of exposure should not be underestimated. This is extremely important when treating patients with wounds or burns, or patients with catheters or tracheostomies.

In our study, only 21% of the respondents regularly cleaned their stethoscopes. Nurses cleaned their stethoscopes more frequently than physicians and medical students. None of the health care workers cleaned their stethoscopes after use in every patient. Isopropyl alcohol has been shown to reduce bacterial colony counts when applied to the stethoscope diaphragm.<sup>3</sup> Regular disinfection of stethoscopes or disposable cover should be used to minimize the possibility of spreading infectious agents in hospitalized patients. This is especially important today, since hospitals now care for more immunocompromised patients than in previous times and also there is increased resistance of bacteria to available antibiotics.<sup>10</sup>

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