

Assessment of Stethoscope Hygiene Practices Among Physicians in Salmaniya Medical Complex- a Cross-Sectional Study in a Tertiary Hospital

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INTRODUCTION

Health care-associated infections (HAIs) are defined as infections that patients acquire within two days or more post- admission, or within one month after receiving medical care. ^{1,2} It is a well-recognized universal medical concern; hence, many preventative measures and surveillance measures have been established to decrease the HAI rate, as HAIs have been related to multidrug-resistant illnesses. ^{1,3,4} In 2021, the United States of America (USA) reported that nearly 4% of hospitalized patients acquired at least one of HAI. ⁴ Another recent study involving three hospitals in Saudi Arabia concluded that the rate of HAIs was 3.5%. In addition, they emphasized the significant correlation between developing an HAI and the length of hospital stay. ^{5,6}

In everyday medical practice, the stethoscope is one of the fundamentally used equipment, and as a result, it can harbor different organisms due to direct contact with a number of patients, which might eventually lead to HAIs. ^{7,8} The most frequently isolated bacterial organisms on stethoscopes are Acinetobacter, Escherichia coli, Pseudomonas, Clostridium difficile, and vancomycin-resistant enterococci. ⁹ During the COVID-19 pandemic, it was determined that the SARS-COV-2 virus can survive for three days or more on different surfaces, which raised concerns about the potential risk of stethoscopes in transmitting this infection. ^{10,11}

This study aimed to assess physicians’ practices and perspectives regarding stethoscope hygiene.

MATERIALS & METHODS

This cross-sectional study was conducted from January 2022 to March 2022 in the Salmaniya Medical Complex (SMC), the largest medical tertiary hospital in the Kingdom of Bahrain. ¹² This study assessed stethoscope hygiene practices among physicians working in the SMC. Ethical approval was obtained from the research and ethical committee. The data were obtained through a questionnaire that addressed the following: physicians’ levels, physicians’ specialties, stethoscope hygiene practices, physicians’ perspectives toward hygiene practices and the use of stethoscopes in special circumstances such as the COVID-19 pandemic and in case of contact isolation.

The questionnaire was sent electronically to the physicians. Participation in the study was voluntary, and electronic informed consent was obtained from the participants.

Physicians with direct contact with patients were included. However, physicians with low stethoscope usage or those who were not in direct contact with patients, such as those working in the radiology and pathology departments, were excluded.

Furthermore, according to CDC recommendations ¹³, we divided the participants into two categories: the first category included participants

with good stethoscope hygiene practices, and the second category included those with poor stethoscope hygiene practices. Physicians were considered to have good stethoscope hygiene practices when they disinfected their stethoscope before or after each use or at least after each use. However, physicians were considered to have poor hygiene practices when they rarely or never disinfected their stethoscope.

RESULTS

A total of 205 subjects responded to the survey. Among the survey respondents, 119 (58%) were female, whereas 86 (42%) were male. Most of the participants 130(63.4%) were in the young age group (21 and 30 years) Figure 1.

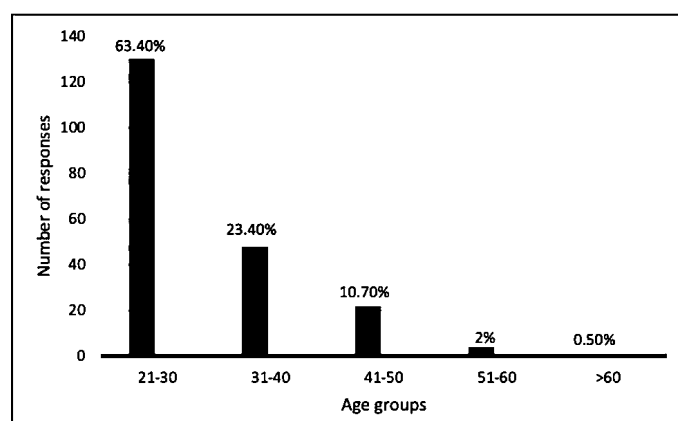


Figure 1. Participation rates by age groups

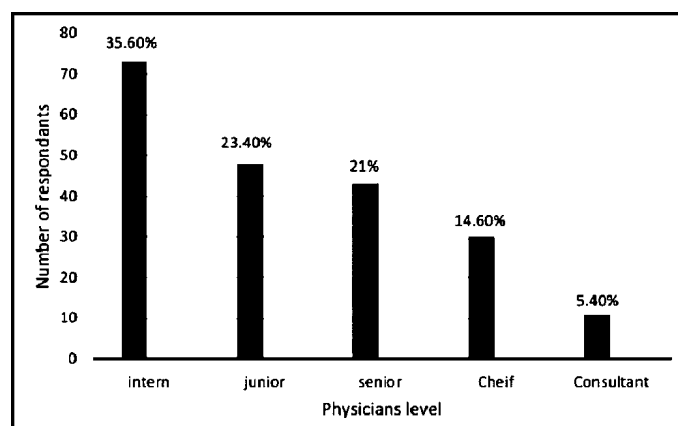


Figure 2. Participation rates by physicians level

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The majority of subjects were residents 91(44.4%), followed by trainees 73(35.6%), chief residents 30(14.6%), and consultants 11(5.4%) Figure 2.

Our study found that the majority of participants 118(57.5%) were practicing good stethoscope hygiene. And 43 (58.9%) of them were trainees. In addition, 39 (15.6%) of participants clean their stethoscope at least once per day. In comparison, 44 (21.4%) were practicing poor stethoscope hygiene Figure 3

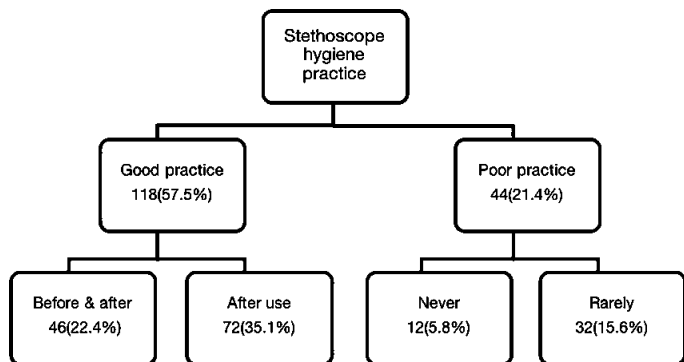


Figure 3. Stethoscope hygiene practice between good and poor practice.

Furthermore, most of the physicians 107(52.20%) spent 5-10 seconds cleaning their stethoscope Figure 4.

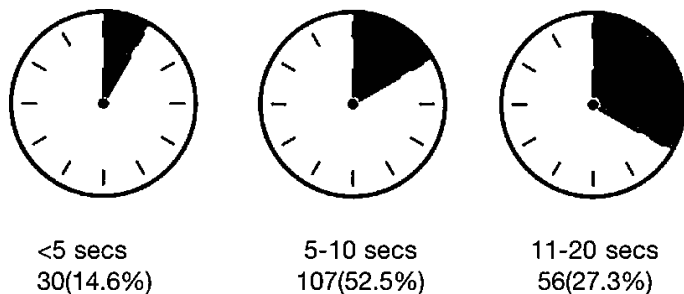


Figure 4. The time spent in stethoscope hygiene practice

And nearly half of the physicians cleaned all parts of the stethoscope Figure 5.

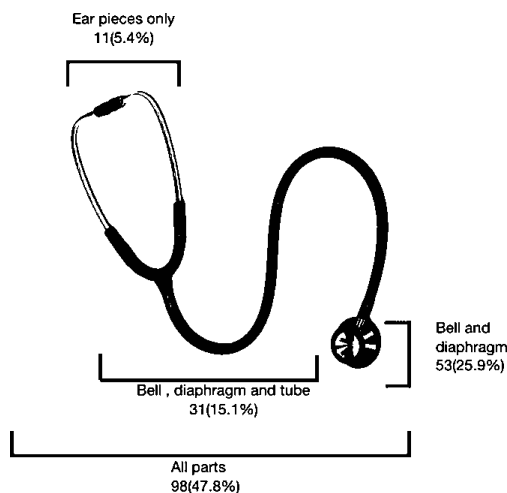


Figure 5. Frequency of disinfecting different parts of the stethoscope

Most participants used alcohol 191 (93.1%) as a disinfecting agent. However, 29 (14.10%) of the participants reported concerns that alcohol could damage their stethoscopes.

The main three commonly reported barriers regarding cleaning stethoscopes were forgetfulness 99 (48%), a lack of time 64 (31.2%), and poor access to disinfecting agents 60(29.3%) Figure 6.

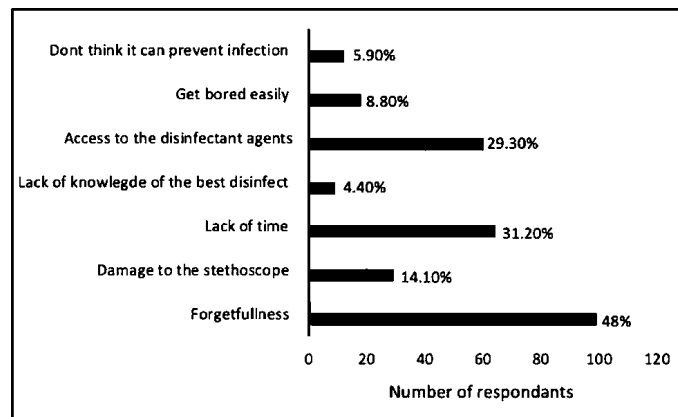


Figure 6. Barriers to stethoscope disinfection among HCWs

In regard to contact isolation practices, 116 (56.60%) of the physicians examined patients with contact precautions by applying their stethoscope on the patients’ clothes. Forty-eight (23.40%) physicians applied their stethoscope directly on the patients' skin, and only 41 (20%) of the physicians covered their stethoscopes with a disposable material while examining patients.

During the COVID-19 pandemic, 100(48.80%) participants used their own stethoscopes during patients’ examinations. However, 73 (35.60%) participants used the allocated stethoscope in each ward. Only 32 (15.60%) participants used a disposable stethoscope. Table1.

Table 1. Stethoscope hygiene practice among HCWs

Agent used in cleaning stethoscope		
Alcohol swab	93.10%	191
Cloth	0.50%	1
Soapy water	0.50%	1
No agent	5.80%	12
Applying stethoscope in contact isolation patients		
Directly on skin	23.40%	48
On clothes	56.60%	116
Covered with disposal material	20%	41
Applying stethoscope in COVID-19 infection		
Physicians own stethoscope	48.80%	100
Ward's stethoscope	35.60%	73
Disposal stethoscope	15.60%	32

DISCUSSION

HAIs are a well-recognized burden on the health care system. Many preventative measures have been taken to reduce the risk of cross-infection, and one of the most commonly recommended strategies is emphasizing regular hand hygiene.¹⁴⁻¹⁶ In contrast, limited consideration has been given regarding stethoscope disinfection³, even though many studies have shown that the microbes that reside on the stethoscopes are similar to those found on our hands and are present in a similar quantity.¹⁷

Stethoscopes are vectors for HAIs.¹⁸ Many organisms have been identified on physicians' stethoscopes, such as methicillin-resistant *Staphylococcus aureus*, *Pseudomonas* species, *Klebsiella pneumoniae*, *Escherichia coli*, and *Listeria monocytogenes*.¹⁹

CDC recommendations state that a stethoscope should be disinfected when it is visibly soiled or on a regular basis, such as after each patient¹³. Our study showed that most of our residents and trainees were practicing good stethoscope hygiene 118(57.5%).

This was reported in another study that found a low bacterial contamination rate for interns' stethoscopes.¹⁹ The majority of our participants cleaned the diaphragm and bell, which are the parts that are most likely in direct contact with patients and where microorganisms reside.²⁰

Out of the respondents, 191 (93.1%) physicians used alcohol as a cleaning method, which reflects the adherence to 44 the CDC recommendation that "stethoscopes should be cleaned with 70% ethyl alcohol or isopropyl alcohol".²¹

However, 37 (18%) of our respondents reported concerns about stethoscope damage after using alcohol for sanitization. In addition, it has been suggested that disinfection with alcohol can negatively impact the quality of the sounds and damage the rubber tube.⁸

A study conducted in the USA found that a lack of time and forgetfulness were the main causes behind not adhering to stethoscope hygiene practices.²² Another study carried out in Dammam reported that forgetfulness is the most prevalent cause of not practicing stethoscope hygiene, followed by a lack of time.²⁰ Both studies are in line with our study findings.

To facilitate adherence with stethoscope hygiene practices, one study suggested that physicians could disinfect their stethoscopes while introducing themselves to patients and while giving their final advice as a way of encouraging the practice of stethoscope hygiene.²³ During the COVID-19 (SARS-COV-2) pandemic, when our study took place, we found that some physicians 48 (23.40%) had been applying their stethoscope directly on patients' skin, and many of them 73(35.60%) shared a ward stethoscope. Notably, viruses, including COVID-19, can survive on surfaces and skin for a period of time^{18,24}. A case was reported for COVID 19 infection, raising concerns about the possibility of the transmission of the virus by stethoscopes²⁵. However, according to the health care guidelines, it is advisable to use a disposal stethoscope when examining patients with contact precautions.²⁶

There are promising technologies aiming to improve stethoscope hygiene, including antimicrobial copper- impregnated stethoscopes²⁷, disposal diaphragm covers and UV light diaphragm cases³.

However, stethoscope hygiene can be achieved by collaborating with the infection control team to educate and spread awareness among health care professionals.

CONCLUSION

In summary, this study concluded that the majority of physicians in the SMC have good stethoscope hygiene practices. Forgetfulness was the most reported barrier to practicing stethoscope hygiene, followed by a lack of time.

Collaborative efforts are needed to increase awareness of good hygiene practices for stethoscope use to reduce the burden of HAIs.

Authorship Contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential Conflict of Interest: None

Competing Interest: None

Acceptance Date: 11-01-2023

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