

## Frequency Of Awareness And Practice Of Stethoscope Hygiene With Regards To Guide Line Among Medical Students, Residents And Doctors In Karachi

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### ABSTRACT:

**Objective:** The objective of the study was to identify “implications” of guidelines provided to participants at the end of a survey for improvement in stethoscope hygiene.

**Methodology:** A cross sectional survey was conducted from January to March 2016 in which a questionnaire was designed to know the awareness of stethoscope hygiene among health care practitioners. The questionnaire was distributed to 150 consented participants, out of which 138 complete (92%) responses [49, (32%) attending physicians, 50(33%) residents and 39(26%) medical students]; comprising of 84 (61%) females and 54 (39%) males was acquired. The responses included following consulting clinics (n=30, 22%), wards (n=41, 30%), intensive care units (n=41, 30%) and acute care units (n=26, 18%). At the end of the survey practicing guidelines were discussed and hard copy given to respondents. They were then asked to tell about to the impact of these guide lines on their measures to maintain stethoscope hygiene

**Results:** It was observed that health care practioners consented to start stethoscope cleaning at the start of every clinic, 33.3% showed their intentions for educating others by verbal instructions, and 66.7% were said they will recommend akohol swab for cleaning of stethoscope.

**Conclusion:** The survey on stethoscope hygiene with practicing guidelines reflects the awareness generated in the respondents. It is further expected that they will disseminate the information and educate others to consider importance of stethoscope sanitation and practice its hygiene

**Key words:** Mediations, HAIs, Hygienic, Swab

### INTRODUCTION:

Stethoscope, one of the most important used and universally recognized tool for assessment of patients is a symbol of health care experts. This clinical and significant instrument was described to be the potential vector for spreading infections in the hospital atmosphere in various parts of the world<sup>1</sup>. It is assessed that more than 1.4 million people worldwide are suffering from hospital acquired infections (HAIs)<sup>2</sup>, have been linked to devices like surgical gloves, blood pressure cuffs, laboratory coats, electronic thermometer and stethoscopes<sup>3</sup>. Rate of HAIs

varies between 3% to 21% in numerous hospitals around the world and it tend to be as high as 39% resource-poor countries like Pakistan<sup>4</sup> Several studies have revealed that stethoscopes can carry antibiotic resistant pathogenic bacteria such as Methicillin resistant staphylococcus aureus (MRSA)<sup>5</sup> and Micrococcus luteus<sup>6</sup> that are capable of spreading bacteria to patients. Good hygiene practices can reduce the risk of infection and improve the quality of life<sup>7,8</sup> The Pakistan hygiene team is working with an aim to expand “save lives: clean your hands”, part of major global effort led by WHO to support health care workers to improve hand hygiene and to prevent from life threatening hospital acquired infection. Multi faced approach including interventions like educational programs, provision of hand hygiene facilities and promotion of hand rubs as an alternative to soap lead to an increase in compliance<sup>9,10</sup>

In addition to inappropriate hand disinfection, clinical tools such as stethoscopes can also potentiate a risk of contamination<sup>9</sup> Stethoscope should be inspected periodically for air leaks and for defective parts that need replacement<sup>11</sup>. Studies from developed countries revealed that a major proportion of health care professionals do not maintain the hygiene of stethoscope and found an association between hand washing and stethoscope cleaning<sup>11</sup> Pittet et al conducted this study to identify the obstacles on the compliance of an infection control program. They found that when health care facilitators,

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were aware, prevalent and preventive measures were taken, the HAIs decreased significantly by more than 70%<sup>12</sup>.

Previous studies revealed that there is a significant reduction in colonies and growth of bacteria while using alcohol based preparations and washing the head of stethoscopes with soap and water<sup>13</sup>. 90% ethanol is very effective in decontaminating stethoscopes<sup>14</sup>.

The aim of this study was to identify the impact of awareness generated by the survey in terms of maintenance of stethoscope hygiene. At the end of this survey of stethoscope, practicing guide lines were distributed to all the respondents

**MATERIAL & METHODS:**

A cross sectional survey was conducted from January to March 2016 in which a questionnaire was designed to know usefulness of guidelines distributed to health care practioners. The questionnaire was distributed to 150 consented participants, out of which 138 complete (92%) responses [49, (36%) attending physicians, 50 (36%) residents and 39 (28%) medical students]; comprising of 84 (61%) females and 54 (39%) males. The responses included from the following hospital areas: consulting clinics (n=30, 22%), wards (n=41, 30%), intensive care units (n=41,30%) and acute care units (n=26,18%). At the end of the survey practicing guidelines were discussed and hard copy given to respondents. They were then asked to respond to the impact of these guide lines on their measures to maintain stethoscope hygiene. Stethoscope hygiene training should be instituted in healthcare training to potentially increase compliance in the healthcare environment.

Data was entered in SPSS version 15, means and standard deviations were calculated for all the items.

**RESULTS:**

The survey concluded that frequency of stethoscope

cleaning varies among medical professionals. Only 15.95% (22/138) had maintained the hygiene of stethoscopes and only 10.87% (15/138) cleaned it after every examination. Table 1 show that greater number of females participated in the study. The response rate from residents was maximum and largest numbers of responses were obtained from wards and intensive care units. Only 5 cases (3.63%) has the practice of cleaning all parts of the stethoscope while 5 persons(3.63%) has the practice of cleaning only diaphragm and ear piece. 27 persons(19.5%) did not responded about the measure for maintaining stethoscope hygiene at all, so a huge number of medical personals are unaware about the stethoscope hygiene.

Alcohol swabs was found to be the commonest agent for sterilization of the stethoscope (51.45%) followed by ethanol (19.51%) in this study. At the end of the survey after discussing practical guide lines, 78 persons (56.53%) agreed that they will communicate with verbal instructions others while 27 (19.57%) agreed that they will practically demonstrate the technique to others.

**DISCUSSION:**

The frequent usage of stethoscope with reference to monitoring and inspection of patient has a vast effect on not only on the patients but for the practitioners as well. This is because of the fact that clinical environment is assumed to be more predisposed to transmission of infections with use of different equipments like stethoscope. Nevertheless, stethoscope asepticism is infrequently reflected or accomplished by consultants, residents and medical students<sup>15</sup>. This habit adds to bacterial contamination of stethoscope and further promotes hospital acquired infections<sup>4</sup>

This survey has highlighted the influence of strategies on awareness about stethoscope sanitization. It was found that only 4.35% consultants, residents and medical students had ever cleaned their stethoscopes at the start

Characteristics		n	%
Gender	Male	54	39.1
	Female	84	60.9
Designation	Consultant	49	35.5
	Resident	50	36.2
	Medical Student	39	28.3
Place of collection	Consulting clinic	30	21.7
	Wards	41	29.7
	Intensive Care Unit	41	29.7
	Acute Care Unit	26	18.8

Table 1: Distribution of respondents from different hospital settings

Questions Asked		Total n (%)
Measures taken for maintenance of stethoscope hygiene	Clean stethoscope at the start of every clinic	
	Cleaning of ear piece	6(4.35)
	No response	27(19.57)
	Disinfection with swab once	12(8.70)
	Use alcohol swab more than once	6(4.35)
	I will maintain hygiene of stethoscope	22(15.95)
	Using sanitizer	6(4.35)
	Regular cleaning	6(4.35)
	Cleaning stethoscope at the end of the day	16(11.6)
	Cleaning it after every examination	15(10.87)
	Cleaning diaphragm and ear pieces	5(3.63)
	Cleaning the entire stethoscope	5(3.63)
Education about hygiene by:	Verbal instructions	78(56.53)
	Practical demonstrations	27(19.57)
	No response	6(4.35)
	Both verbal and practical demonstrations	22(15.95)
	Verbal instructions and role modeling	5(3.63)
Types of disinfectant to be used	Alcohol swab	71(51.45)
	Purell	6(4.35)
	Ethyl Alcohol	27(19.57)
	Practically cleaning my own stethoscope	6(4.35)
	Hand sanitizer	6(4.35)
	No response	11(7.98)
	Various disinfectants available	6(4.35)
	soap, washing material and ethyl alcohol	5(3.63)

Table 2: Response of questionnaire

of every auscultation which is supported by other groups<sup>16, 17</sup>. We have observed that health care professionals who practiced cleaning, had least contamination. The habit can be inculcated only when users know the significance of stethoscope hygiene as well as follow their role models<sup>18</sup> a strong management would thus play a pivotal role in influencing the attitude of coming generations for prevention of infection<sup>16, 19</sup>.

Proper use of stethoscopes is an essential part of clinical practice, however it appears that instrument care has not been usually addressed<sup>20</sup> One hundred thirty eight study respondents (84 females & 54 males) expressed the strongest negative attitude for the practice of stethoscope hygiene<sup>21</sup>. Cleaning of stethoscopes on regular basis has been shown to decrease bacterial contamination by 94% in studies done in department of microbiology at hammer smith hospital, UK<sup>22,23</sup>. There are studies in which education about stethoscope hygiene is provided by reminder flyers to house staff, medical students as well as attending physicians<sup>24,25</sup>. It is expected that circumstances inhibiting stethoscope cleaning will be identified from our study and used for targeted interventions to

improve cleanliness in the clinical environment.

#### CONCLUSION:

The survey on stethoscope hygiene with practicing guide lines reflects the awareness generated in the respondents. It is further expected that they will disseminate the information and educate others to consider importance of stethoscope sanitation and practice its hygiene. We further recommend visual reminders in all clinical settings to reinforce the concept till the time; it becomes a well-established practice.

#### REFERENCE:

1. Zuliani Maluf M.E., Maldonado F.A., Bercial M.E., Pedrosa S.A. Stethoscope: a Friend or an Enemy? Sao Paulo Medical Journal. 2002; 120(1): 13-5 <http://dx.doi.org/10.1590/S1516-31802002000100004>
2. Vincent J.L. Nosocomial Infections in Adult Intensive Care Units. Lancet. 2003; 361(9374): 2068-77. [https://doi.org/10.1016/S0140-6736\(03\)13644-6](https://doi.org/10.1016/S0140-6736(03)13644-6)
3. PatentStorm. US Patent Issued in 2004. "Disposable Cover for Stethoscope Head." Retrieved June 15, 2008. <http://www.freepatentsonline.com/5747751.html>
4. Rizvi MF, Hasan Y, Abdullah M, Rizvi MF, Saleem S, et al.

- Pattern of nosocomial infection in two intensive care units of a tertiary care hospital in Karachi. *J Coll Physicians Surg Pak.* 2007; 17: 136-9.
5. Nunez S, Moreno A, Green K, Villar J. The stethoscope in the emergency department: A vector of infection? *Epidemiol Infect.* 2000; 124(2):233-237
  6. Kocur M, Kloos WE, Schleifer KH. (2006). The Genus *Micrococcus*. In Dworkin M, Falkow S, Rosenberg E, Stackebrandt E. Eds(3rd edition), *The Prokaryotes*; Springer, New york pp. 961-971
  7. Merchant AT, Jones C, Kiure A, Kupka R, Fitzmaurice G, et al. Water and sanitation associated with improved child growth. *Eur J Clin Nutr.*2003;57:1562-68
  8. Wood MW, Lund RC, Stevenson KB. Bacterial contamination of stethoscopes with antimicrobial diaphragm covers. *Am J Infect Control.* 2007;35:263-266.
  9. Sjoberg S, Eriksson M. Hand disinfectant practice: the impact of an education intervention. *Open Nurs J.* 2010;4:20-4
  10. Allegranzi B, Bagheri Nejad S, Graafmans W, et al. Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *Lancet.* 2011;377:228-241
  11. Kober P, Labes H, Moller H, et al. Hygiene status of ambulances and equipment in rescue services. *Anesthesio Intensivmed Notfallmed Schmerzther.* 2001; 36(1):25-30.
  12. "Stethoscope." *How Products Are Made.* . Retrieved January 15, 2018 from [Encyclopedia.com](http://Encyclopedia.com)
  13. Jürgen L. Holleck, Naseema Merchant, Shin Lin, Shaili Gupta. Can education influence stethoscope hygiene? *Am J Infect control* 2017; 45 (7): 811-12 DOI: 10.1016/j.ajic. 2017.02. 004
  14. Pittet D, Hugonnet S, Harbarth S, Mourouga P, Sauvan V, Touveneau S, et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. *Infection Control Programme.* *Lancet.* 2000; 356(9238): 1307-12
  15. Uneke CJ, Ogbonna A, Oyibo PG, Ekuma U. Bacteriological assessments of stethoscopes used by medical students in Nigeria: implications for nosocomial infection control. *World Health Popul.* 2008;10:53-61
  16. Lecat P, Cropp E, McCord G, Haller NA. Ethanol-based cleanser versus isopropyl alcohol to decontaminate stethoscopes. *Am J Infect Control.* 2009; 37:241-243 Doi: 10.1016/j.ajic.2008.08.006
  17. Burrie N.A. Stethoscopes as vectors of infections. *Australian Medical Student Journal.* 2011,2: 32-35
  18. Nichols A, Badger B. An investigation of the division between espoused and actual practice in infection control and of the knowledge sources that may underpin this division. *Br J Infect Contr.* 2008;9(4):11-5
  19. Africa-Purino FMC, Dy EER, Coronel RF. Stethoscopes: a potential source of nosocomial infections. *Phil J Microbiol Infect Dis.* 2000;29(2):9-13
  20. Pratt R, Pellowe C, Wilson J, Loveday H, Harper P, Jones S, et al. epic2: National evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. *J Hosp Infect.* 2007;65:S1-S59
  21. Hunt D, Mohammudally A, Stone S, Dacre J. Hand hygiene behavior, attitudes, and beliefs in first year clinical medical students. *J Hosp Infect.* 2005;59(4):371-3
  22. Gaskin PRA, Owens SE, Talner NS, Sanders SP, Li JS. Clinical auscultation skills in pediatric residents. *Pediatrics.* 2000; 105:1184-7.
  23. Rehman R, Ahmed K, Ali SM, Raza A, Rana Z. Stethoscope as vector of hospital infections. *J Pak Med Assoc* 2018; 68 (2):329-330
  24. Whittington AM, Whitlow G, Hewson D, Thomas C, Brett S J. Bacterial contamination of stethoscopes on intensive care unit. *Anaesthesia.*2009; 64: 620-624
  25. SaunderC, Hryhorskyj L, SkinnerJ, Factors influencing stethoscope cleanliness among clinical students. *J Hosp infect* 2013;84:242-244

