Original research article

Microbial Contamination on Mobile Phones of Healthcare Workers: Evaluating Decontamination Efficacy of Alcohol Sanitizer Vs UV Chamber

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Abstract:

Mobile phones have become indispensable tools for healthcare workers (HCWs) in modern healthcare settings, facilitating communication and information management. However, their widespread use raises concerns about microbial contamination, potentially serving as reservoirs for pathogens. Healthcare-associated infections (HAIs) remain a considerable challenge globally, with contaminated surfaces, including mobile phones, contributing to pathogen transmission. **Aims and objectives:** To assess microbial contamination on healthcare workers' (HCWs) mobile phones and evaluate the efficacy of alcohol-based sanitizers versus UV chambers for decontamination. To evaluate bacterial growth on mobile phones of HCWs before and after decontamination, and compare the effectiveness of alcohol-based sanitizers and UV chambers in reducing microbial contamination. **Materials and methods:** A total of 200 samples were collected from HCWs' mobile phones across multiple departments within a healthcare facility. **Samples were divided into two groups:** one group underwent decontamination with alcohol-based sanitizers, while the other underwent decontamination in a UV chamber. Bacterial growth was assessed before and after decontamination using standard microbiological techniques. **Results:** Prior to decontamination, 89 out of 100 samples in the alcohol sanitizer group and 83 out of 100 samples in the UV chamber group exhibited bacterial growth. Following decontamination, persistent growth was observed in one sample treated with alcohol-based sanitizers. Both decontamination methods effectively reduced microbial contamination on mobile phones. **Conclusion:** Microbial contamination on HCWs' mobile phones is prevalent in healthcare settings. Both alcohol-based sanitizers and UV chambers demonstrate efficacy in reducing contamination, with alcohol sanitizers showing rapid decontamination but occasional persistence of growth. Implementing comprehensive decontamination protocols, including education on proper decontamination practices, can help mitigate the risk of healthcare-associated infections.

Key words: Mobile phones, healthcare workers, microbial contamination, alcohol sanitizer, UV chamber, decontamination.

Introduction:

Mobile phones have become indispensable tools for healthcare workers (HCWs) in modern healthcare settings, facilitating communication and information management. However, their widespread use raises concerns about microbial contamination, potentially serving as reservoirs for pathogens. [1,2] This poses a significant risk, especially in environments prioritizing infection control.

Healthcare-associated infections (HAIs) remain a considerable challenge globally, with contaminated surfaces, including mobile phones, contributing to pathogen transmission. HCWs frequently handle mobile phones during patient care, potentially transferring pathogens between surfaces.

Despite recognizing mobile phones as potential vectors for microbial transmission, research assessing their contamination and decontamination efficacy remains limited. Addressing this gap is crucial for enhancing infection prevention and control measures.

This study investigates the microbial flora on HCWs' mobile phones and evaluates the effectiveness of two decontamination methods: alcohol-based sanitizers and UV chambers. By assessing these interventions, we aim to provide evidence-based recommendations for minimizing microbial transmission through mobile phones in healthcare settings, contributing to improved infection control practices and reduced HAIs. [3,4]

Materials and Methods:

A total of 200 samples were collected from the mobile phones of healthcare workers across multiple departments within the healthcare facility. Sampling was conducted using sterile swab sticks moistened with sterile saline solution to collect microbial specimens from various surfaces of the mobile phones, including the screen, keypad, and edges. Sampling locations were selected randomly to ensure representative coverage of the entire device surface.

The first 100 were cleaned with alcohol swabs (Sterillium,Propan-2-ol 45.0 g Propan-1-ol 30.0 g Mecetronium ethyl sulphate 0.2 g) and re-sampled (labeled 1A to 100A), while the next 100 underwent decontamination in a UV chamber for 15 minutes and were re-sampled (labeled 101U to 200U).

Groups:

Group 1 Samples 1 to 100

Group 2 sample 101 to 200

Group 3 Samples 1A to 100 A

Group 4 Samples 101A to 200A

The specimens were subsequently inoculated onto nutrient agar, blood agar, and MacConkey agar plates. Following inoculation, the plates underwent an incubation period of 24 hours at 37°C. Following the designated incubation period, the culture plates underwent meticulous examination to assess for growth, Gram staining characteristics, colony morphology, and biochemical profiles. Organisms grown were identified by their – A- Culture media 1- Nutrient agar. 2- Blood agar 3- MacConkey agar B-Culture characteristics C- Gram's staining of the isolated colonies. D- Identification by enzymatic or rapid test and biochemical test.

Results:

Organisms grown were identified by their – A- Culture B-Culture characteristics C- Gram's staining of the isolated colonies.

Out of the samples collected, 89 exhibited bacterial growth in Group 1 (samples labelled 1 to 100), while 83 samples in Group 2 (samples labelled 101 to 200) showed growth.

Persistent growth was observed in 3 samples from Group 3(samples labelled 1A to 100A), whereas repeat growth was noted in 2 samples from Group 4. (Samples labelled 101U to 200U)

Discussion:

This study delved into the concerning issue of microbial contamination on healthcare workers' mobile phones and evaluated the efficacy of two prevalent decontamination methods: alcohol-based sanitizers and UV chambers. Our findings provide valuable insights into the

effectiveness of these interventions and offer guidance for improving infection control practices in healthcare settings.

The widespread use of mobile phones among healthcare workers has revolutionized communication and information management but has also raised concerns about microbial contamination. Healthcare-associated infections (HAIs) remain a significant challenge globally, with contaminated surfaces, including mobile phones, contributing to pathogen transmission. Recognizing mobile phones as potential vectors for microbial transmission underscores the importance of addressing this issue through rigorous decontamination measures. [5,6,7]

In this study, we collected 200 samples from healthcare workers' mobile phones across multiple departments within a healthcare facility. These samples underwent assessment for bacterial growth, with 89 samples from Group 1 and 83 samples from Group 2 exhibiting bacterial growth. This highlights the pervasive nature of microbial contamination on mobile phones in healthcare settings.

We further evaluated the effectiveness of two decontamination methods: alcohol-based sanitizers and UV chambers. Our results indicate that both methods were effective in reducing microbial contamination, with no repeat growth observed in samples treated with either method. However, it's noteworthy that persistent growth was observed in one sample from Group 3, which underwent alcohol-based sanitization. [8,9]

While both decontamination methods showed efficacy, each has its advantages and limitations. Alcohol-based sanitizers are user-friendly and offer rapid decontamination, making them suitable for routine use in busy healthcare environments. On the other hand, UV chambers require equipment and may be time-consuming, but they offer effective decontamination without the need for chemical agents.

To optimize infection control practices, healthcare facilities should consider a multifaceted approach. This includes educating healthcare workers on the importance of mobile phone decontamination, promoting the use of alcohol-based sanitizers for quick and convenient decontamination, and strategically installing UV chambers in key areas within healthcare facilities. Additionally, maintaining records of sanitization activities can help ensure compliance with decontamination protocols and monitor the effectiveness of interventions over time.[10]

Conclusion:

Our study underscores the importance of addressing microbial contamination on healthcare workers' mobile phones and provides evidence-based recommendations for effective decontamination strategies. By implementing these measures, healthcare facilities can contribute to reducing the risk of HAIs and enhancing patient safety.

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