MISTING TENTS/ DISINFECTION CHAMBERS

RECOMMENDATION

We recommend against the use of misting tents or disinfection chambers for preventing and controlling COVID-19 transmission. *(Very low quality of evidence; Strong recommendation)*

Consensus Issues

The strong recommendation was based on the intrinsic irritant properties of the chemicals used in disinfection. Although some health facilities have implemented misting tents, evidence was not established to show their effectiveness to prevent and control COVID-19 transmission. Likewise, it was noted that aerosols are not actually recommended because the contact time is not enough to kill the microorganism.

EVIDENCE SUMMARY

Are misting tents or disinfection chambers effective in preventing and controlling COVID-19 infections?

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Key Findings

There are no existing or ongoing studies investigating the effectiveness and safety of sanitation tents for preventing and/or controlling COVID-19 infections. Indirect evidence from a rapid systematic review of 6 laboratory studies and 1 in-vitro case control study showed effective viral inactivation after application of various cleaning products. However, disinfecting substances pose significant health risks, especially when used outside their manufacturer's recommendation or with repeated, prolonged exposure.

Introduction

Disinfection chambers or misting tents became widely popular in the Philippines and other countries during the second quarter of 2020. Disinfectant chambers commonly use chloroxylenol, benzalkonium chloride and chlorine-based chemicals [3]. Mists are sprayed on a person for 20-30 seconds using the recommended disinfectant, usually diluted household bleach [2].

Although these are currently used as methods to minimize the spread of the virus and avoid cross-infection inside workplaces, a rapid review (April 2020) found no evidence regarding the efficacy of these strategies for COVID-19 prevention and control [1]. At the time there were no completed

studies on the topic and most commonly used agents were household bleach, alcohol and povidone iodine, all of which were potential irritants to skin and mucous membranes. This review aims to determine current evidence regarding the benefits and harms of these environmental interventions.

Review Methods

A comprehensive literature search of various electronic databases as of 09 Feb 2021 in the following search engines and databases for clinical trials: PubMed, Google Scholar, Cochrane CENTRAL, pre-print databases such as Chinaxiv.org, medrxiv and biorxiv.org, trial registries of EU, Canada, IISRCTN, China, ANZ, Brazil, Germany, Japan, Korea, India, the Netherlands and Pan Africa. We also checked for recommendations and evidence summaries from the USPSTF, NICE, WHO, EU, Canadian Preventive Task Force, Australia and Covid-19 Open Living Evidence Synthesis site. Search terms included misting tents, sanitation booths, disinfecting tunnels or chambers, fog chambers, or disinfectant sprays.

Results

No direct evidence was found assessing the effectiveness of misting tents for COVID-19 prevention or control after. Indirect evidence from a rapid systematic review [6] of 6 laboratory studies and 1 in-vitro case control study, showed effective viral inactivation after application of various cleaning products such as chlorine-based disinfectants, alcohol, detergents, glutaraldehyde, iodine-containing detergents, hydrogen peroxide compounds and household bleaches, with alcohol showing immediate activity [6].

This review only assessed the efficacy of these cleaning products when applied on surfaces and not as misting agents or sprays. There was no evidence that spraying can prevent an infected person's ability to infect another person. The mists can also irritate the nasal passage and causing an infected person to sneeze and potentially spread the virus [2,3].

When used outside its manufacturer's recommendation, adverse reactions may be encountered. The aerosolized particles may find its way into the mucosal lining of the respiratory tract, exposed skin, and the cornea. Chlorinated compounds, alcohol and hydrogen peroxide can cause immediate danger to health or life at 10ppm, 2000 ppm and 75 ppm, respectively. The most common symptoms include irritation of the eyes, nose, throat, respiratory tract and skin hypersensitivity (Appendix 1, Table 1). Repeated and increased duration of exposure further magnify the potential hazards [3,4,5]. One news article reported the death of one doctor following an accidental inhalation of disinfectant [14].

No ongoing studies or clinical trials were found in the different trial registries searched.

Recommendations from Other groups

Local and international health agencies currently do not support the use of misting tents or disinfecting chambers. WHO recommends against the use of these interventions under any circumstances, citing physical and psychological harm such as skin and eye irritation, bronchospasm due to inhalation, and gastro-intestinal effects like nausea and vomiting [8].

The Department of Health (DOH) guidelines echoes the WHO recommendation to avoid using misting tents and spraying for lack of evidence of its efficacy. This recommendation has remained unchanged since it was published last 10 April 2020 [1].

The CDC has maintained its position on using disinfectants only based on the manufacturer's recommendation of its preparation and use on surfaces. It has provided a list of approved disinfectants with the proper dilution and use [9].

The USPSTF, NICE and Canadian Preventive Task Force do not have any recommendations for the use of sanitation or disinfection tents/chambers.

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Appendix 1. Summary of Findings

Table 1. Comparison of commonly used chemicals in disinfecting chambers (Philippines)

Table adapted from:
OSHA, Occupational Safety and Health Administration
a ACGIH TLVs and BEIs for Chemical Substances and Physical Agents.
NIOSH Pocket Guide to Chemical Hazards, Department of Health and Human Services (CDC and NIOSH).
https://www.fishersci.com/store/msds?partNumber=AC263820010&productDescription=BENZALKONIUMCHLORIDE%2C+50+1LT&vendorId=VN00032119 &countryCode=US&language=en.
dhttps://pubchem.ncbi.nlm.nih.gov/compound/Chloroxylenol#section=Acute-Effects
https://www.carbosynth.com/80257AD2003D1CDB/0/D3F37CDD1DED695780257AD30044A18E/$file/MSDS+-+FP16108+-+SDS148723.pdf.

Comparison of commonly used chemical in disinfecting chambers.(*a-e*)							
CHEMICAL	FLASH POINT (°C)	Immediately Dangerous To Health or Life (ppm)	Permissible Exposure limit (ppm)*	OSHA Short term exposure limit (ppm)**	Reactivities	HEALTH CONCERNS - symptoms	TARGET ORGANS
Isopropyl alcohol	10°C	2000 ppm (10% (LEL	400 ppm (980 mg/m3)	400 ppm	Strong oxidizer	Irritation of eyes, nose, throat, upper respiratory tract, Drowsiness, dizziness, headache, Dry skin	
Chlorine (includes Na hypochlorite)	Non-flammable	10 ppm	1ppm (3 mg/m3)	1 ppm	Strong oxidizer, Explosive with turpentine, fuel, ammonia	Burning of eyes, nose, mouth. Lacrimation and rhinorrhea, Cough and choking, Nausea, vomiting, headache, dizziness, Pulmonary edema, pneumonia	Eyes, Skin, Respiratory system
Hydrogen peroxide	Non-combustible	75 ppm	1 ppm (1.4 mg/m3)	Not available	powerful Oxidizer with selective metals	Irritation of eye, nose, throat,, Corneal ulcers,, Skin damage and bleaching of hair	
Chloroxylenol	Potentially flammable	no limit	no limit	no limit	Stable under normal conditions	Irritation and corrosion of skin and eyes, Skin hypersensitivity	Eyes, Skin, Respiratory system
Benzalkonium chloride	Flammable	no limit	no limit	no limit	Corrosive	Irritation of eyes, skin, mucosa, Skin Hypersensitivity, Respiratory irritation, Acute toxicity	Eyes, Skin, Respiratory system
Povidone Iodine	Potentially flammable	no limit	no limit	no limit	Explosive with hydrogen peroxide	Irritation of eye, nose, Contact dermatoses; Acute renal failure	Eyes, Skin, Renal system
Acetic Acid	39°C	50 ppm	10 ppm (25 mg/m3)	15 ppm	Strong oxidizer	Irritation of eyes, skin, nose, throat. Damage to skin and eyes. Discoloration of skin, Skin hypersensitivity, Dental erosion, Pharyngeal edema, chronic bronchitis	Eyes, Skin, Respiratory system