

THE EFFECTIVENESS AND SAFETY OF THE DISINFECTION TUNNEL FOR COVID-19: A NARRATIVE REVIEW

Nik Ahmad Shaiffudin¹, Nik Arif Nik Mohamed¹, Azizul Fadzli Jusoh¹, Amirsyarifuddin Amir Hussain² Radhir Sham³ Aminuddin³



¹Hospital Pengajar Universiti Sultan Zainal Abidin, 20300 Kuala Nerus, Terengganu
²Faculty of Medicine, Universiti Sultan Zainal Abidin, 20400 Kuala Terengganu, Terengganu
³Intelligent & Dynamic and System Ikhza, Jabatan Kejuruteraan Mekanikal, Malaysian Japan International Institute of Technology (MJIT), Universiti Teknologi Malaysia.



Introduction

The disinfection tunnel is designed on a concept of a small walkway where the persons are sprayed with a disinfectant. The use of a disinfection tunnel has become increasingly popular to eliminate the Covid-19 on the body particularly during the pandemic, however insufficient attention paid to its effectiveness and safety. We undertake a narrative review on the disinfection tunnel and evaluate their effectiveness and safety.

Materials and methods

The literature search was conducted in November 2020. The search focused on the period of 2015–2020 because it was during this period that coronavirus infection became a topic of concern in medical and public health practice. The objective of the review is to identify the type of disinfection tunnel and evaluate its effectiveness and safety. The primary focus of the review is therefore on the latest Covid-19 concerning the effectiveness and safety of disinfectant tunnel usage to limit its spread used by the authorities in many parts of the world.

Results

There was no specific relevant article retrieved from the scientific databases however the manual search from general search engines (Google Scholar and US Food and Drug Administration, USFDA) on the type and technical specifications of a disinfection box or chamber or tunnel or booth or partition or gate revealed a few information. Malaysian Health Technology Assessment Section (MaHTAS, 2020), Ministry of Health, summarised the specification of the available disinfectant chamber as follows:

No	Name	Technical specification
1	Mobile Disinfectant Chamber (MDC) Penang, Malaysia	<ul style="list-style-type: none"> Automatic system with sensors to activate and deactivate the disinfectant sprays
2	Virus Buster Nano Spray	<ul style="list-style-type: none"> Chamber size: 2.2m (length) x 1.2m (width) x 2.0m (height) A walk through the chamber Automatic detection (infrared) 14 nozzles to spray disinfectant
3	Disinfectant Box	<ul style="list-style-type: none"> The disinfection box/cabin is equipped with an indicator light, tower light, water tank, water pump, host pipe and limit switch
4	Sterilization chamber	<ul style="list-style-type: none"> A walk through the chamber Automatic spraying of disinfectant within 3 seconds
5	Automated Disinfection Chamber, University Technology Malaysia (UTM)	<ul style="list-style-type: none"> Motion sensor technology and fluid mechanics Portable
6	Disinfectant Tunnel Universiti Malaysia Perlis (UniMAP), Malaysia	<ul style="list-style-type: none"> Chamber size: 1.8 metre (6 ft)-wide, 2.7 metre (9 ft)- long and 2.4 metre (8 ft)-tall
7	Disinfection Tunnel Sabah Police	<ul style="list-style-type: none"> Not available
8	Automatic Disinfectant Tunnel School of Electrical and Electronic Engineering (PPKEE), Universiti Sains Malaysia (USM) Malaysia	<ul style="list-style-type: none"> A touchless temperature detector No-touch soap dispenser and a hand dryer sonar detector
9	Sanitize Chamber, (Model CVD 901)	<ul style="list-style-type: none"> Mist nozzle, plastic flexible tube High-pressure water pump Sanitize liquid 75% alcohol Motion sensor disinfectants

Table 1A. The name and technical specifications of the disinfectant tunnel in Malaysia (Adapted from MaHTAS, 2020)

No	Name	Technical specification
1	Body disinfection Chamber from Turkey named IKARUS (Havva Dereagzi, 2020).	<ul style="list-style-type: none"> An antibacterial and corrosion-resistant composite body 60-degree swivel base Fingerprint reading Self-cleaning with ultraviolet Body temperature detection with thermal camera
2	Human sanitizer Box (Product of Indonesia)	<ul style="list-style-type: none"> A walk through the chamber Fast auto spray disinfectants in 5 seconds Use chlorine and chlorine compounds as disinfectants
3	Mobile sterilization chamber (Product of Vietnam)	<ul style="list-style-type: none"> Divide into wet and dry chamber In the chamber, automatic spray fog mist at 360 degrees with infrared sensor
4	Personal sanitization box (product of India)	<ul style="list-style-type: none"> A portable walkthrough box An automatic spray of sodium chloride mist Duration of spray is 25 seconds and automatically stop
5	Personal Spray booth (Product of Thailand)	<ul style="list-style-type: none"> Footswitch operation Auto sensor operation lights Fire retardant materials Sprays 3-5 seconds pulse

Table 1B. The name and technical specifications of the disinfectant tunnel outside Malaysia (Adapted from MaHTAS, 2020)

Research on SARS-CoV and MERS-CoV revealed that coronavirus is sensitive to ultraviolet and heat e.g. exposure to 56 degrees celsius for 30 minutes will eliminate the virus. The type of disinfectant such as ether, 75% ethanol, chlorine-containing disinfectant, peracetic, and chloroform can effectively inactivate the virus but not chlorhexidine (National Health Commission & State Administration of Traditional Chinese Medicine, 2020). Therefore, the claimed effectiveness of disinfection tunnel usage largely depended on the type of disinfection.

Discussion / Conclusion

There was no evidence retrieved from the scientific databases on the effectiveness, safety, and cost-effectiveness of the disinfection box/chamber/tunnel/partition/gate to reduce transmission of Covid-19. It may lead to potential disinfectant hazards and a false sense of security. The disinfection box/chamber/tunnel/booth/partition/gate is an innovative approach that has the potential to assist in reducing the Covid-19 transmission, thus creates an opportunity for further research.

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References

1. Giulio Barbieri. *Disinfection Tunnel against the Coronavirus Pandemic: Sanitary Gate*. (n.d). Available at <https://www.giuliobarbieri.it/en/outdoor-products/retractable-tunnels-portable-carports/sanitary-gate-sanitizing-tunnel-against-the-coronavirus-pandemic#null> (Accessed on 19 July 2020)
2. Havva Dereagzi (2020). *Turkish firm pioneer's disinfection against COVID-19*. Available at <https://www.aa.com.tr/en/latest-on-coronavirus-outbreak/turkish-firm-pioneers-disinfection-against-covid-19/1776693> (Accessed on 24th September 2021)
3. "How COVID-19 Spreads". *Centers for Disease Control and Prevention (CDC)*. Updated July 2021. Available at <https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/how-covid-spreads.html> (Accessed on 24th September 2021).
4. Lokman Hakim Sulaiman. *Disinfection tunnels could offer a false sense of security*. *The Star*. Wednesday, 08 Apr 2020. Available at <https://www.thestar.com.my/opinion/letters/2020/04/08/disinfection-tunnels-could-offer-a-false-sense-of-security> (Accessed on 19th July 2020)
5. MaHTAS Covid-19 Rapid Evidence Updates 2020. *Disinfection Box / Chamber / Tunnel / Booth / Partition / Gate To Reduce Transmission Of Covid-19*. Malaysian Health Technology Assessment Section (MaHTAS), Medical Development Division, Ministry Of Health, Malaysia. Available at https://www2.moh.gov.my/moh/resources/penerbitan/mymahtas/MaHTAS%20COVID-19%20Rapid%20Evidence/Disinfectant%20And%20Sterilisation/Disinfection_Box_Chamber_Tunnel_Booth_Partition_Gate_To_Reduce_Transmission_Of_COVID-19_21052020.pdf (Accessed on 24th September 2021)
6. National Pesticide Information Center (NPIC). *Using Disinfectants to Control the COVID-19 Virus*. at Available at <http://npic.orst.edu/ingred/ptype/amicrob/covid19.pdf> (Accessed on 19th July 2020)