

The Dynamic Relationship between Sanitizers and Diseases like COVID-19

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DOI: [10.36348/sjnhc.2023.v06i07.006](https://doi.org/10.36348/sjnhc.2023.v06i07.006)

| Received: 04.06.2023 | Accepted: 08.07.2023 | Published: 14.07.2023

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Abstract

Poor sterilizing is led to transfer of so many human diseases such as dysentery, cholera, hepatitis A and cholera. In this review, the important of sanitization to the human diseases is explained and the dynamical relationship between them is illustrated. Sterilizing and hygiene are very important to defeat diseases by washing hands and using alcohol sanitizer to clean floor, stairs offices and indoors. In addition, many types of sterilizers that used to clean are introduced with their components. The risk of using alcohol a lot is discussed also it is compared with normal washing with soaps and non-alcohol materials use. Moreover, the important relation between sterilizing and recent disease such as MARS and Covid-19 is covered in details. Eventually, the antimicrobial resistance that produced from the overuse of the sanitizers is discussed with the aim of covid-19 pandemic.

Keywords: Sterilizers, Bacteria, Pathogens, Covid-19, alcohol and epidemics.

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1. INTRODUCTION

For many years, people are used to sanitizing to hygiene and clean their hands, houses and offices preventing themselves from diseases [1]. Sterilizers played very important role in defeating germs, bacteria and viruses by its components that worked on cleaning places to avoid the chance of these spores from being in the environment [2]. In addition, sterilizers became an important step in health hygiene protocols especially after Covid-19 pandemic [3]. Firstly, the World Health Organization (WHO) started to share knowledge and recommendations with countries all over the world to aware them after Covid-19 outbreak [4]. Then, WHO applied some mandatory actions toward Covid-19 pandemic including wearing masks, step away, hygiene hands and gel sanitization [5]. Thereafter, sanitization and cleaning became more important than ever because infected to Covid-19 became a matter of live or die [6].

Generally, sterilization process is referred to any kind of process that sanitizes, removes, deactivates and kills all types of spores such as bacteria, germs, fungi, Plasmodium and other biological agents on a specific surface [7]. Further, sterilization could be achieved in different shapes and forms such as high pressure, heat, filtration, irradiation and chemicals [8]. However, sterilization differs from pasteurization,

disinfection and sanitization because these process are used to reduce all kinds of biological agents while sterilization process is used to element them [9]. Therefore, the sterilized object and surface are known as sterile (or aseptic) after the sterilization process [10]. In years ago, so many people are died due to speared of diseases and epidemics without using sterilizers therefore sterilization process reduced the number of infections and then considered as one of important actions during epidemics [11].

In Iraq, one of the earliest actions towards the Covid-19 pandemic was to sanitizing and using sterilizers alongside with another actions such as shutdown, step away, using masks and other things [12]. First of all, the National Health and Safety Committee (NHSC) in Iraq decided to shutdown cities, close the borders, close Airways and quarantine the recent visitors to make sure that the Ministry of Health (MoH) can contain the situation in the country [13]. Next, the NHSC decided to shutdown cities every two weeks and held meetings to study the MoH reports of Covid- 19 to decided continue the shutdown or not [14]. Then, they decided to push people to use masks and sterilizers in the governmental buildings and streets to mitigate the situations in the country [15]. After that, the vaccines arrived to the country and the NHSC

highly recommended people to take it to prevent the hard symptoms of Covid-19 infection [16]. All of these steps were used along with the sanitization and sterilization process that forced to use at the early stages of Covid-19 pandemic [17]. Eventually, the sterilization process is very important step to face any kind of pandemic because it reduces and eliminates every kinds of germs and bacteria [18].

The rest of the review paper is organized as follows. In Section 2, different types of sterilizers are introduced. The benefits and risks of using sterilizers are illustrated in Section 3. In Section 4, a discussion with details of weather washing hands or using sterilizers is better for people to follow. The relationships between covid-19 and sterilizers are explained in Section 5. Eventually, the conclusion is presented at the end of the review paper.

2. Types of Sterilizers and their Compounds

There are so many types of sterilizers that used to element bacteria and spores. Consequently, these sterilizers have different chemical prescriptions such as alcohol based hand sterilizer which is consist of ethanol, isopropanol and 1- propanol [19]. In addition, sterilizers types that contain about 60%-90% are more effective than the others [20]. However, it is worth to mention that these kinds of sterilizers are danger and flammable [21]. Therefore, health organizations aware people when using high percentage alcohol sterilizers because it is very effective against viruses but it causes skin issues [22].

On the other hand, alcohol free sterilizers may contain triclosan or benzalkonium chloride that is used as hand sterilizer and contain 60% alcohol or permanent disinfectant [23]. Further, washing hands and using alcohol is important to eliminate many types of bacteria like TB bacteria and antibiotic-resistance [24]. Moreover, hand sterilizers that contain 90% of alcohol are very effective against viruses and germs such as cold virus, HIV, influenza virus and coronavirus [25]. Also, alcohol concentration in sterilizers are used in 70%-90% and not reached 100% because it would result an immediate surface coagulation or cell wall proteins that prevent alcohol to pass into the cell [26].

The effectiveness of the alcohol differs from one to another such as methanol and ethanol are organic compounds used in pharmaceuticals, chemical synthesis and foods, ..., etc [27]. Consequently, these compounds are becoming a health problem due to the abuse of ethanol which is containing beverages and methanol that is unfit and highly toxic for consumption [28]. Moreover, there is ethyl alcohol which is used as psychoactive agent and averaging 9.67 liters/capita in Poland in 2013 also averaging 7-10 grams/hour of its biotransformation rate for adults [29].

In addition, researches were explained the effects of ethanol on human body and how it affects the progression of diseases such as cardiovascular diseases, senile dementia and osteoporosis. Furthermore, researchers were paid people attention to the possibility of usage of the ethyl alcohol that results a reduction in the mortality rate. However, the advantage influences were viewed only through a moderate and slight consumption [30]. Also, ethyl alcohol is the most commonly used psychoactive agent and take many doses of alcohol may cause accidents such as car accidents and criminals. The purpose behind this thesis is an attempt to answer the question, the relationship of alcohol as sterilizers and diseases with the aim of its benefits? Also, the importance of this topic comes from the fact that due to the hand sanitizer being widely used in the covid-19 pandemic [31].

3. The Risks of Overuse of Sterilizers for Human Health

Recently, the increased using of hand sanitizers are caused toxicity that lead to fatal issues such as accidental ingestion, absorption through dermal contact and suicidal ingestion. For instance, ethanol's potential effects may cause a skin cancer through skin carcinogenicity and absorption is in scientific debate and investigation [32]. In addition, isopropyl alcohol sanitizer has some negative impact on human health and environment dermal contact or ingestion but with ethanol based hand sanitizer has minimum systematic toxicity [33]. However, WHO recommended to use a low concentration hydrogen peroxide for safety and human health while exposing to triclosan causes potential bacteria to become resistant to antibiotics. In addition, triclosan also impairs human immunity system and a weakened in the immunity system cause people to be more suspect to allergies [34].

Moreover, anti-bacterial products combined of two different substances that are triclocarban and triclosan which are in charge of defending against germs and bacteria. Triclosan is easy to be absorbed into the body and transmit by the bloodstream that may cause various negative effects such as neurological adverse, hormonal allergy, muscle weakness, and cancer. Triclocarban effects the hormones like testosterone and estrogen that are used to grow the prostate cancer and breast cancer [35]. However, the undue use of sterilizers also cause damage to the skin and yet may cause some cell damage; especially for people who suffer from skin diseases like allergies and eczema [36].

Nowadays, a lot of hand sterilizers are available in brightly colored bottles and appealed to smell like candy, gum or any food flavor which is very tempting to children. However, if a child licked a sanitizer to taste it, he is not going to be sick but ingesting some more than a taste may become in danger of alcohol poisoning [37]. Moreover, children and

infants are considered to be more exposing to get sick from alcohol toxicity than teenagers and adults. Furthermore, children have decreasing of glycogen stores in liver which is increasing their exposure to develop numerous pharmacokinetic and hypoglycemia factors that makes them more apt to alcohol poisoning [38].

Children are in danger throughout the increasing usage of hand sterilizers. Recent reports recognized and viewed serious concerns about children that ingested alcohol based hand sterilizers and exposed to sicknesses such as acidosis, coma, and apnea [39]. In addition, American Association of Poison Control Center (AAPCC) is reported that 7593 alcoholic hand sterilizer cases were children under the age of 12 years and it is viewed that the overuse of alcohol hand sterilizers caused antimicrobial resistance which increased the issues on the healthcare professionals [40].

4. Washing Water and Soap is Better than Sterilizers

In this section, a discussion on using soap and water or sterilizer to washing hands is made to establish the advantages and disadvantages for both of them [41]. For a longtime, washing hands with soap has been such a gold standard that is recommended by doctors. However, there are particular situations that doctor recommends to use sterilizer/sanitizer and that is in pandemics [42]. In spite of, sterilizers are been very covenant in pandemic situations but there are so many drawbacks in using them. For instance, hand sanitizer may not eliminate some common types of harmful bacteria and germs such as staphylococcus and salmonella while washing hands with soap and water maybe much more effective against them. In addition, hand sanitizers are not highly recommended for cleaning hands that are covered dirty or greasy in contrast for soap and water. Moreover, Centers for Disease Control and Prevention (CDC) is recommending for anyone to wash their hands with soap and water and using hand sanitizer in pandemic situation [43].

In 2020 during Covid-19 pandemic washing our hands and using sanitizers became front-page news and one of the WHO step to fight against the pandemic and prevent get infected [44]. They have risen it to the global consciousness of the people around the world because simply washing our hands properly can prevent so many diseases including covid-19 whether at hospital, home or in a public places. For the last 2 years, this considered as an important step to protect people from being infected and also from spreading disease by taking few seconds to lather up, wash and dry [45]. In addition, number of government, doctors and scientists advice people for the best hygiene practices and protect them from COVID-19 by using hand sanitizers. Moreover, alcohol based hand sanitizer is used to

control many microbial diseases worldwide for many decades [46]. Furthermore, it is viewed that the overuse of alcohol based hand sanitizer leads to antimicrobial resistance diseases which can put more efforts on already struggling healthcare doctors and professionals. Also, the more exposure of antibiotics, disinfectant and other genotoxic chemicals the more people get mutations by natural process that makes them resistant to survive from the overuse of the hand sanitizer [47].

5. The Relationship between Sterilizers effects and Covid-19

After coronavirus outbreak, WHO starts to recommend guidelines and apply policies on the countries. In the beginning, it starts to follow two types of strategies called suppression and mitigation strategy. Suppression means that the governments starts to shutdown malls, schools, sometimes the whole town, ..., etc. in order to control the spread of covid-19 as its applied in China [48]. On the other hand, mitigation strategy comes later by countries who affected by covid-19 economically like UK and it means to follow guidelines and policies such as step away, use hand sanitizers, wear masks, ..., etc. After that, the hand sanitizers use become important than ever as one of the policies applied by WHO to clean and element any kind of viruses including covid-19 [49].

Consequently, there are effects of using sterilizers depending on its chemical components. Recently, ethanol and methanol toxicity effects on the body that may cause a poisoning to individuals. In addition, the highly concentration of alcohol in sterilizers may develop the disease; therefore the acceptable percentage of alcohol will defeat and element viruses and germs [50]. Moreover, the impact of methanol and ethanol on the human's body is shown in reports the possibility that implication of alcohol in Alzheimer's disease and antidotal therapy for methanol poisoning. Furthermore, the role of ethanol in degenerative disorders and cancer are discussed in those reports [51]. To sum up, the relationship between sterilizers effects and disease goes ups and downs but the standards are measured by WHO and Healthcare Institutes that people should follow. Eventually, there are so many advantages of sanitizers especially in pandemic situations that makes it very important to be used to protect ourselves with a few side effects of misuse and overuse it.

CONCLUSION

It can be concluded that hand sterilizers are playing an important role in the pandemic situation. In addition, it is important to use sanitizers to hygiene and cleaning hands from germs and viruses and element them. Moreover, it is highly recommended by WHO to force people in countries to use as one of covid-19 protocol policies. Furthermore, there are many types of hand sanitizers based on its components and its chemical structure some contain ethanol others contain

methanol and so on. Also, the concentration of alcohol in those sanitizers is not arbitrary because it means that a certain percentage (60%-80%) of alcohol is used to tear the cell of those viruses and kill them but higher percentage may work conversely. Eventually, sanitizers are important in all situations maybe more in pandemic's because it is cleaning, sanitizing, protecting, ... etc. against many kinds of diseases.

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